

# Outcome Mapping

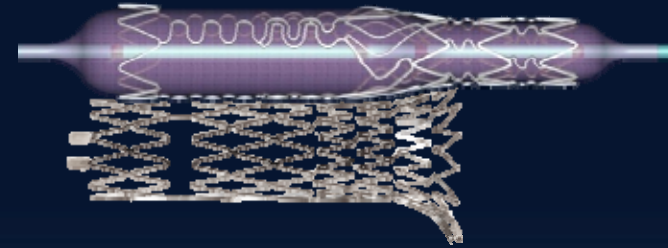
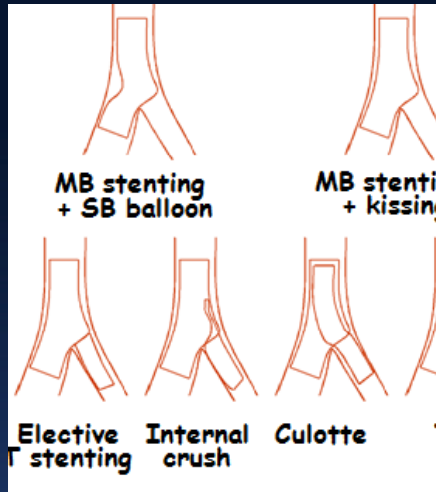
## Techniques, Devices and Skills

Young-Hak Kim, MD, PhD

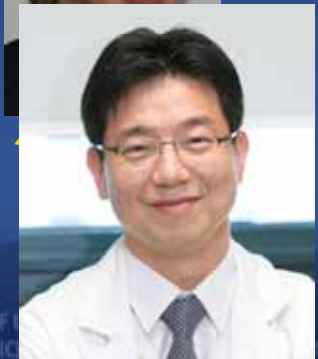
Heart Institute, University of Ulsan College of Medicine  
Asan Medical Center, Seoul, Korea

# Key is ~~what~~ ~~good~~ ~~technique~~ ... for a good outcome after bifurcation PCI ?

What technique ?



What device ?



How skillful ?

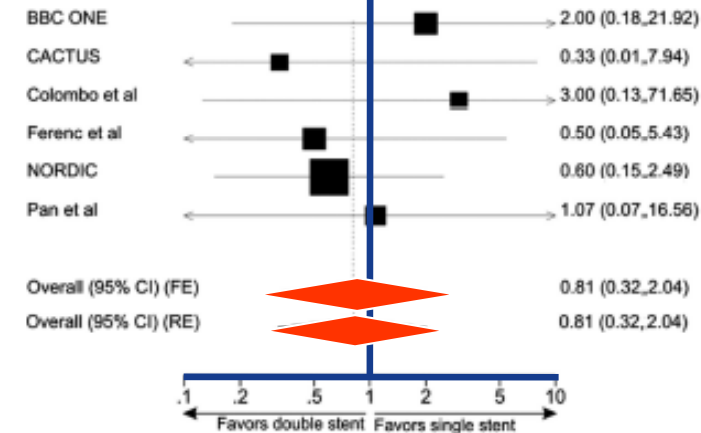
# Technique ?

## 1-stent compared with 2-Stent

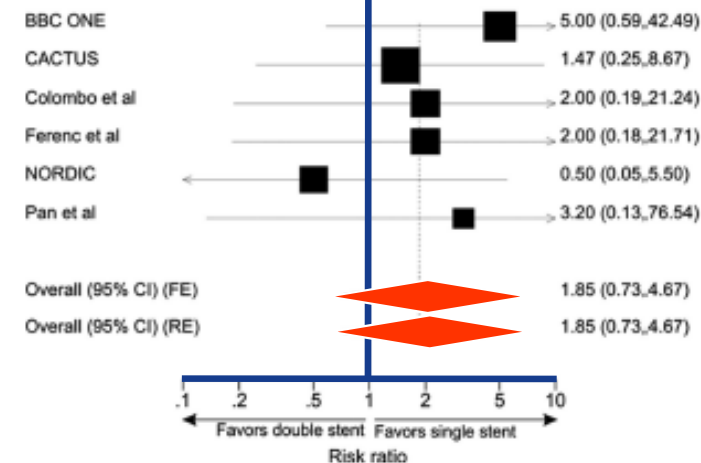
- More standardized
- Easy to perform
- Less stent
- Less contrast agent
- Less radiation
- Less procedural complication
- Shiftable to provisional SB treatment with simple kissing, T, Culotte, Crush..
- Comparable long-term outcomes to 2-stent

# Meta-analysis of 1- vs. 2-stent 9-Month Outcomes

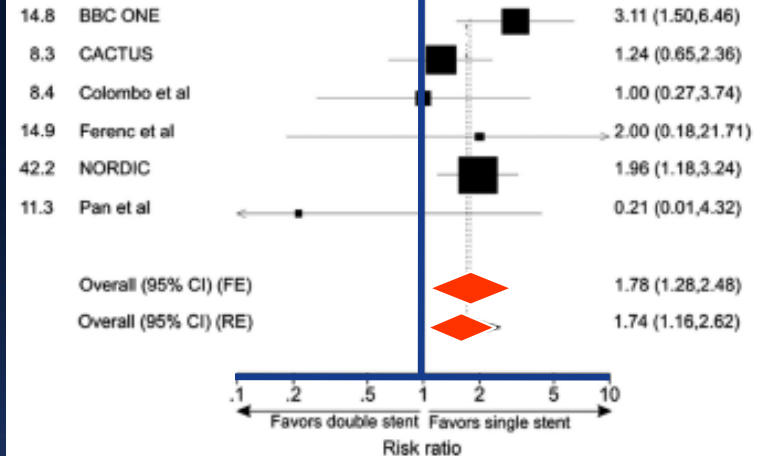
## Death



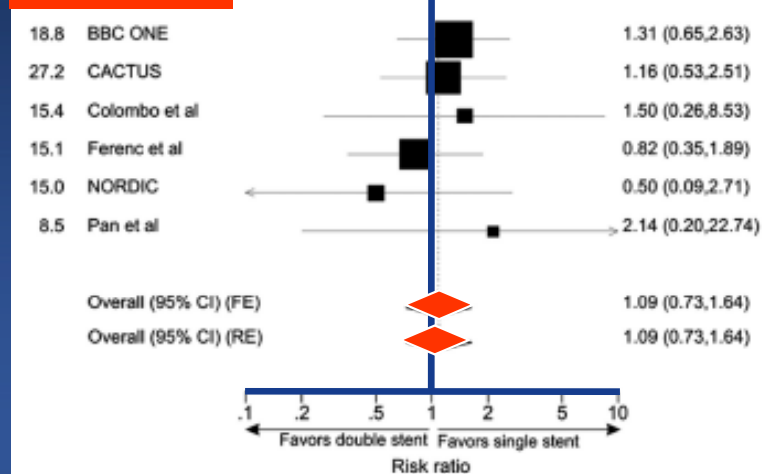
## ST



## MI



## TLR



2-stent better

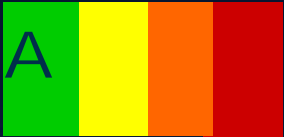
1-stent better

2-stent better

1-stent better

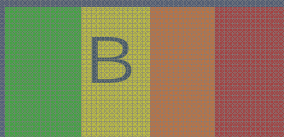
# Guideline

I IIa IIb III



**Provisional** side-branch stenting should be the initial approach in patients with bifurcation lesions when the **side branch is not large** and has only **mild or moderate focal disease** at the ostium

