

# Keynote Lecture on Bifurcation PCI; *Concept and Technique?*

**Duk-Woo Park, MD, PhD**

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

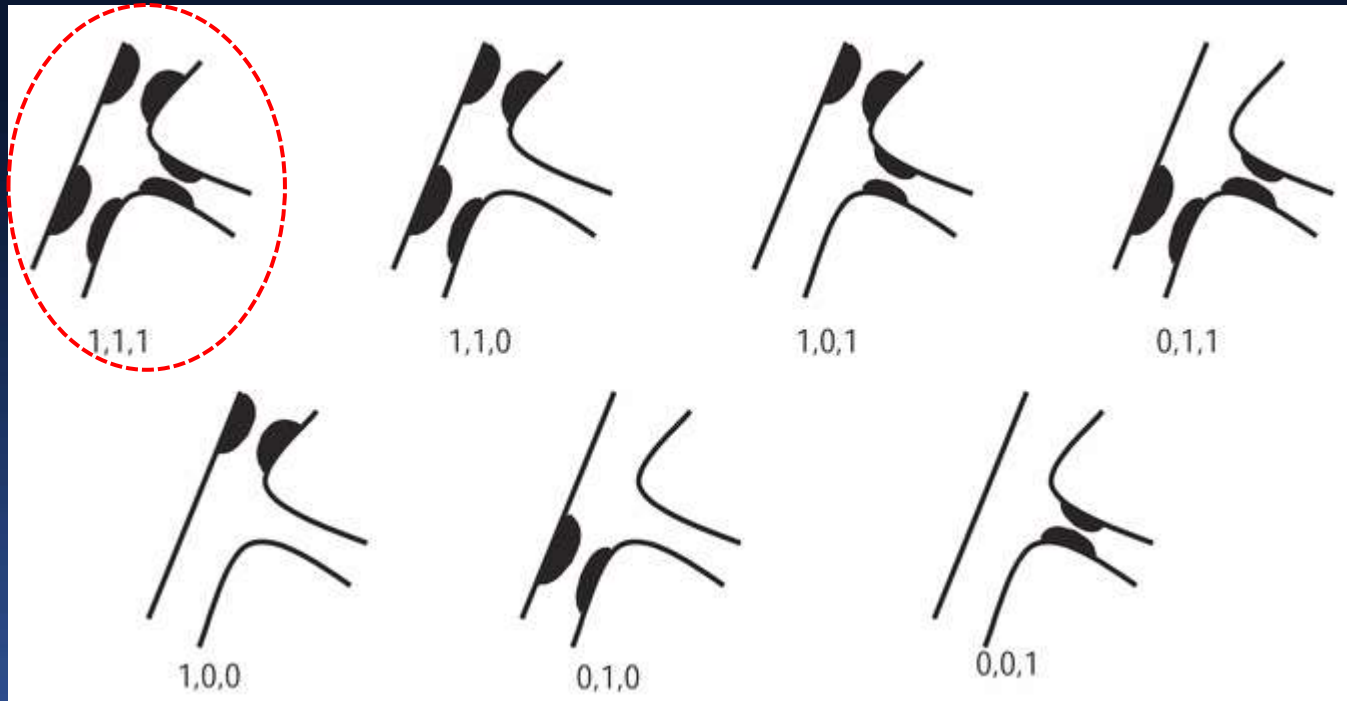
# Nothing to disclose

# Anatomic Diversity of Bifurcation PCI

- The approach is dictated by the SB:
  - True vs. Non-true
  - Size of SB
  - Angle from MB
  - Extent and distribution of SB disease
  - How important the SB is for that patient and for that specific anatomy

# Anatomic Diversity of Bifurcation PCI

## Anatomic concept; the Medina classification



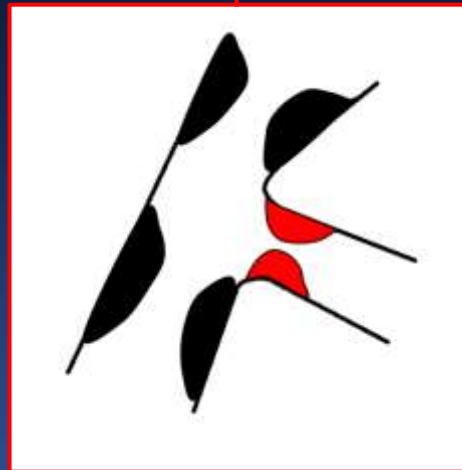
The Medina classification can provide useful information to decide bifurcation PCI strategies.

In bifurcation lesions, Medina (1.1.1) lesion is one of the most challenging lesion subsets.

# Even in the Media (1.1.1) lesion...



Focal moderate lesion in  
SB



Focal severe lesion in  
SB



Diffuse lesion in SB

There are sub-groups which can impact on decision of bifurcation PCI strategies: **Anatomic Concept !!!**

# Conventional Concept

## True Bifurcation

(significant stenosis on the main and side branches)

No

Yes

Provisional SB stenting

Is SB suitable for stenting?

