

Provisional Use of SB Stenting for All Bifurcations

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Disclosure Statement of Financial Interest

Within the past 12 months, I have had a financial interest/arrangement or affiliation with the organization(s) listed below.

Affiliation/Financial Relationship

Minor Fees

Company

Abbott, Boston, Cordis, Edwards



Bifurcation Lesions: A problem in Daily Practice !

	ARTS II	Reality	Syntax
≥ 1 bifurcation lesion/pt	53%	52%	64%
Bifurcation lesions/lesion	22%	22%	23%

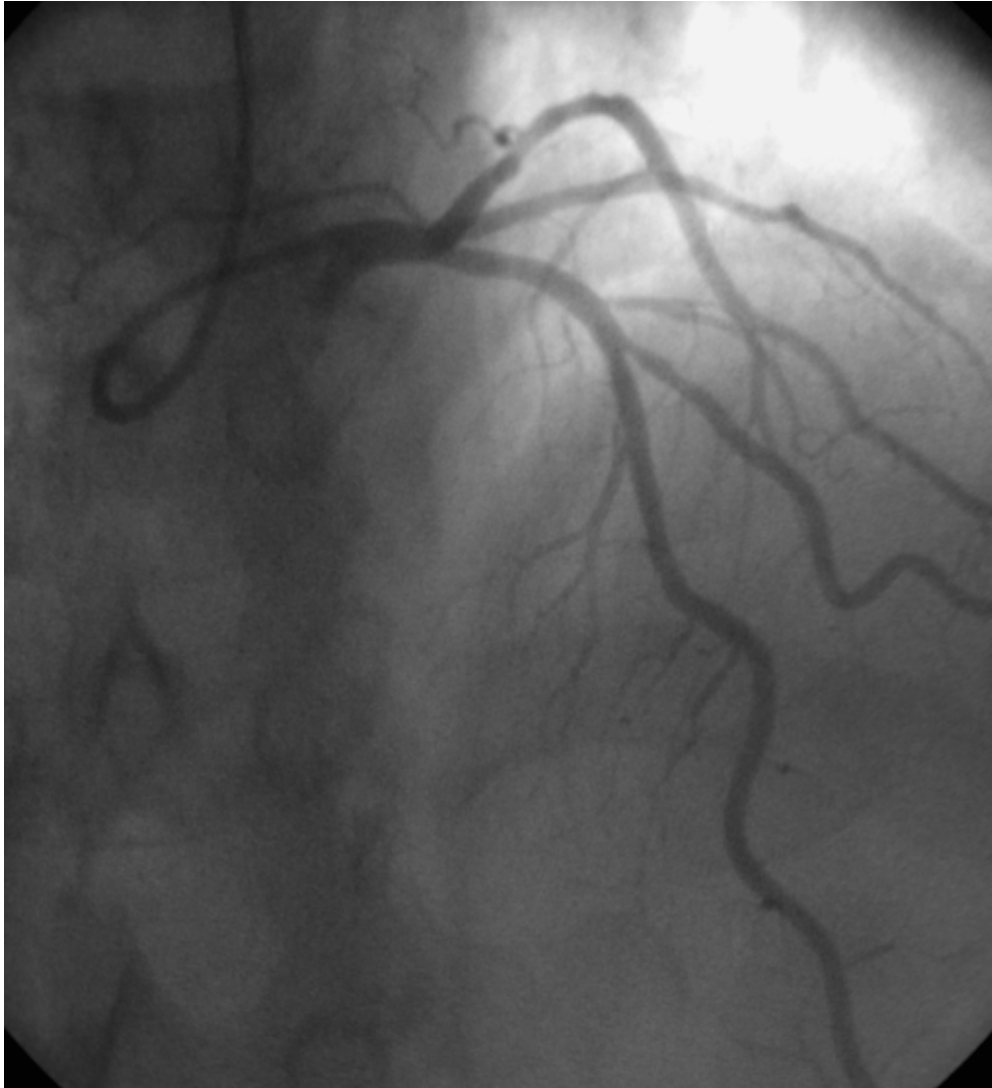
Tsuchida et al, EHJ 2007
Lefèvre et al., ECCO 2008
Serruys et al. ESC 2008

Bifurcation Lesions: A problem in Daily Practice !

- ✓ Need a standardized approach
- ✓ Simple and safe
- ✓ High rate of success
- ✓ Low rate of complications
- ✓ Good long term results

What should we know before selecting the Optimal Technique ?

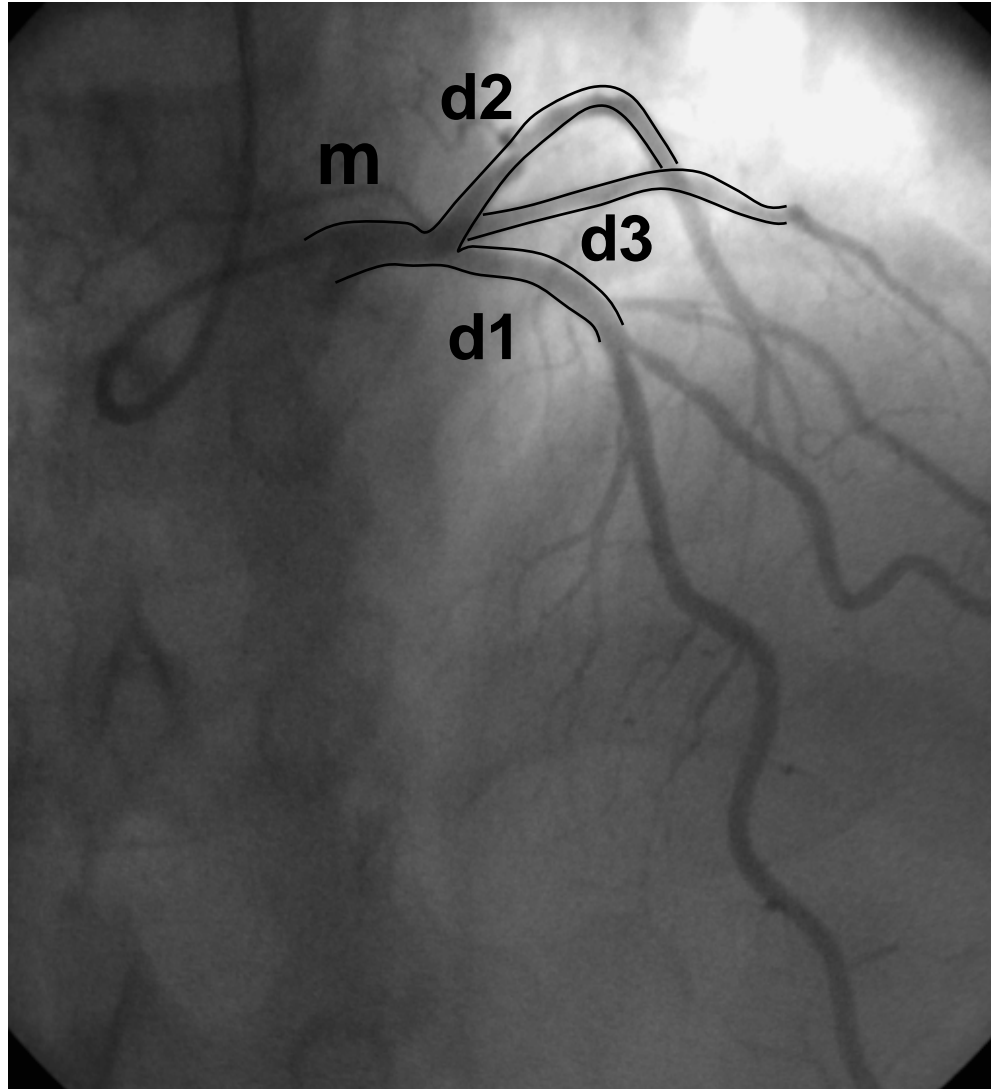
Structure-function scaling laws of vascular trees



The branching systems in the nature is characterized by a fractal mathematical law.