I IIa IIb III



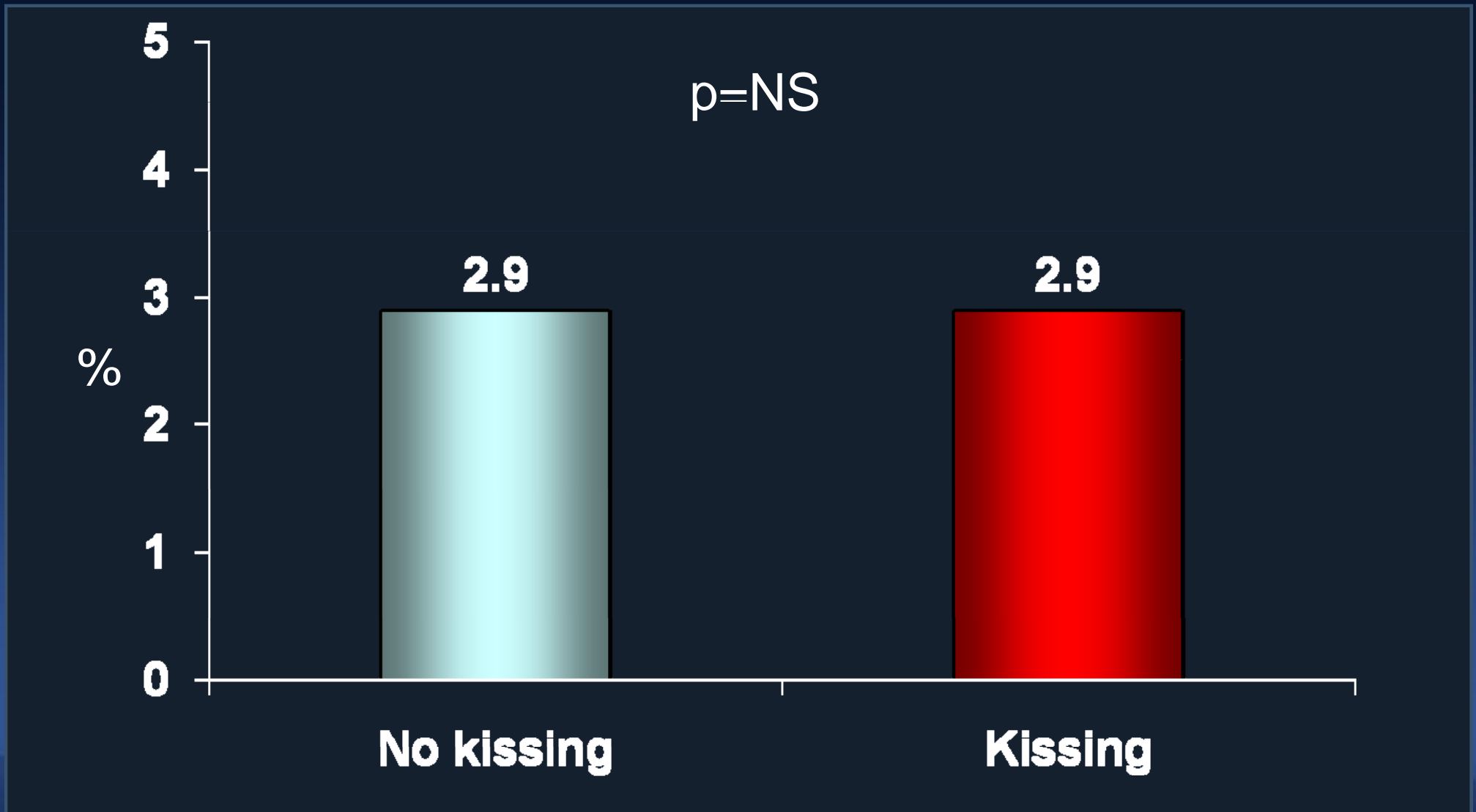
It is reasonable to use **elective double stenting** in patients with complex bifurcation morphology involving a **large side branch** where the **risk of side-branch occlusion is high** and the likelihood of successful side branch re access is low