Approach is dictated by the  
Side Branch!

No

Yes

Provisional SB  
stenting

Elective implantation of two stents  
(MB and SB)

# ***Bifurcation PCI***

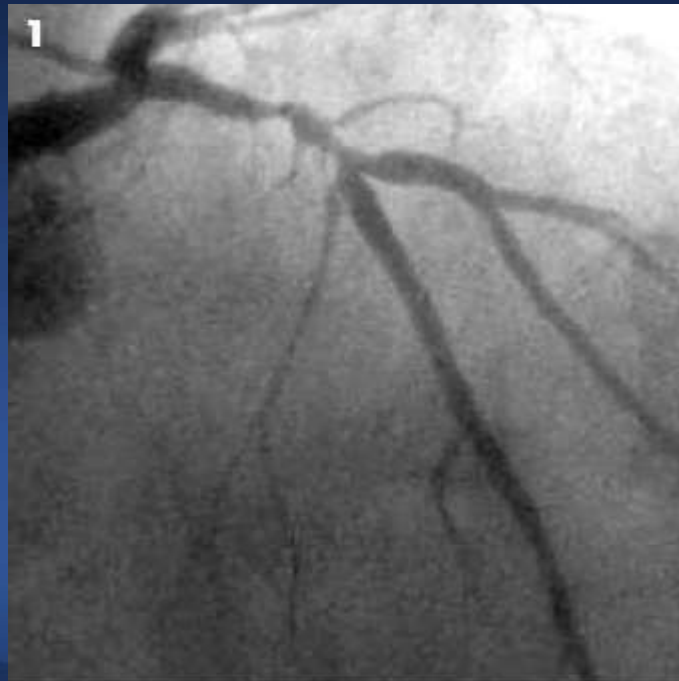
## ***How To Do ? Functional Concept?***

1. Lots of device and technical Issues.
2. Lots of bench tests and simulation studies generated lots of hypothesis and concerns.
3. ***But, Still lack of functional concept in real practice.***

# *Non-LM Bifurcation PCI*

## *How To Do ?*

1. 1 stent cross over,  
with/without provisional stenting of SB
2. Planned 2 stent strategy