Kamiya and Takahashi. J Appl Physiol March 2007

Structure-function scaling laws of vascular trees

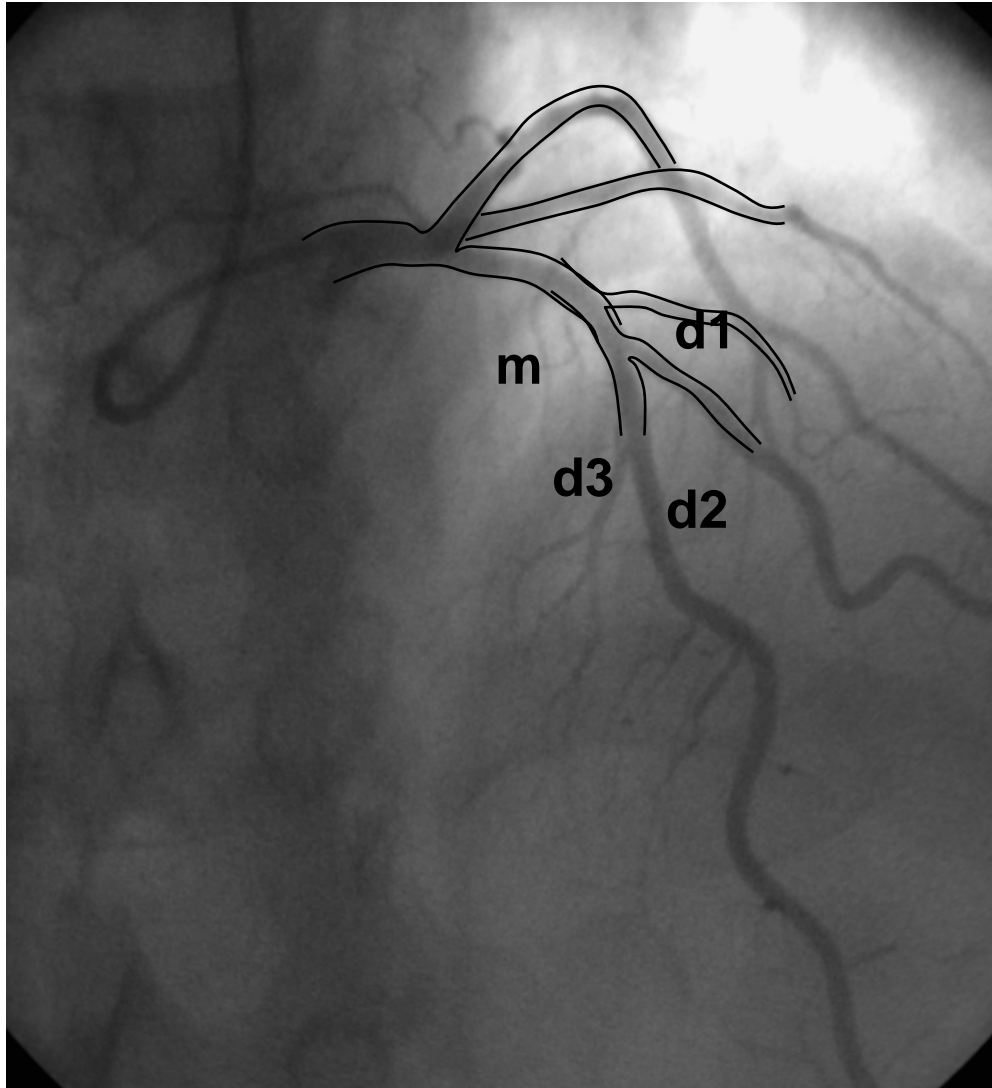


$$D_{\text{mother}}^3 = D_{\text{daughter 1}}^3 + D_{\text{daughter 2}}^3 + \dots$$

Murray's law

Murray CD. The physiological principle of minimum work. Proc Natl Acad Sci 1926

Structure-function scaling laws of vascular trees



$$D_{\text{mother}}^3 = D_{\text{daughter 1}}^3 + D_{\text{daughter 2}}^3 + \dots$$

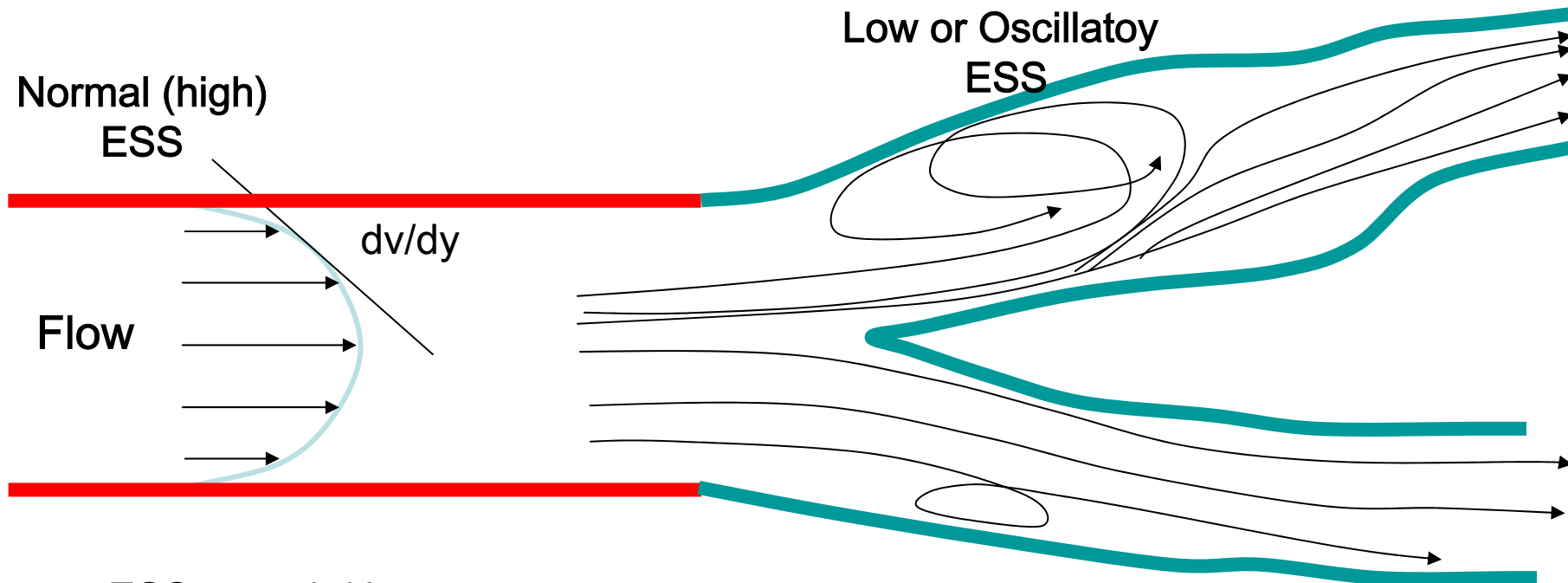
Murray's law

$$D_{\text{mother}} = 0.67^* (D_{\text{daughter 1}} + D_{\text{daughter 2}} + \dots)$$