# NORDIC 3 trial (477 pts)

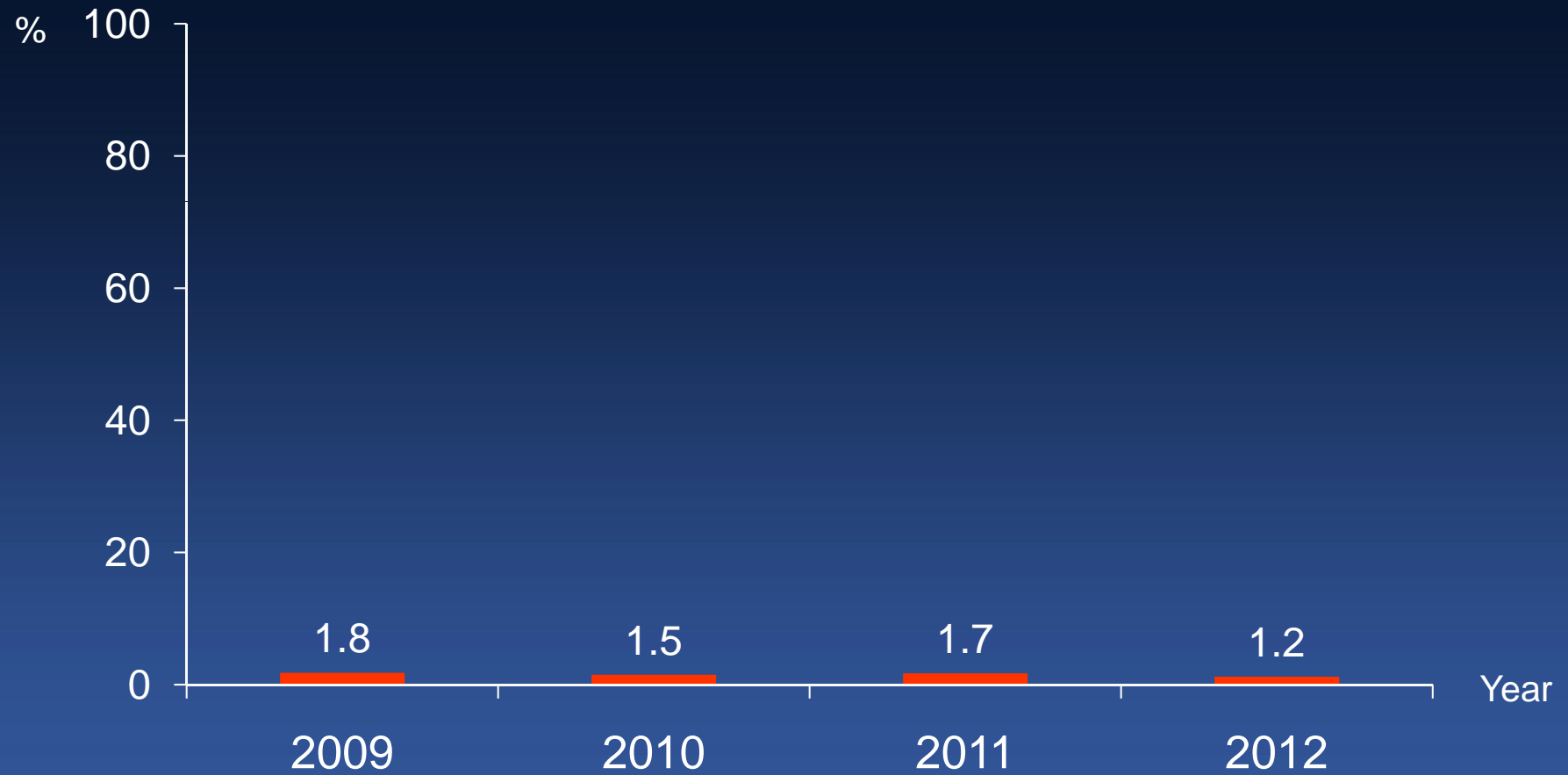
## Kissing vs. No kissing

6-month composite of death, MI, TLR, and ST

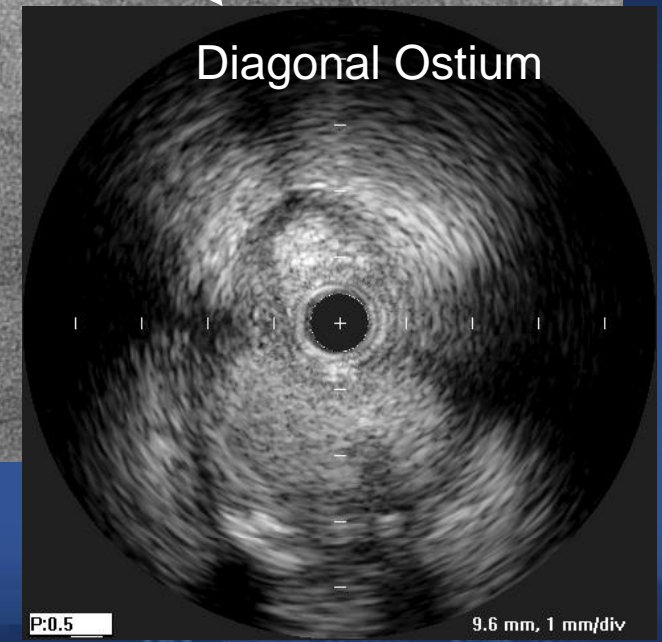
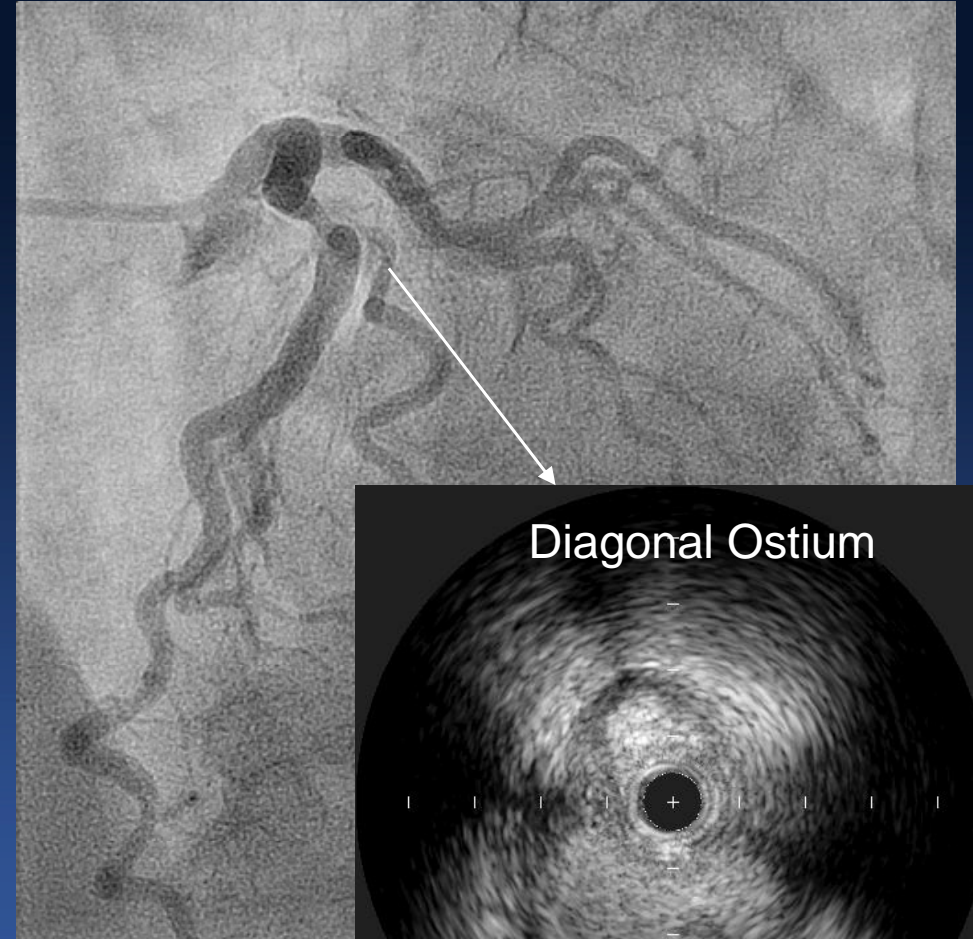


# % of 2-stent in all PCI in AMC

**98% with 1-stent from all stentings**  
**~ 10% from bifurcation stentings**

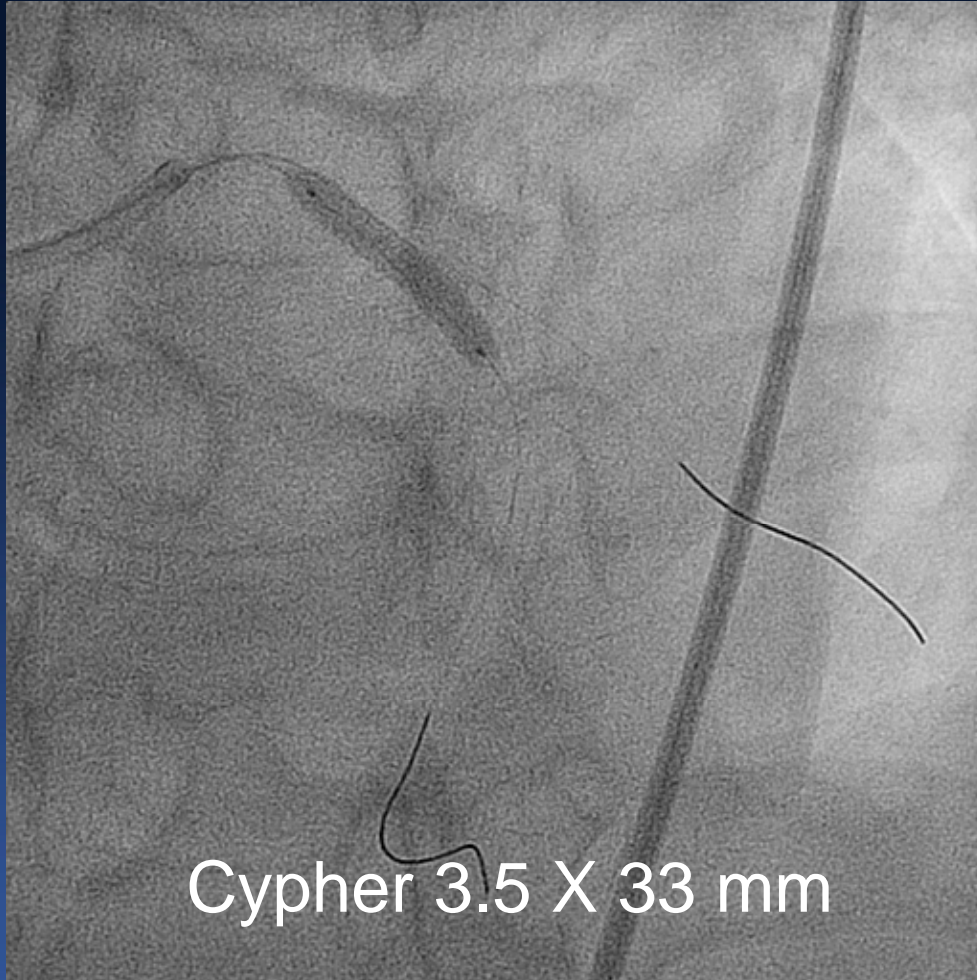


# Is 1-stent always good ?



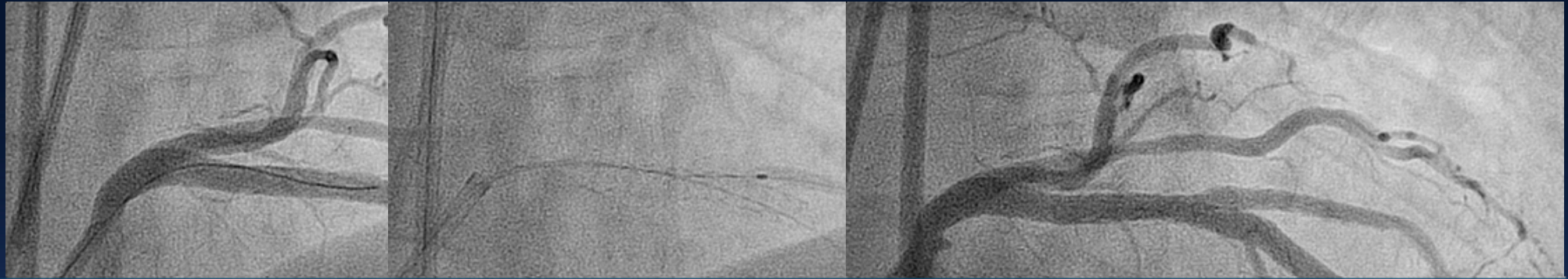


# Who (which) is guilty ?



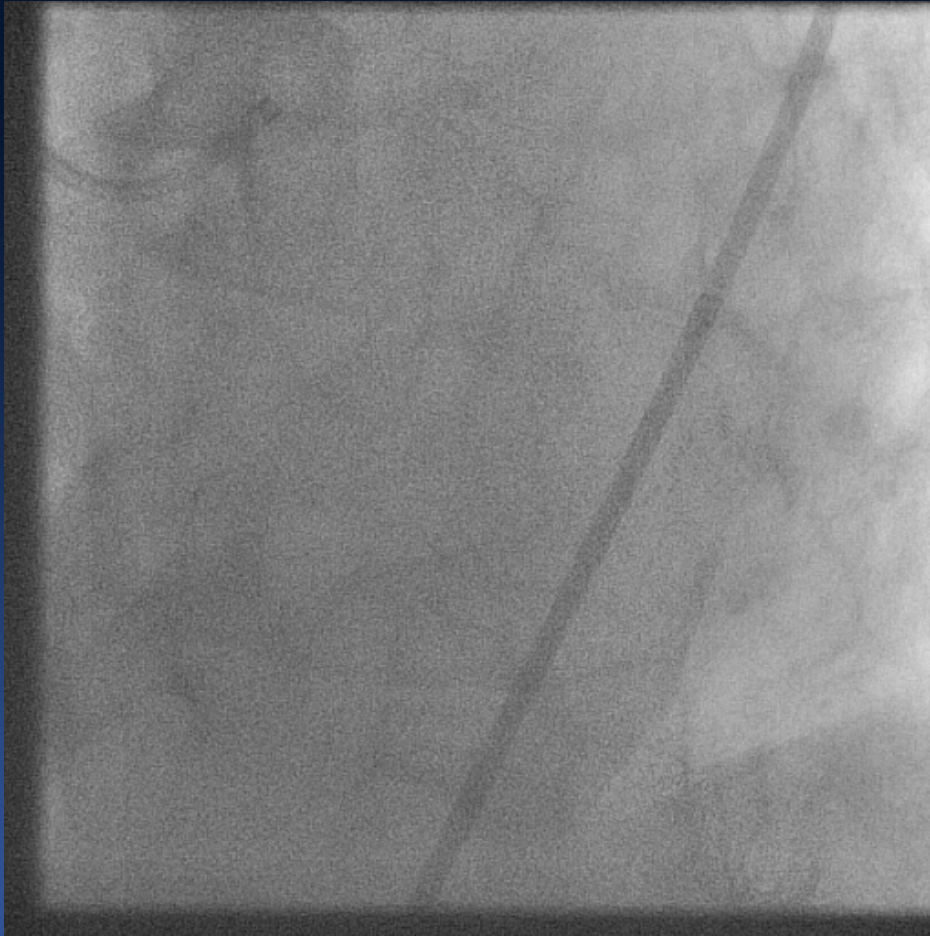
# Rewiring with CTO wire and T stenting

## Difficult rewiring because of calcified ostium



- ***The device was not responsible...***
  - My decision might be wrong.
  - Planned 2-stent might be better.
- ***The technique was not responsible...***
  - My skill (rewiring) was not good.
  - I had to pay more attention during the 1<sup>st</sup> stent placement and wire recrossing.

# What is the best technique ?

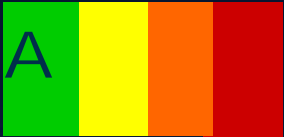


- Pt is symptomatic
- Intermediate LAD stenosis
- Not small D territories
- MEDINA 0.1.1 for 1<sup>st</sup> D
- MEDINA 1.0.1 for 2<sup>nd</sup> D
- Narrower angle in 2<sup>nd</sup> D



# Guideline

I IIa IIb III



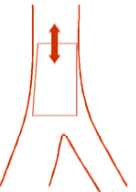

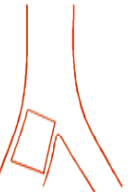


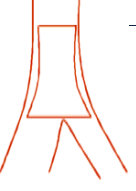



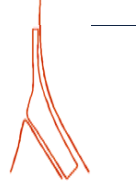





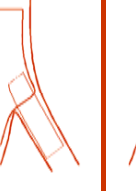
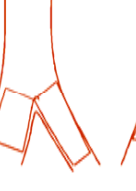
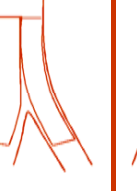
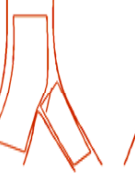


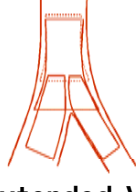

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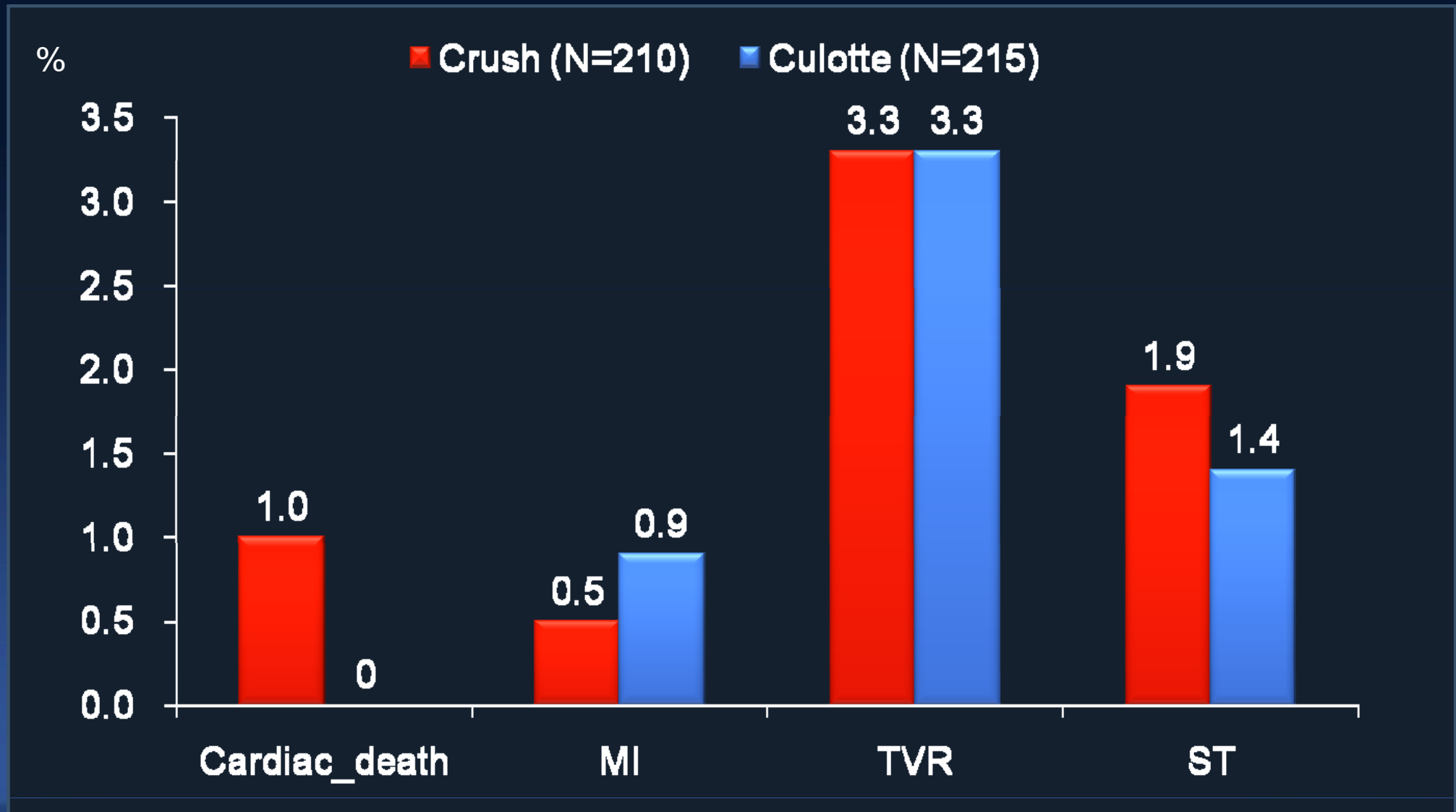
# Best 2-stent technique ?