G. Finet

Finet et al. Eurointervention 2007; 490-8

Rheology



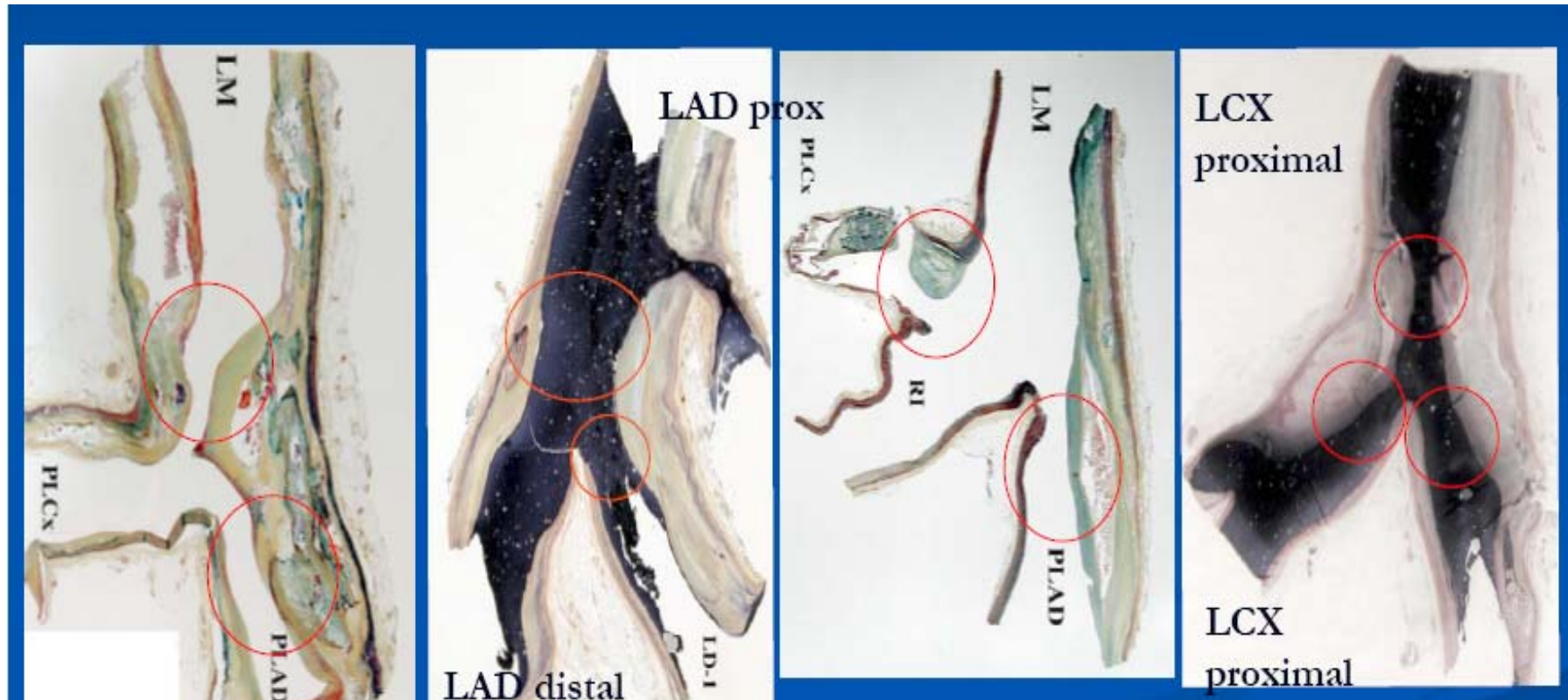
$$ESS = \mu \cdot dv/dy$$

μ = viscosity

dv/dy = spatial gradient of blood velocity at the wall

Adapted from Chatzisis et al JACC 2007

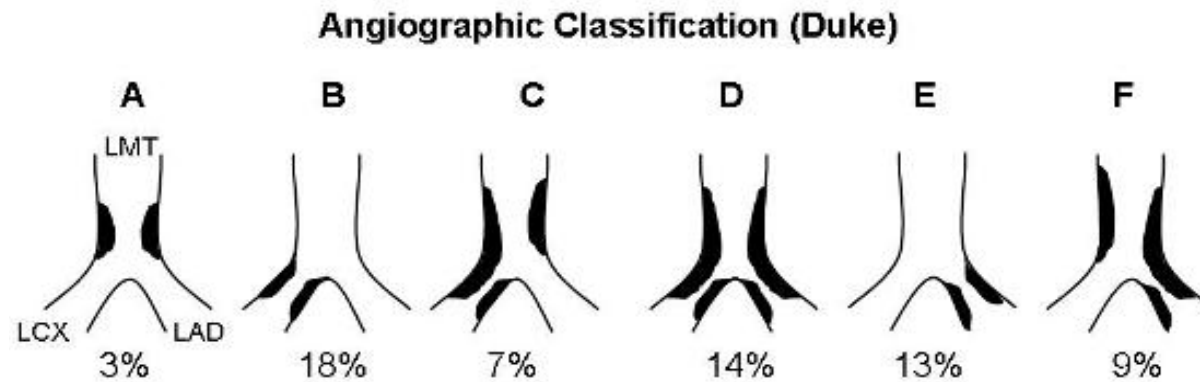
Lumen vs Plaque



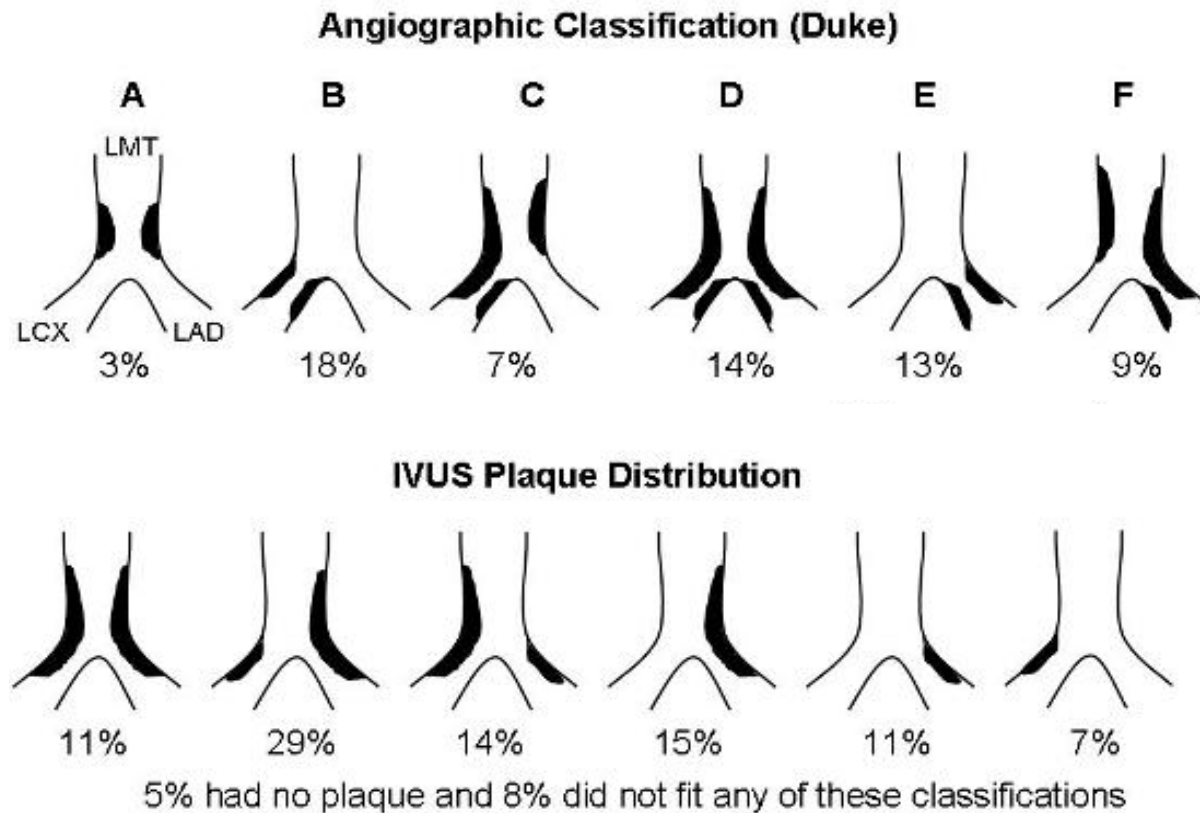
Courtesy of Renu Virmani



Lumen vs Plaque



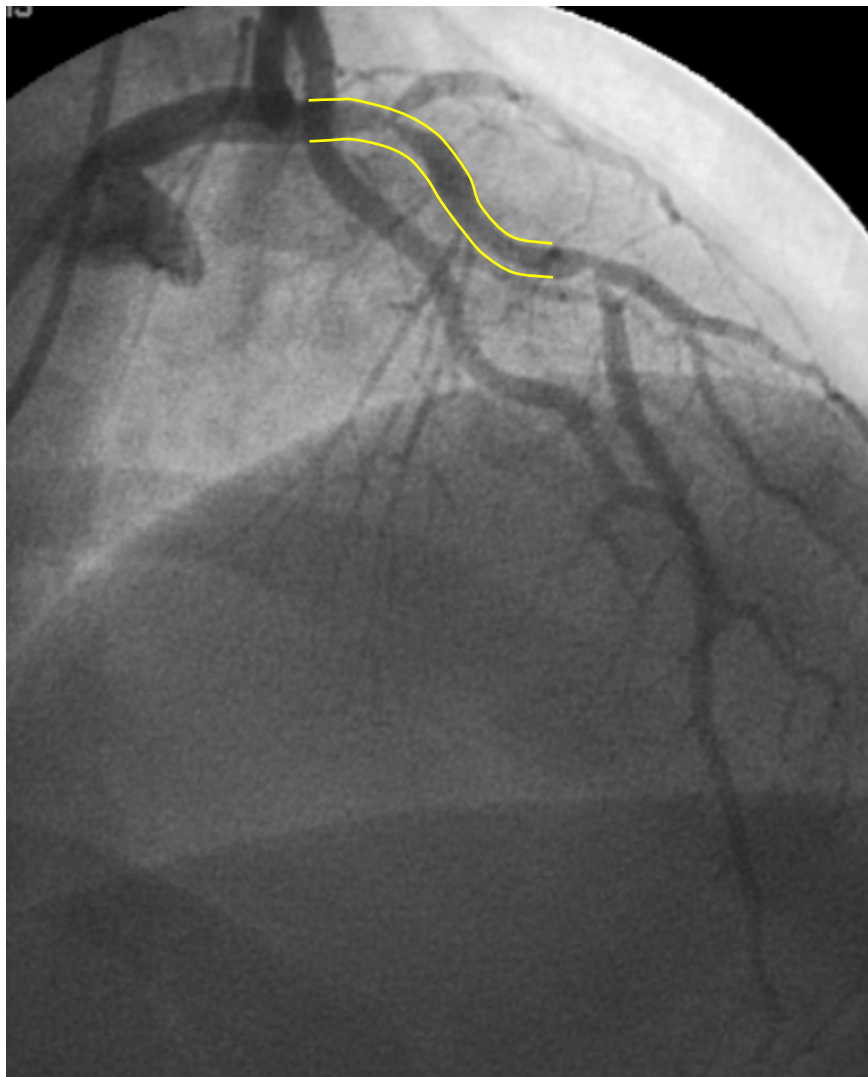
Lumen vs Plaque



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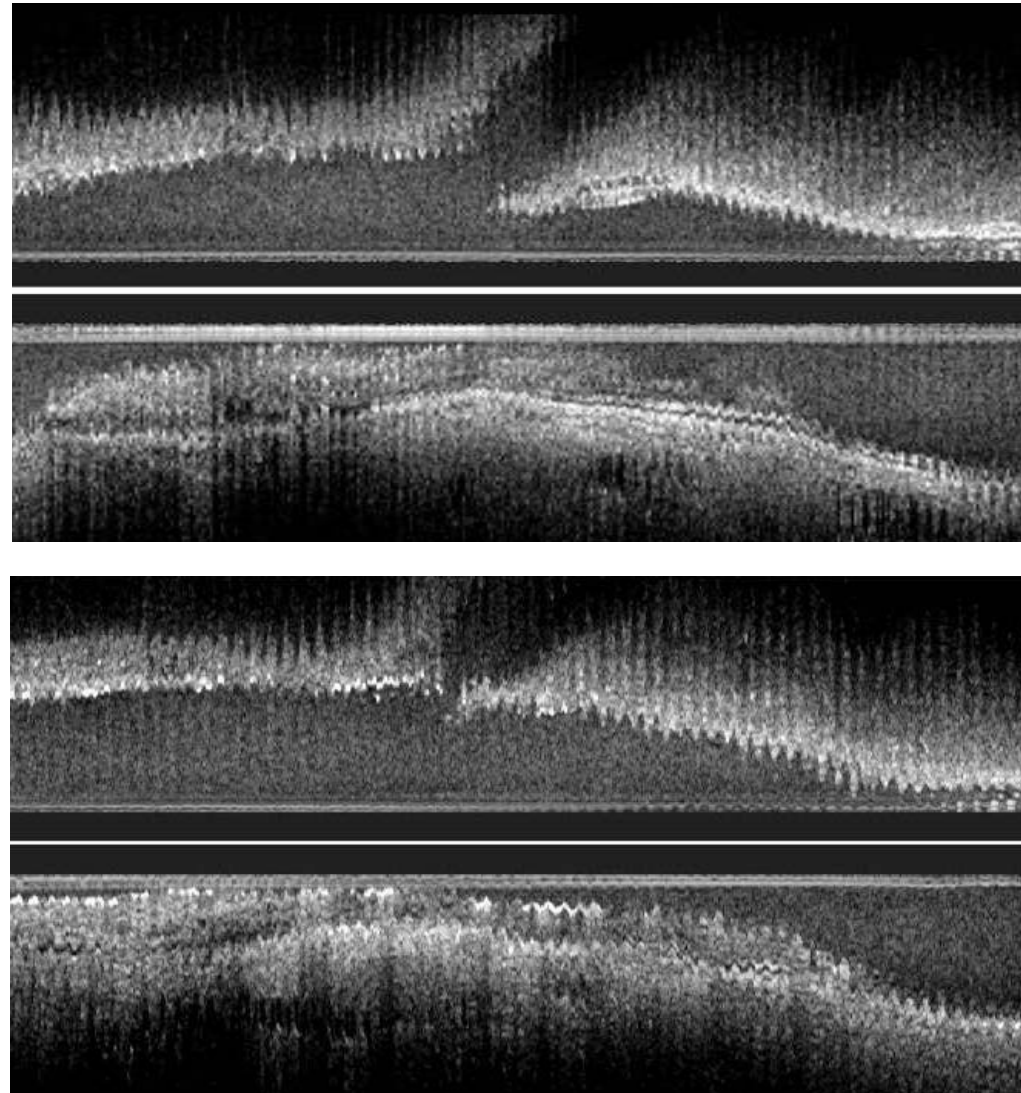
Lumen vs Plaque