	<b>M</b> Main prox. first	<b>A</b> Main Accross side first	<b>D</b> Distal first	<b>S</b> Side branch first							
<b>1<sup>st</sup> stent</b>	 PM stenting	 MB stenting across SB	 DM stenting	 Provisional SKS	 SB ostial stenting						
<b>After balloon</b>	 Skirt	 MB stenting + SB balloon	 MB stenting + kissing	 SB minicrush	 SB crush						
<b>2 stents</b>	 Skirt + DM	 Skirt + SB	 Elective T stenting	 Internal crush	 Culotte	 TAP	 V stenting	 SKS	 Syst. T Stenting	 Minicrush	 Crush
<b>3 stents</b>	 Extended V			 Trouser legs and seat							

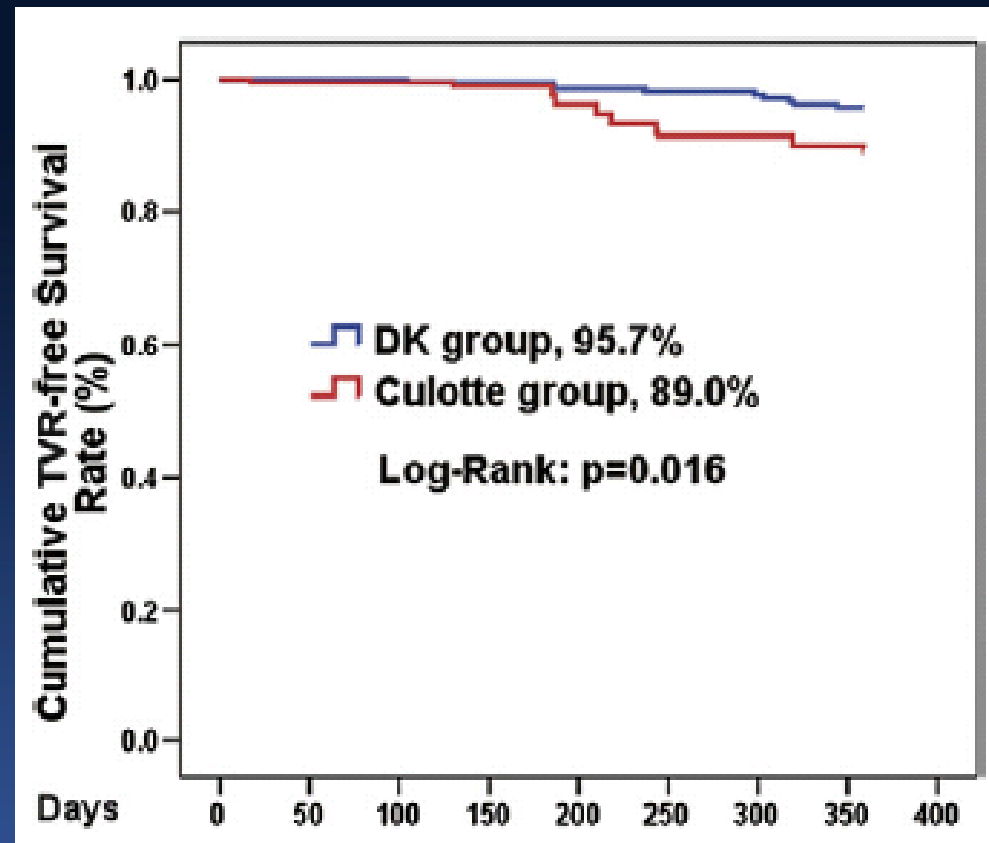


# NORDIC II trial (425 pts)

## Crush vs. Culotte



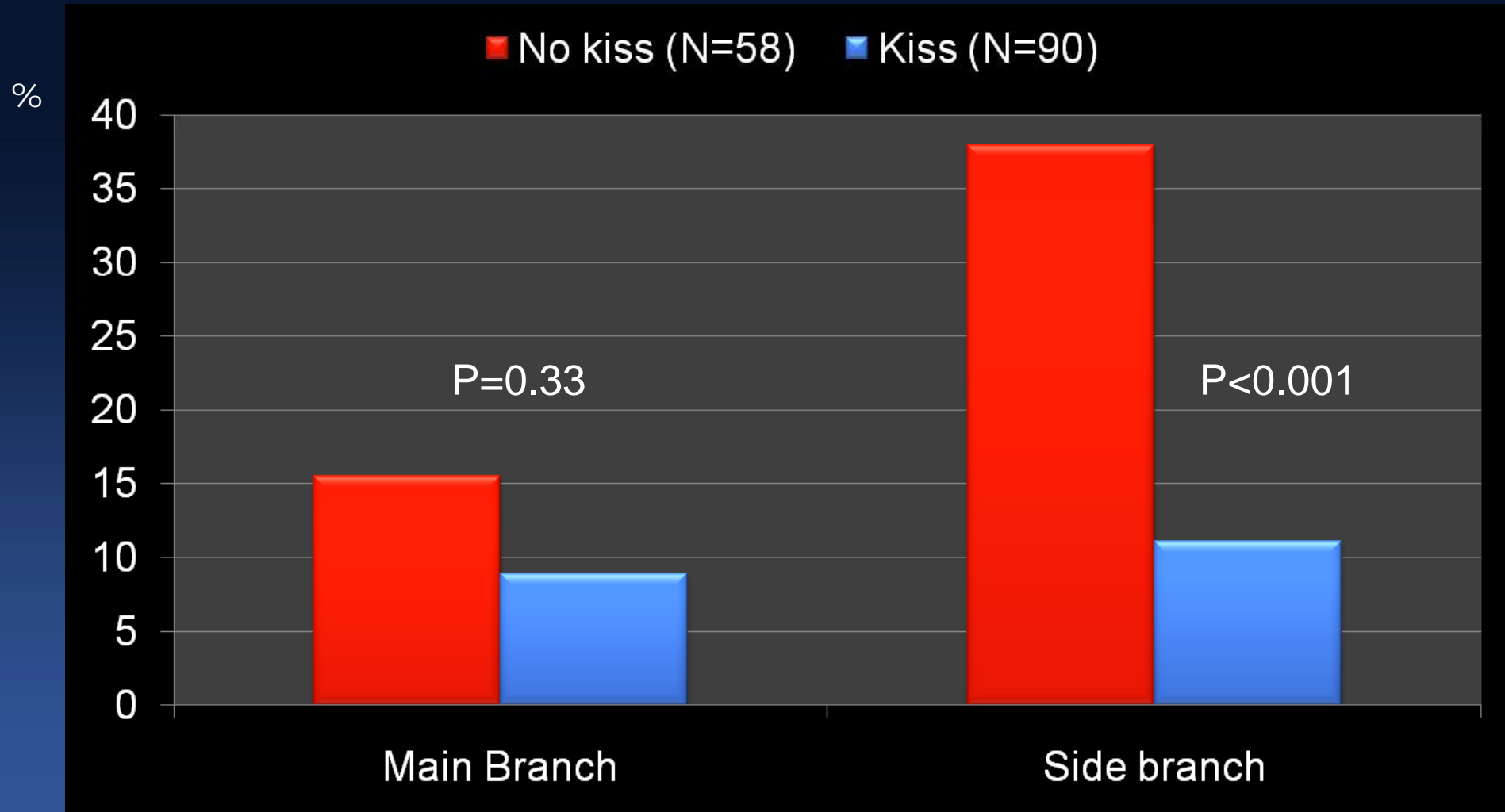
# DKCRUSH-III Study for LM Bifurcation Culotte vs. Double Kissing Crush TLR-Free Survival



The difference might be inflated  
due to routine angio FU ...