~~Plaque~~ Carena Shift

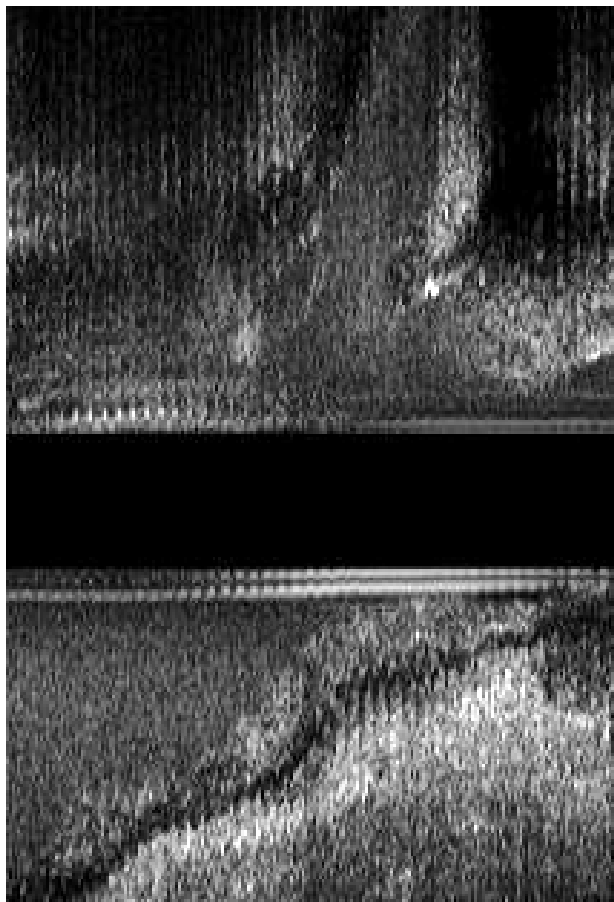


Carena Shift

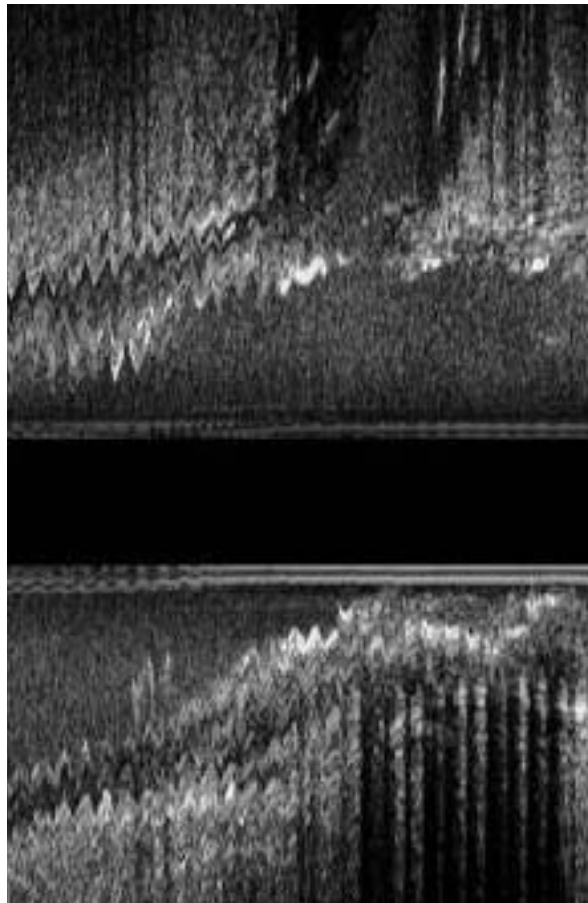


Koo et al EBC 2008

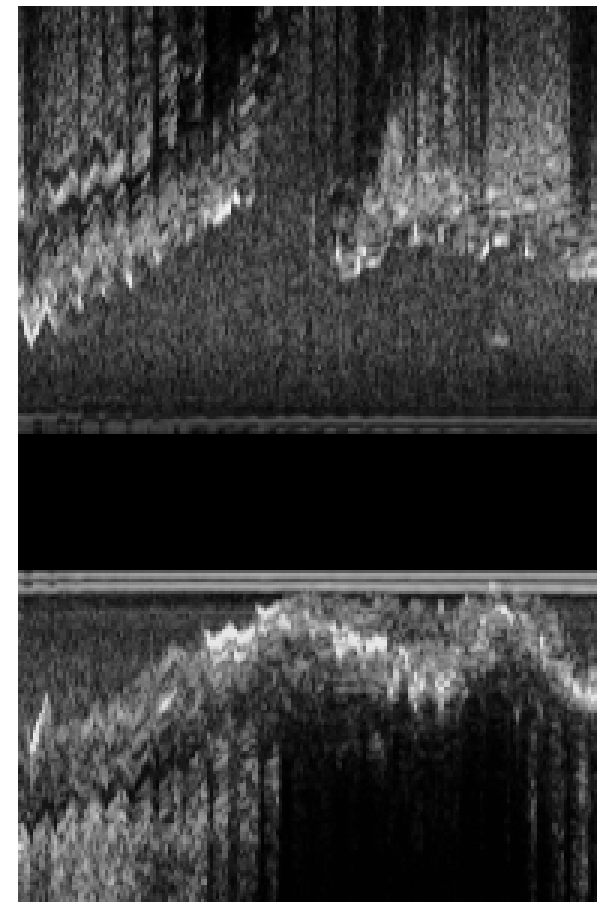
Carena Shift



Pre-intervention



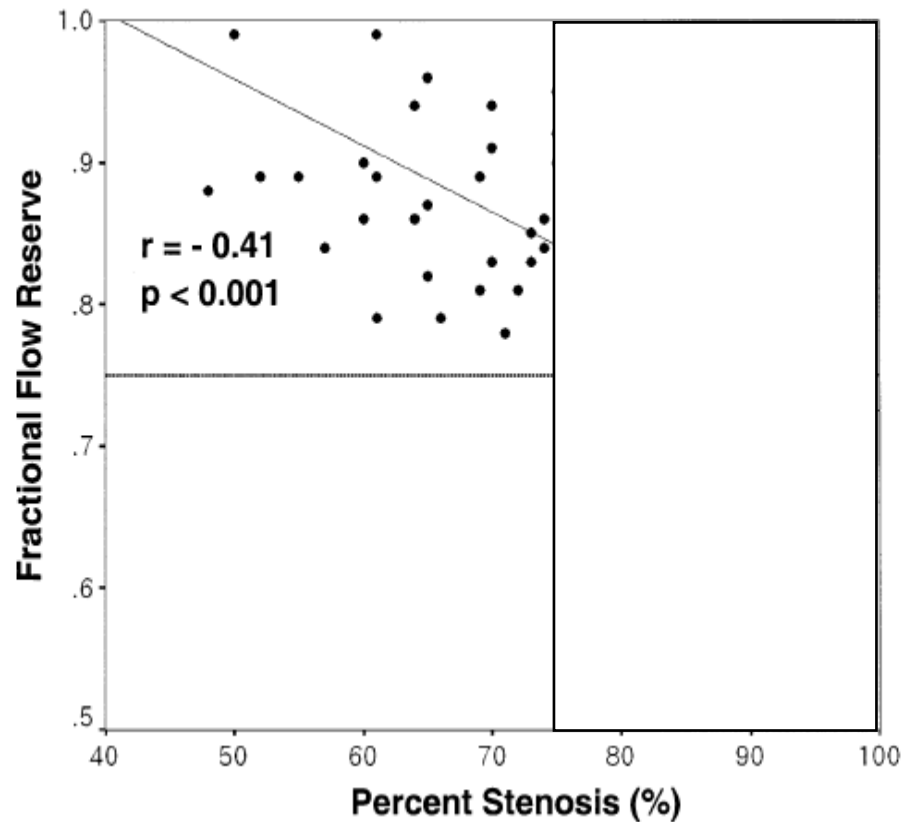
MB stenting



Kissing balloon

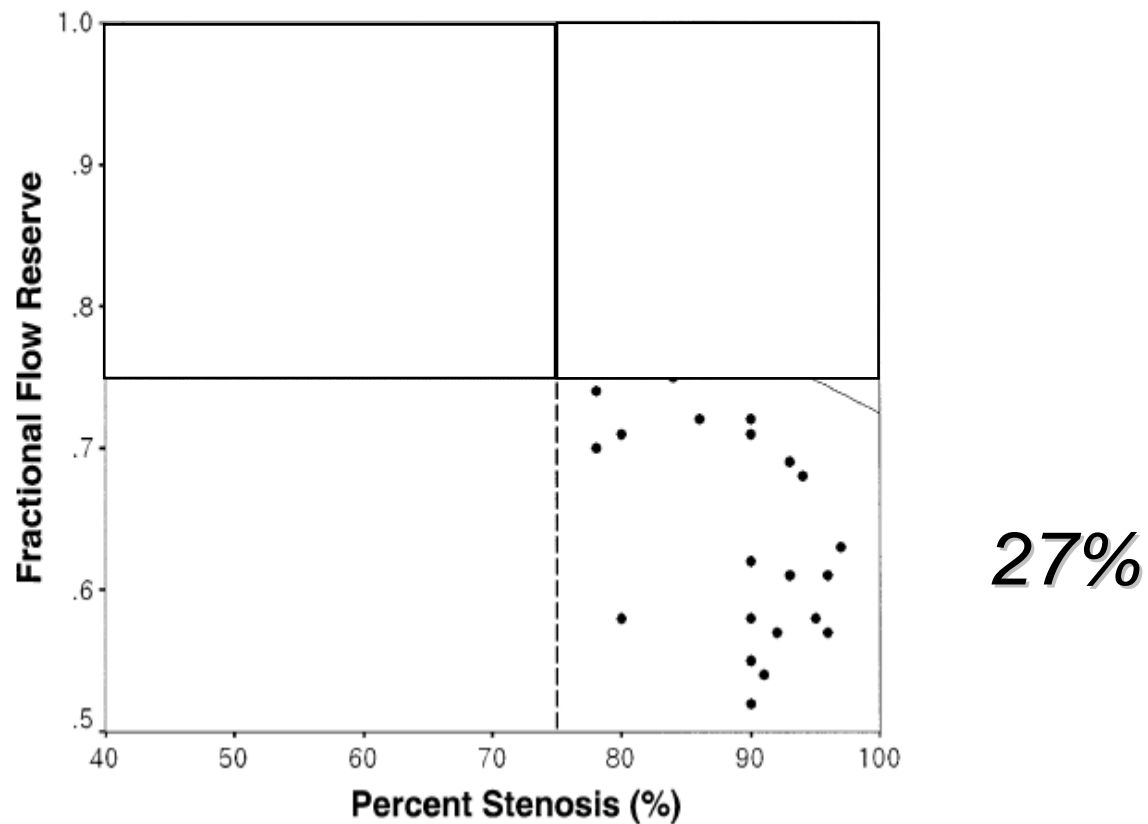
Koo et al EBC 2008

Physiology vs Angiography



Bon-Kwon Koo et al JACC 2005; 46: 633-7

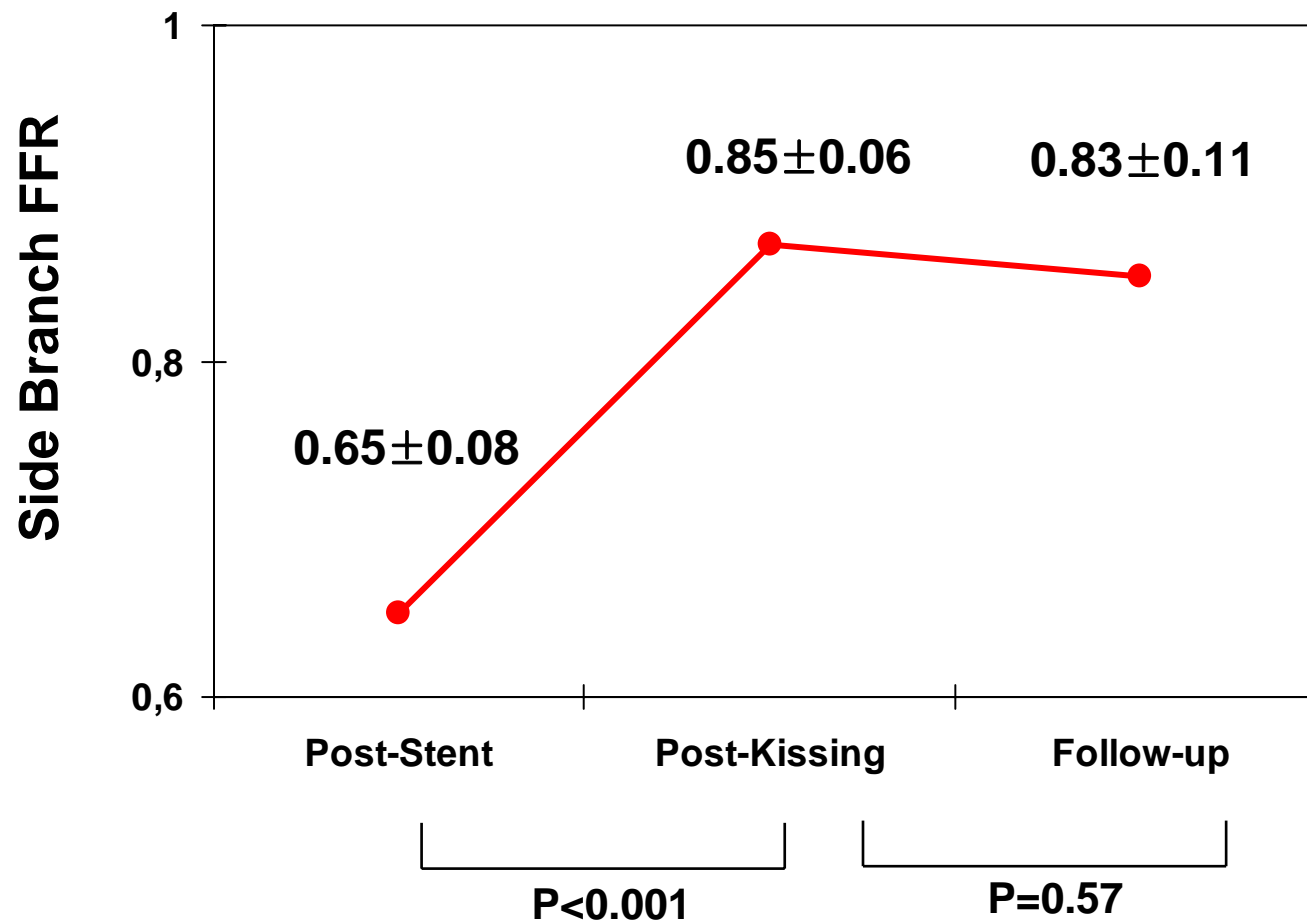
Physiology vs Angiography



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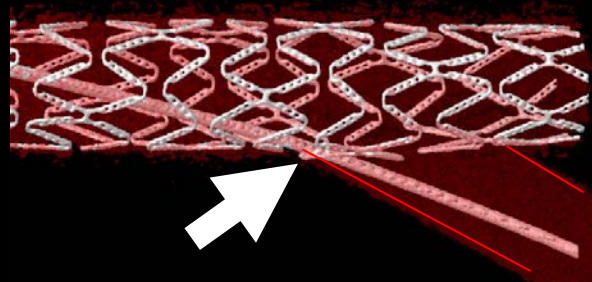
FFR after kissing balloon inflation