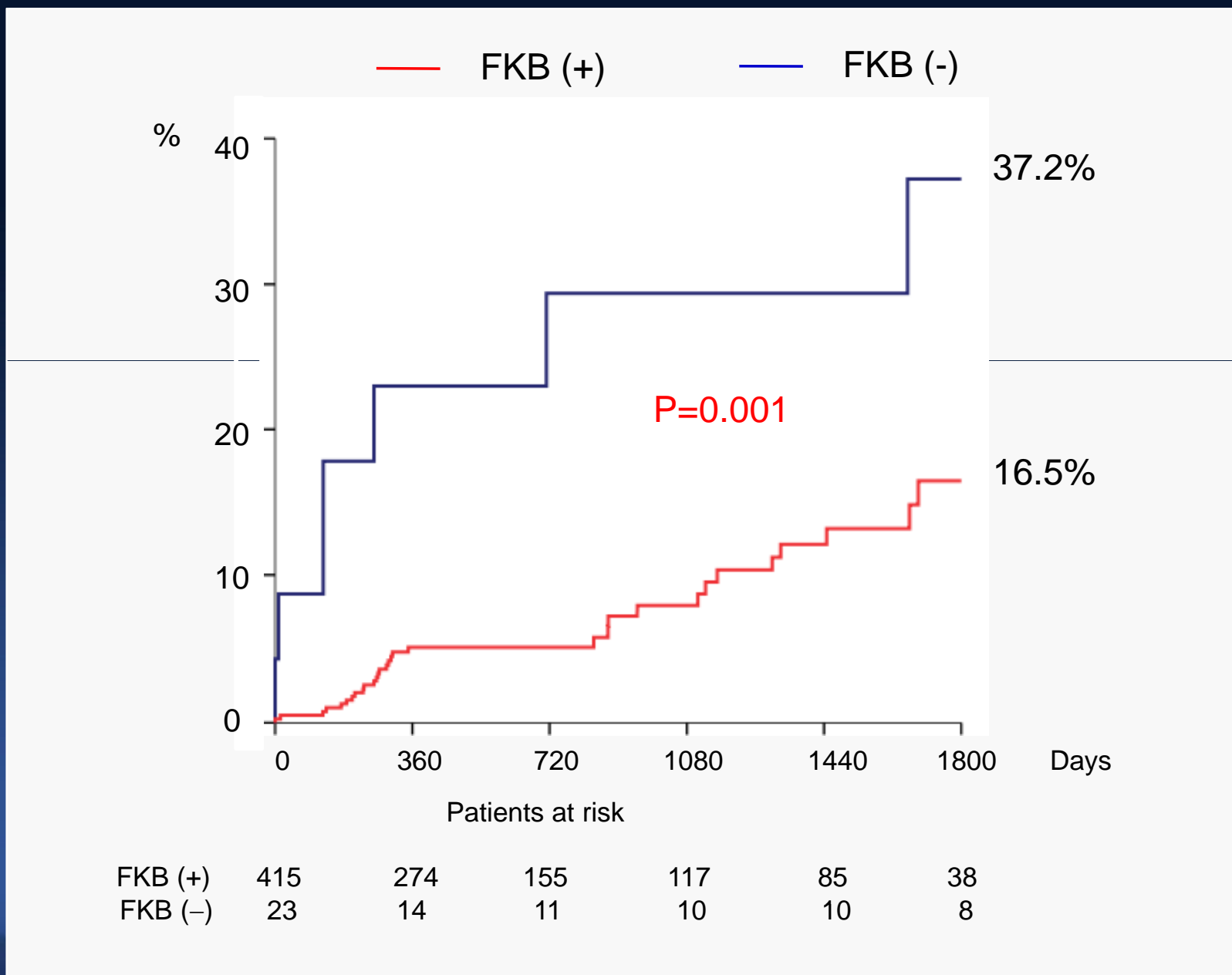
# Impact of FKD after Crush

## Restenosis Rate



Ge L et al. J Am Coll Cardiol 2005;46:613

# MACE btw FKB vs. Non-FKB after Crush



# Studies of Crush Stenting

***Which (who) is a major contributor of very high success rate of FKB ?***

Author	No.	Type	FKB	IVUS	MACE	ST
Ge L et al <sup>1</sup>	181	Classic	64%		26.5% (9M)	2.8%
Colombo A et al <sup>2</sup> (CACTUS)	177	Classic	92%		15.8% (6M)	1.7%
Galassi AR et al <sup>3</sup>	199	Mini-crush	88%		20.6%(25M)	1.0%
Moussa I et al <sup>4</sup>	120	Classic	88%	< 10%	13.0% (6M)	1.7%
HS David et al <sup>5</sup> (BBC)	169	Classic	72%		15.2% (9M)	-
Erglis A et al <sup>6</sup> (NORDIC2)	209	Classic	85%		4.3% (6M)	-
Chue CD et al <sup>7</sup>	100	Classic	75%		28% (3Y)	-

1. J Am Coll Cardiol 2005;46:613

3. J Am Coll Cardiol Interv 2009;2:185

5. Circulation. 2010;121:1235

7. Cath Cardiovasc Interv 2010;75:605

2. Circulation. 2009;119:71

4. Am J Cardiol 2006;97:1317

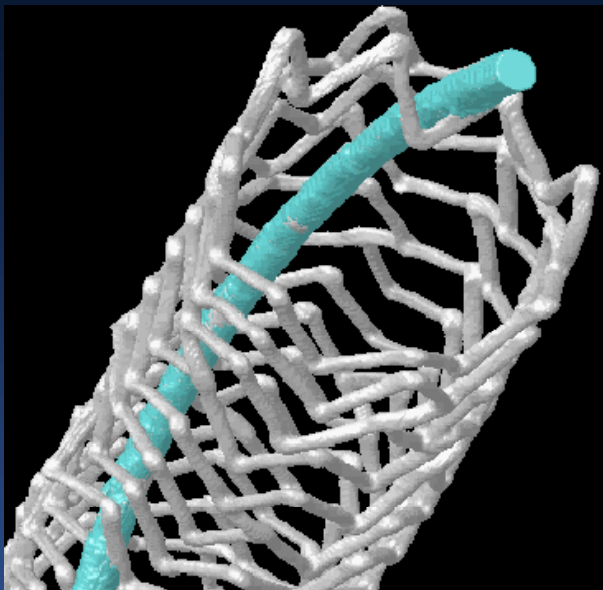
6. Circ Cardiovasc Intervent. 2009;2:27



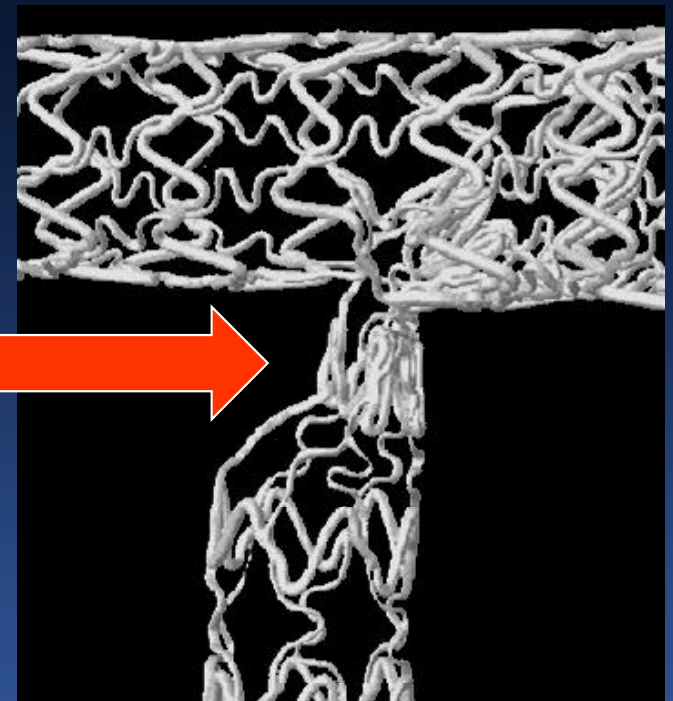
# Why does this happen ?

## *Technique, stent, wire, balloon ?*

SB wire pass outside of stent



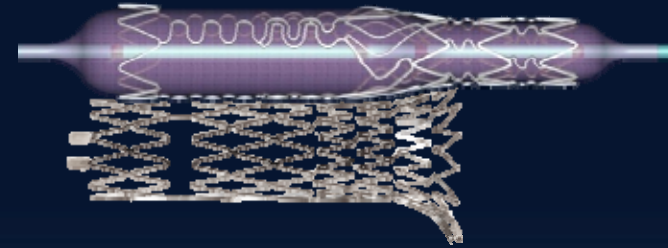
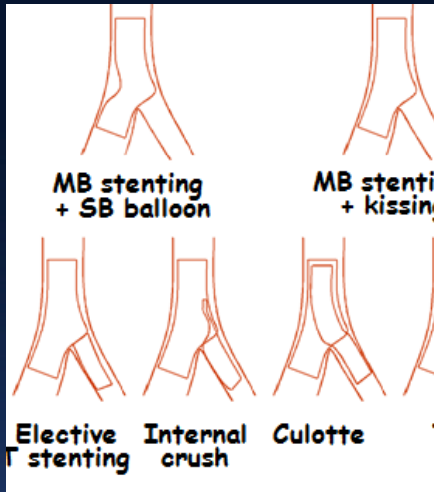
*SB  
Balloon*



**How to do is more important than what to do !**

# Key is a good device ...

What technique ?