Side branch balloon/artery ratio: 0.9 ± 0.1

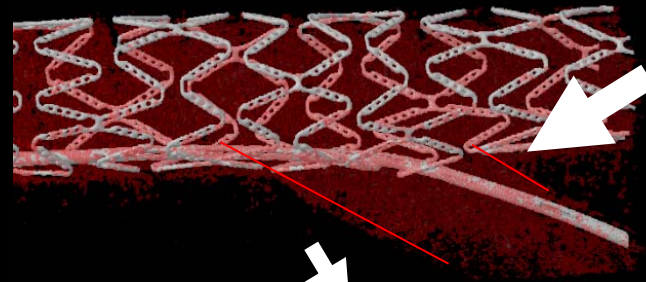


Proximal vs Distal Cross

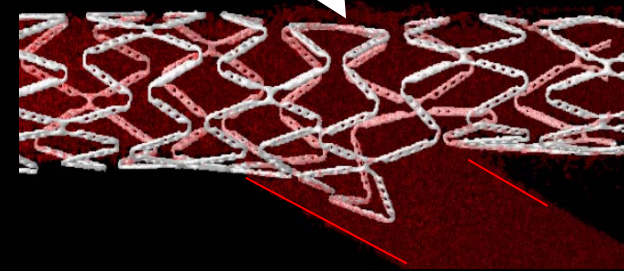
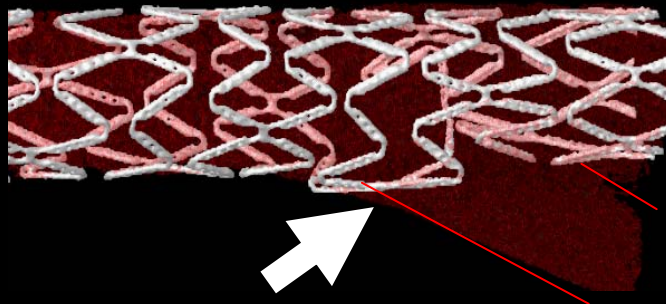
Proximal cross



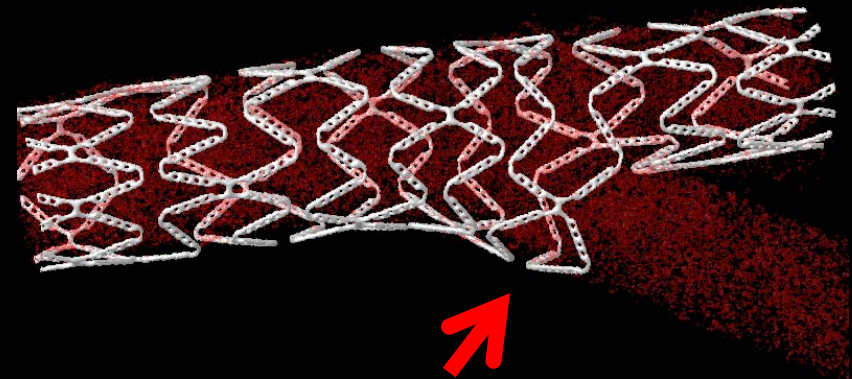
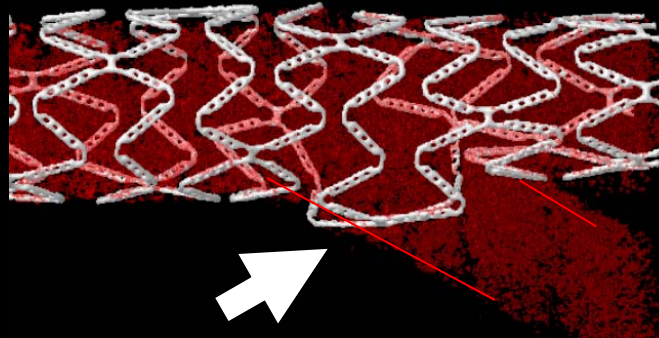
Distal cross



SB dilatation

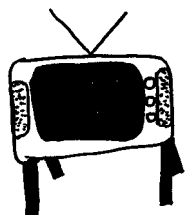


Kissing balloon



Limitation of the 2 Stents Techniques

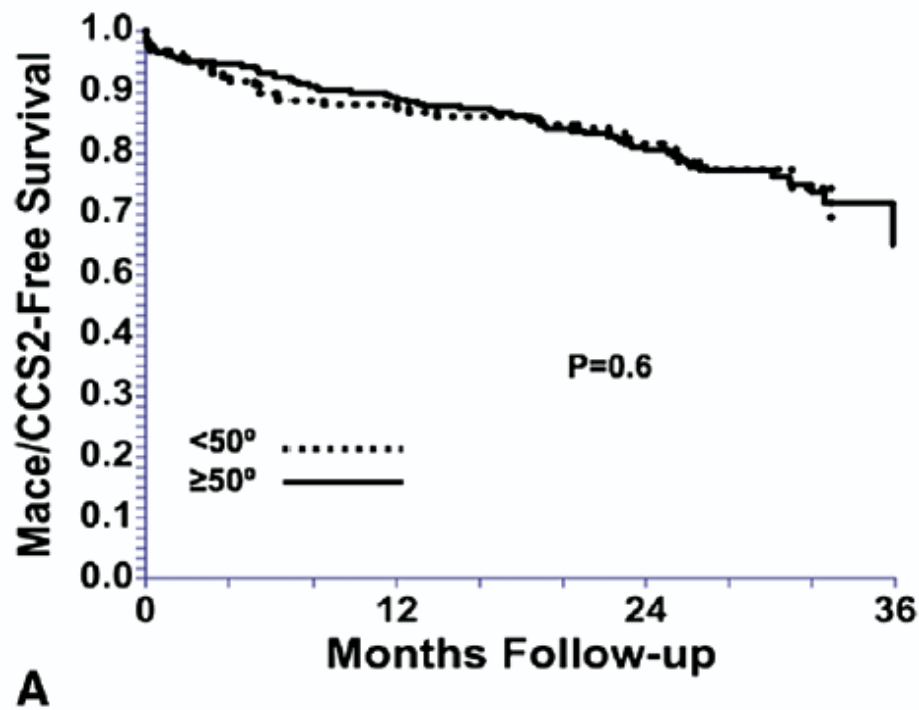
- ✓ Wire management more difficult
- ✓ Final kiss more difficult
- ✓ Overlap (delayed endothelialisation, stagnation)
- ✓ Stent not fully apposed
- ✓ Rheology not optimal
- ✓ Higher risk of MI
- ✓ Higher risk of stent fractures
- ✓ Higher risk of stent thrombosis
- ✓ Worse in T shape angulation



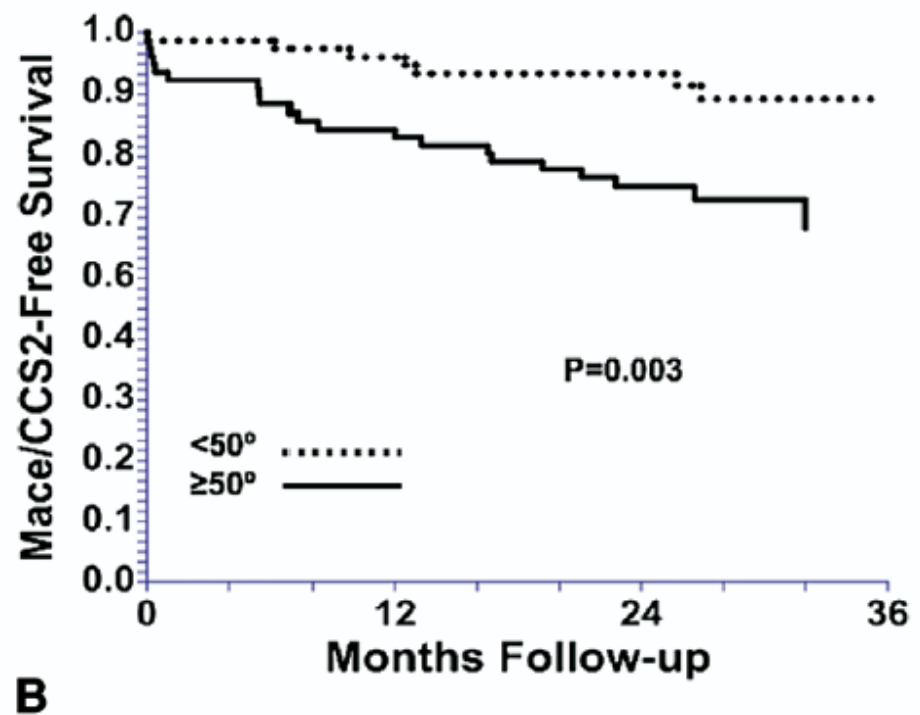
Peri-procedural MACE

	Complex	Simple	P value
Patients (n)	250	250	-
MACE (%)	7.6	2.0	0.003 RR 3.8 (1.5 to 10.0)
Death (n)	0	0	
MI (n)	18	5	
CABG (n)	2	0	

Role of the Bifurcation Angle



Main vessel stent only



Culotte or crush

Role of Kissing Balloon Inflation

CACTUS trial

Coronary Bifurcation Application of the Crush Technique Using Sirolimus-Eluting stents

	Yes	No	P value
Patients (n)	319	31	
MI (%)	7.5	29.0	<0.0001
Stent Thrombosis (%)	0,9	6,5	0.06
Restenosis MB (%)	4.7	16	0.03
Restenosis SB (%)	11.9	36	<0.001

From Flavio Airoldi, EBC IV, Prague 2008

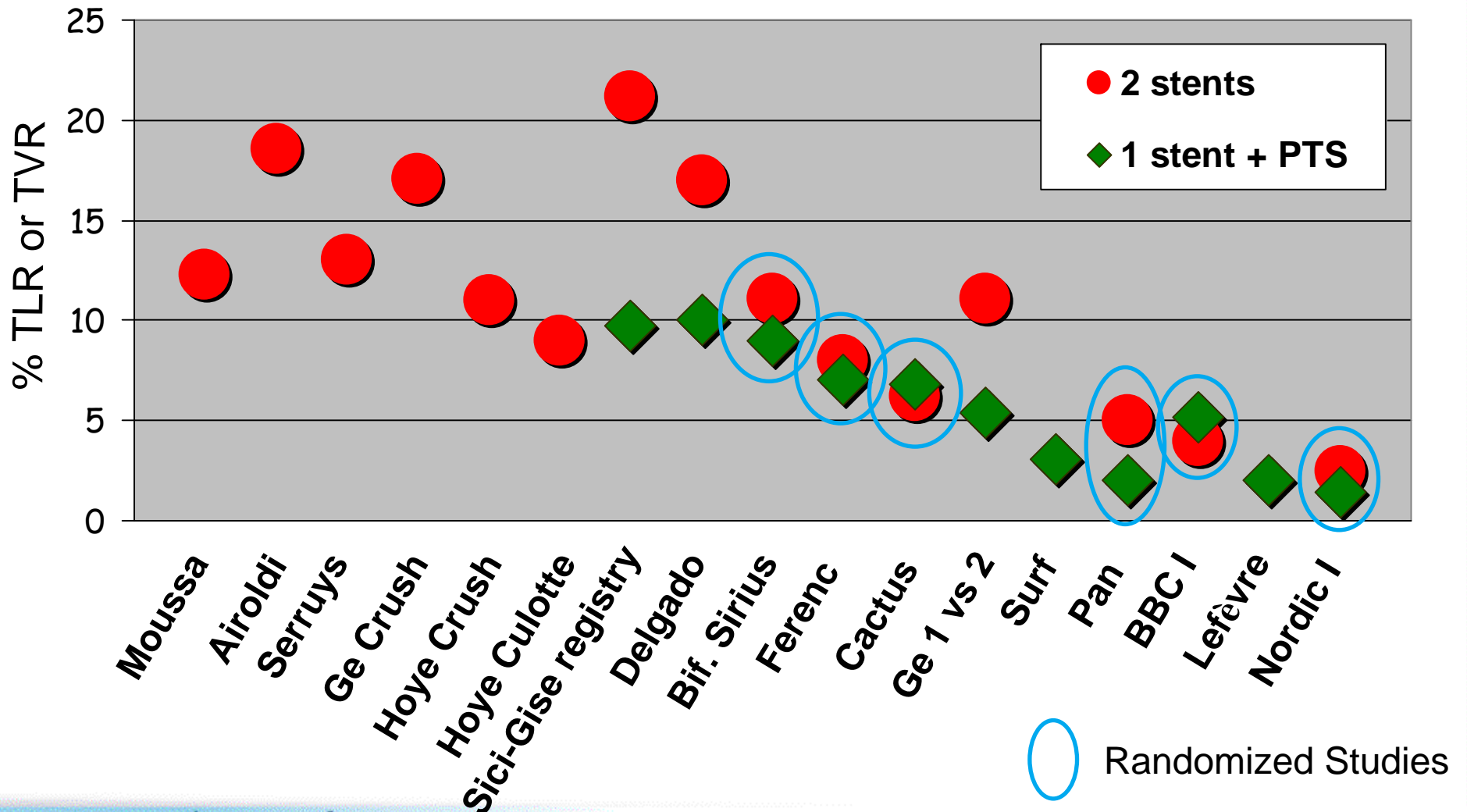
What Are the DES Data Currently Available ?

DES Efficacy:

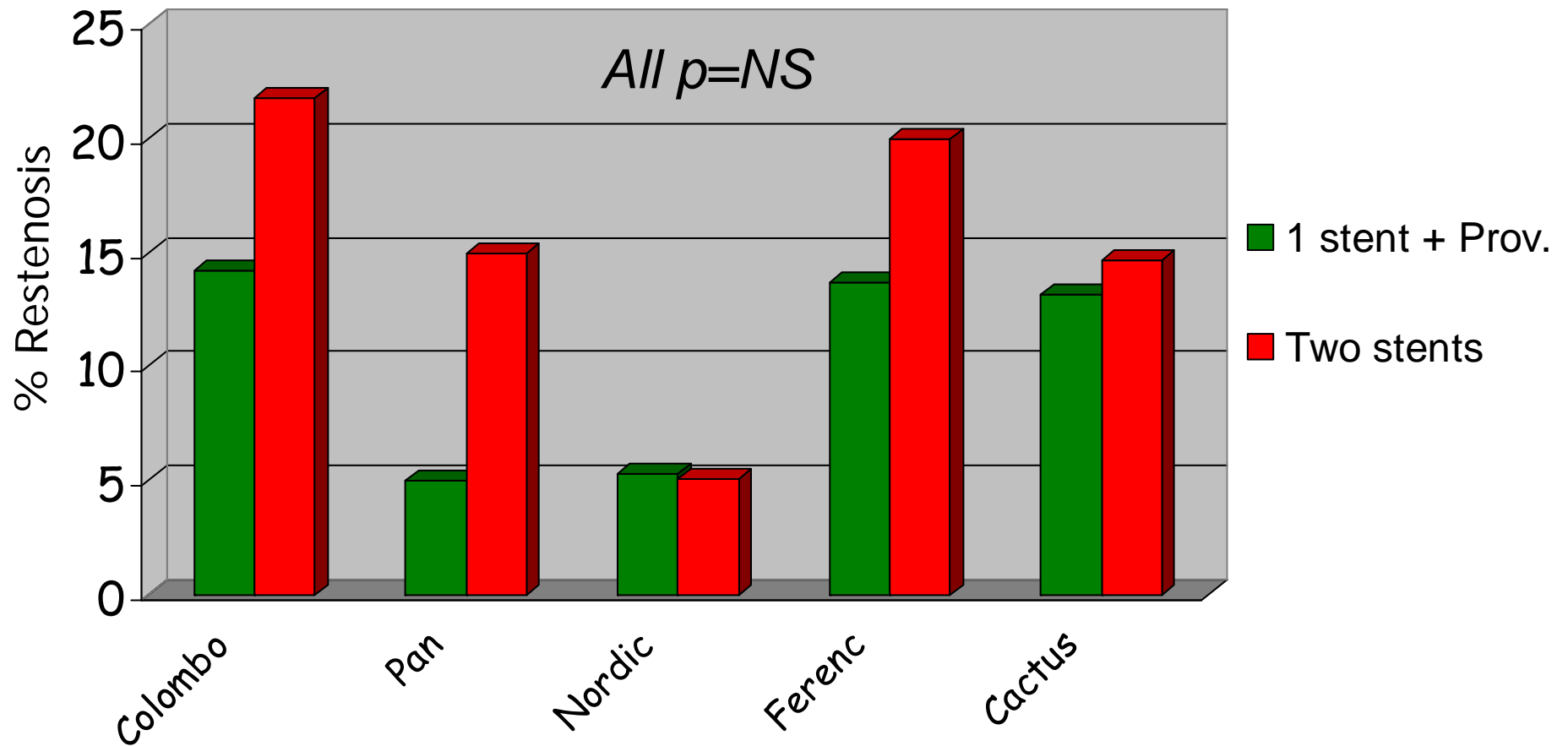
Provisional SB stenting
VS
Systematic SB stenting