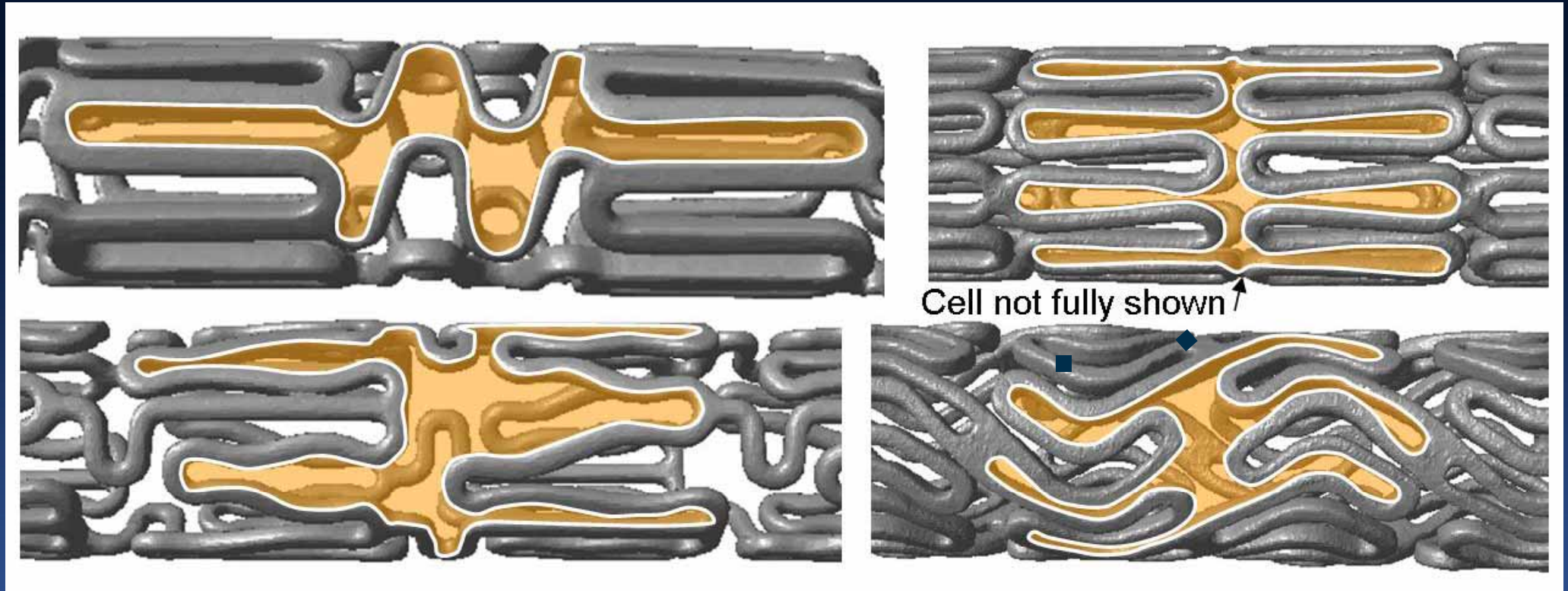


What device ?



How skillful ?

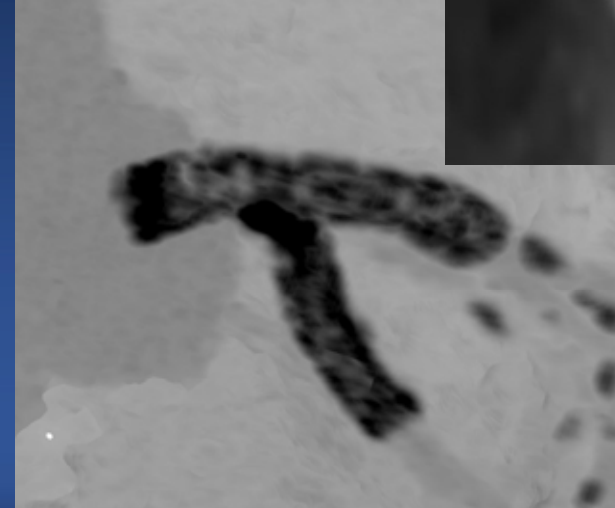
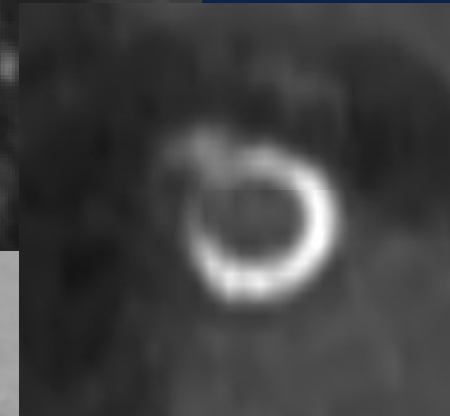
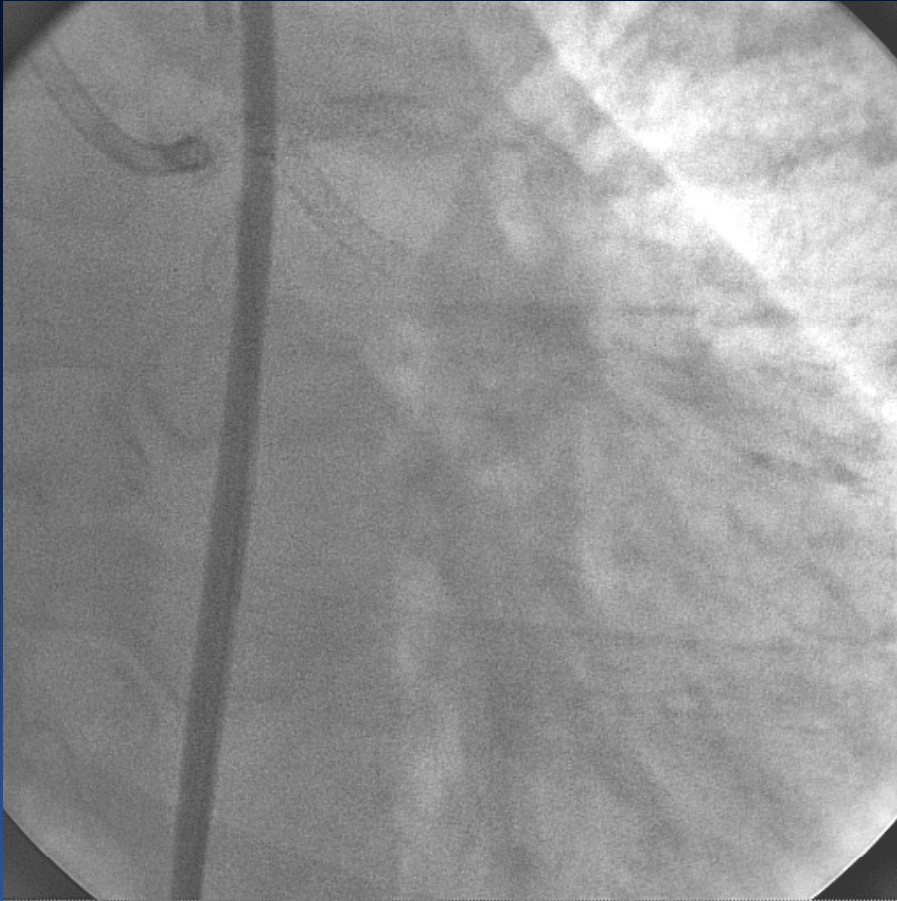
# Does a good fit lead to better a clinical outcome ?