6 Randomized Studies !

Low Rate of Reintervention with DES

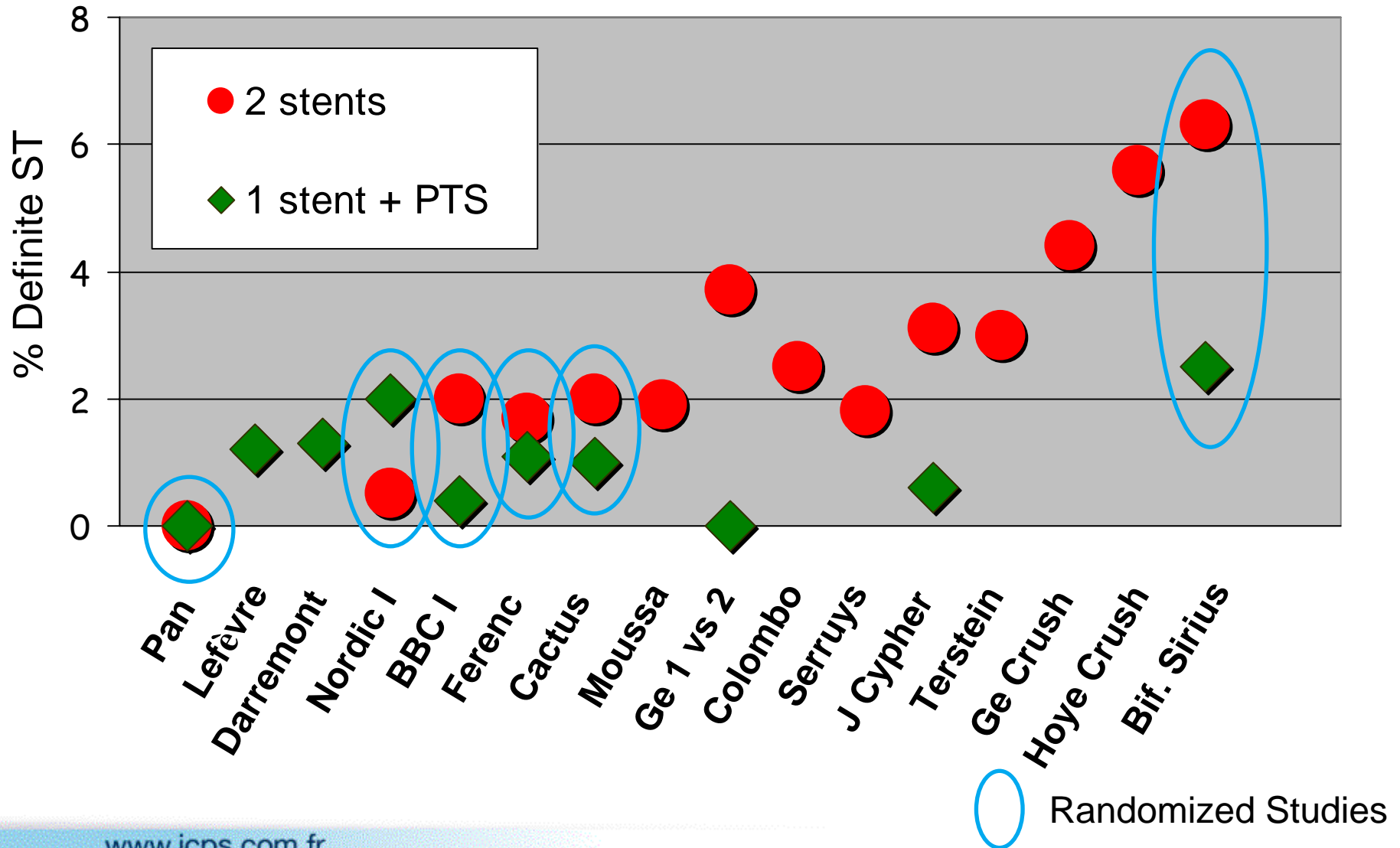


Low Rate of SB Restenosis With DES



Safety of DES in Bifucation Lesions

DES in Bifurcation Lesions: Safety



DES in Bifurcation Lesions: Safety

Predictors of Definite and probable ST Through 1 year

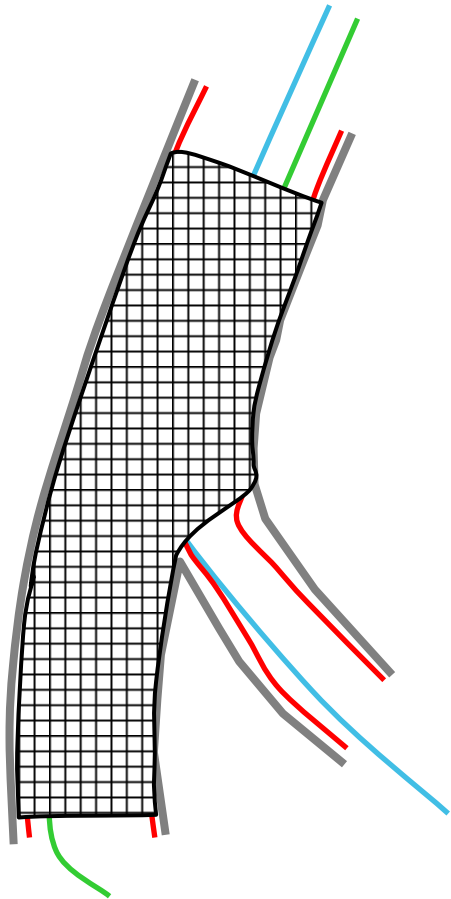
5003 lesions, one year Follow-up

Factors	OR 95% CI	P value
2 stent approach in bif.	2.05 (1.22-3.30)	0.0085
Hemodialysis	2.04 (1.22-3.16)	0.009
Emergency procedure	1.73 (0.97-2.82)	0.006

Isshiki et al. J Cypher Registry, Summit 2007

Provisional SB Stenting is Now the Gold Standard !

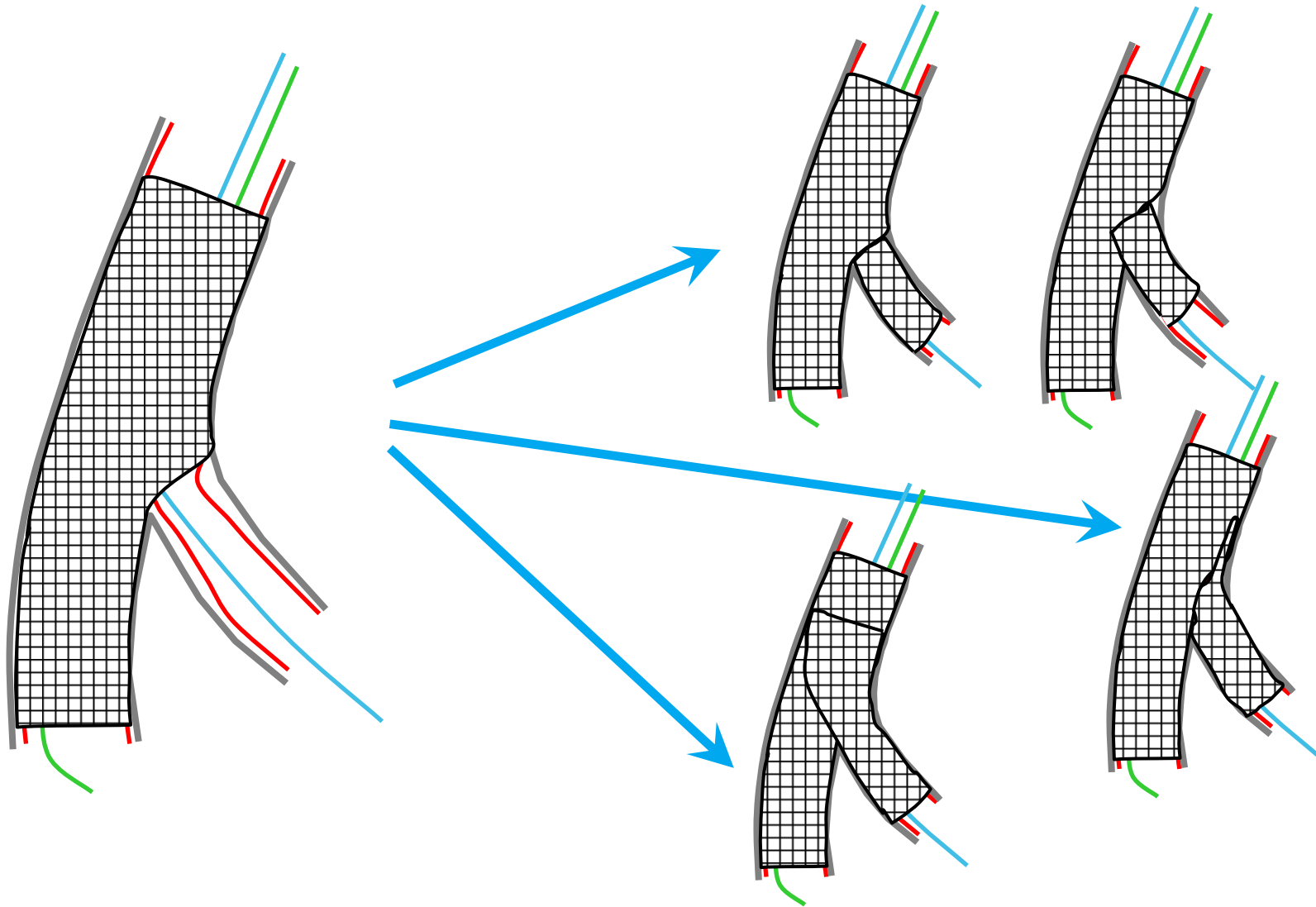
Provisional Side Branch Stenting



Advantages

- ✓ Can be standardized
- ✓ Few tips and tricks
- ✓ One stent in > 80% of cases
- ✓ Kissing balloon easy
- ✓ Good efficacy and safety profile

Provisional Side Branch Stenting



Conclusion

Today the Gold standard technique in the treatment of bifurcation lesions with DES is provisional side branch stenting.

With a standardized approach, it is relatively simple and safe, and can be used in the vast majority of cases.

Conclusion

With this technique a second stent is needed in 5 to 25% of cases with acceptable SB angiographic results and excellent clinical outcome.

Conclusion

The instances when two stents are required (SB lesion length ≥ 5 mm in large SB ?), and how they should be implanted are still a matter of debate.

When a two stents technique is needed, it can be safely done if the technique is optimal.

Thank You !