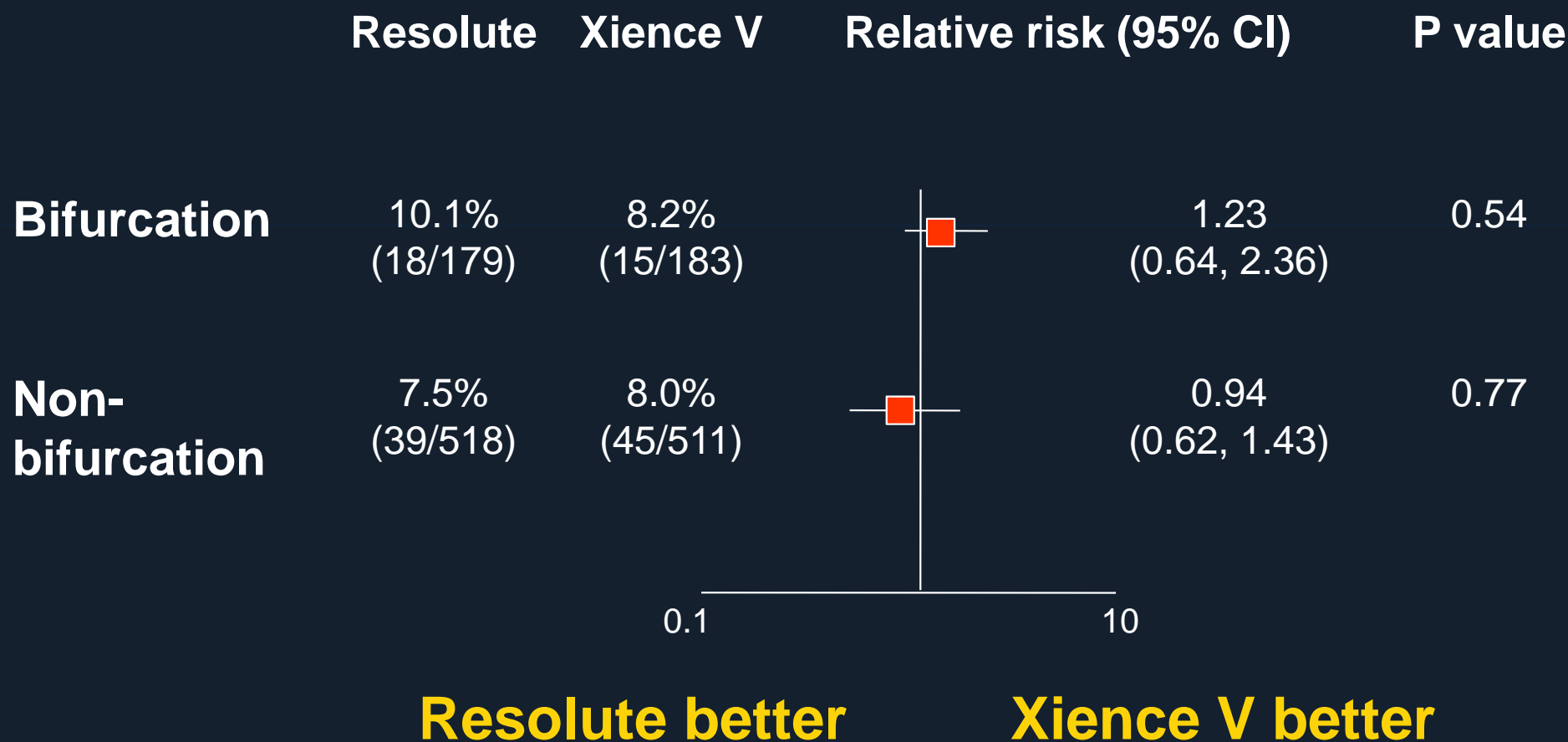
# Device

## Mechanical Property ?



# Biological Efficacy of DES

## TVF in Subgroups of TWENTE RCT



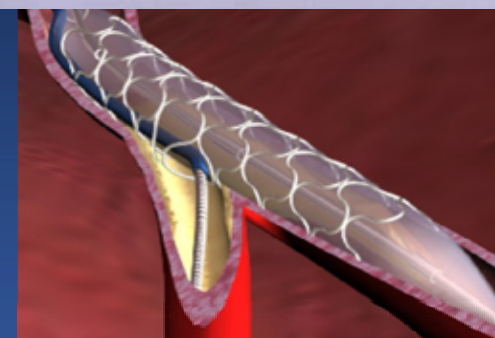
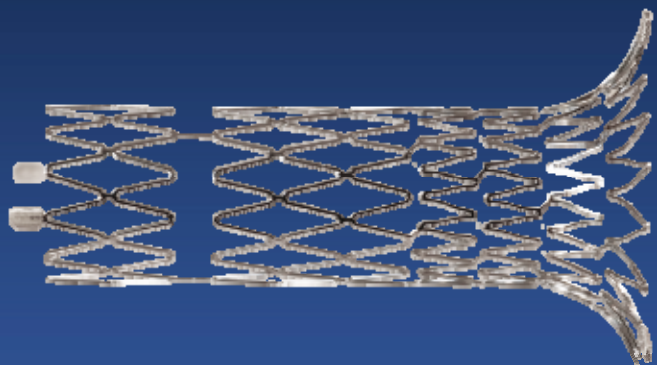
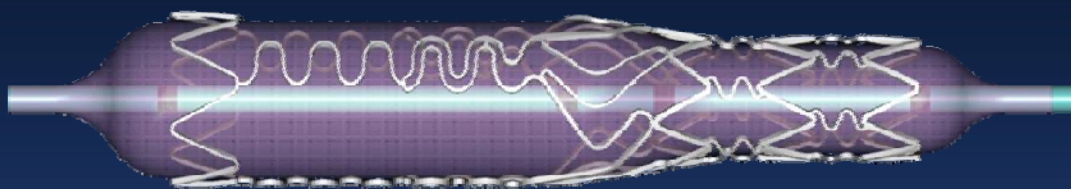


# Biological Efficacy of DES

## SEA-SIDE RCT

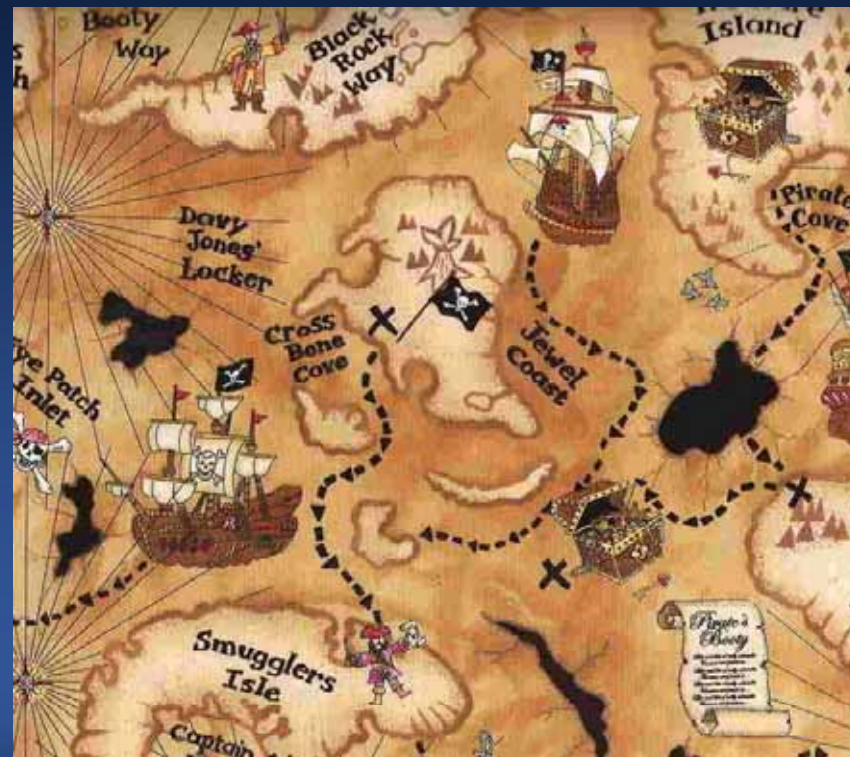
	Cypher (N=75)	Xience V (N=75)	P
Any events	7 (9%)	9 (12%)	0.60
Cardiac death	1 (1%)	1 (1%)	0.56
Peri-MI	1 (1%)	3 (4%)	0.31
Spont-MI	1 (1%)	3 (4%)	0.31
TVF	5 (7%)	5 (7%)	1.00
Angiographic failure	6 (8%)	5 (7%)	0.75
Associated with MACE	5 (7%)	5 (7%)	1.00
Detected but, not treated	1 (1%)	0	0.32

# Dedicated Bifurcation Stent



Does any bifurcated stent fit 'all' heterogeneous bifurcations ?

**Key is me...**  
**not the type of technique or device**



Seoul, Korea: 25-27 April 2012

Left Main and Bifurcation Summit  
"Paradigm Shift: Bifurcation Summit"

**My top 10 rules in non-LM  
Bifurcation stenting**

Speaker – 12'

**Antonio Colombo**

*Centro Cuore Columbus and  
S. Raffaele Scientific Institute, Milan, Italy*



# Problems with bifurcation lesions

- ✓ **Should I wire the side branch?** YES, very little to loose (except for a guide wire) to take this decision
- ✓ **Should I implant 1 or 2 stents?** 1 stent most of the times; 2 stents if you are afraid to loose the SB, if the SB is large and diseased extending distal to the ostium and if you are confident with 2 stent technique



# A key is HOW to manage with skillful hands and brain ...

- Do evaluate well using angiography, IVUS, FFR
- Do kiss after 2-stent
- Never compromise MB result
- Never overestimate SB stenosis
- Never do cosmetic angioplasty
- Never kiss routinely after 1-stent

**Be experienced,  
whatever technique or device you use !**