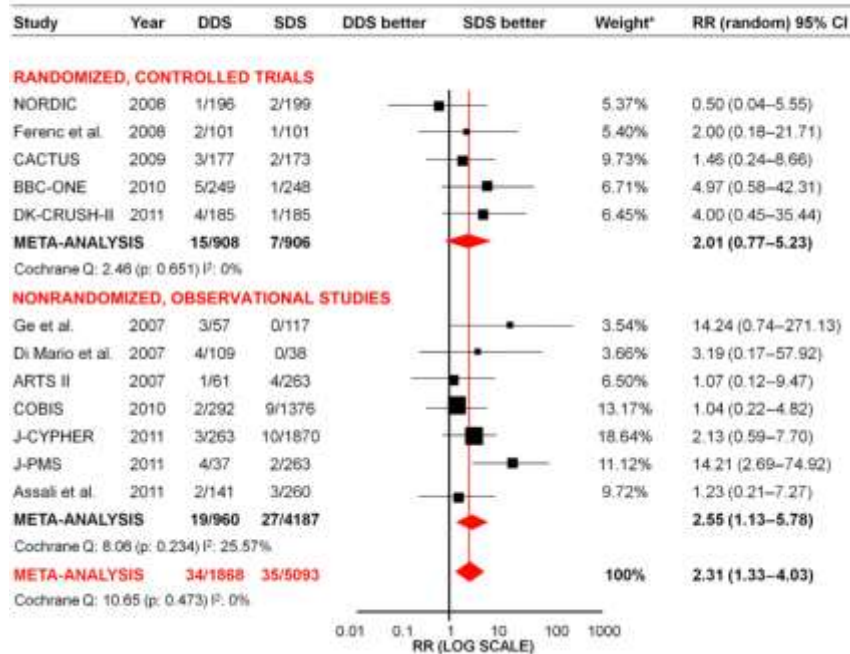


# Meta-Analysis of 12 Major Studies, 6961 Pts

## *Provisional Single-Stenting is Better!*

### A DES Thrombosis

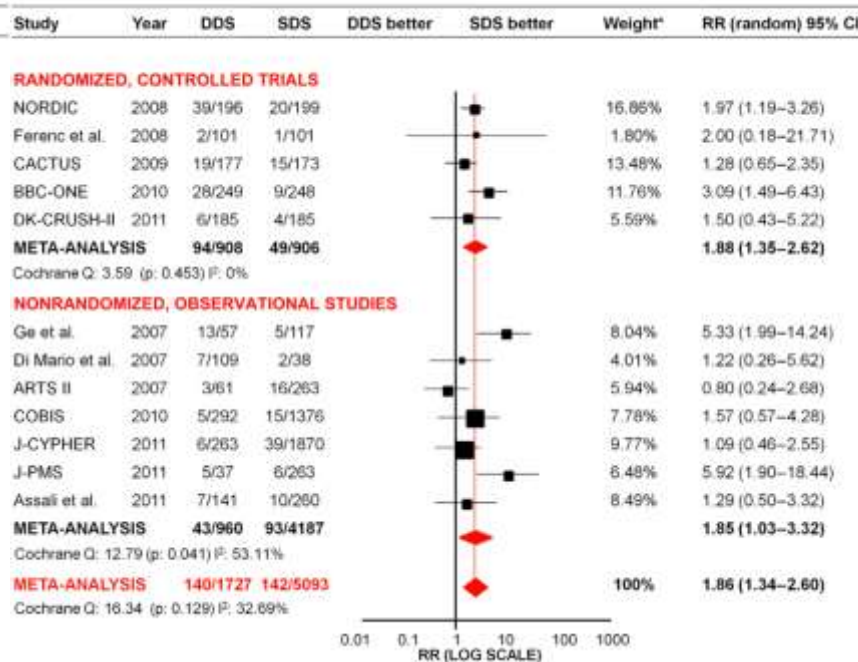
A



Single-stent      Two-stent

### C Myocardial Infarction

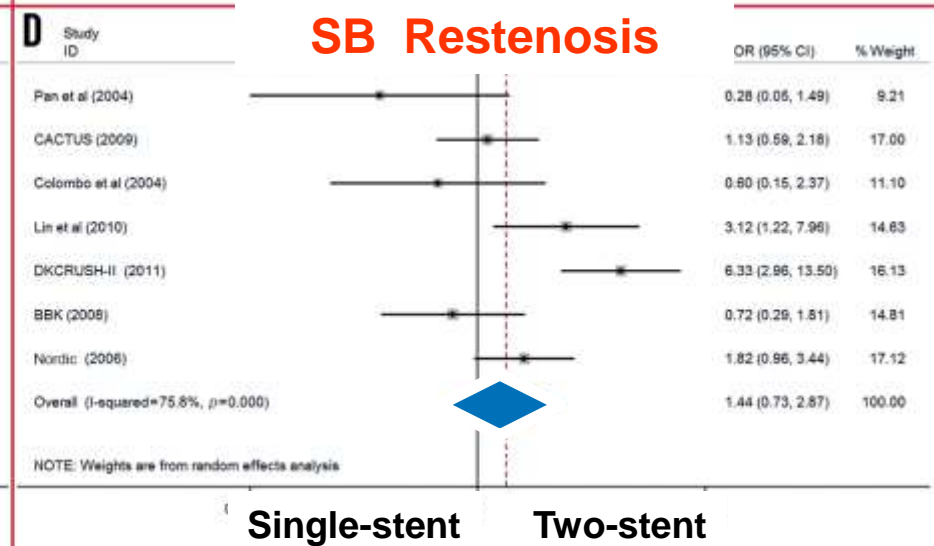
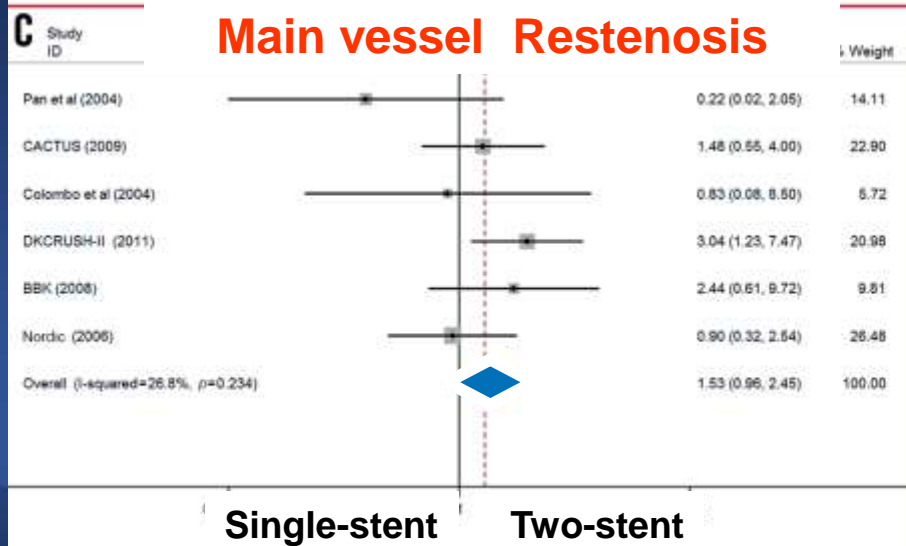
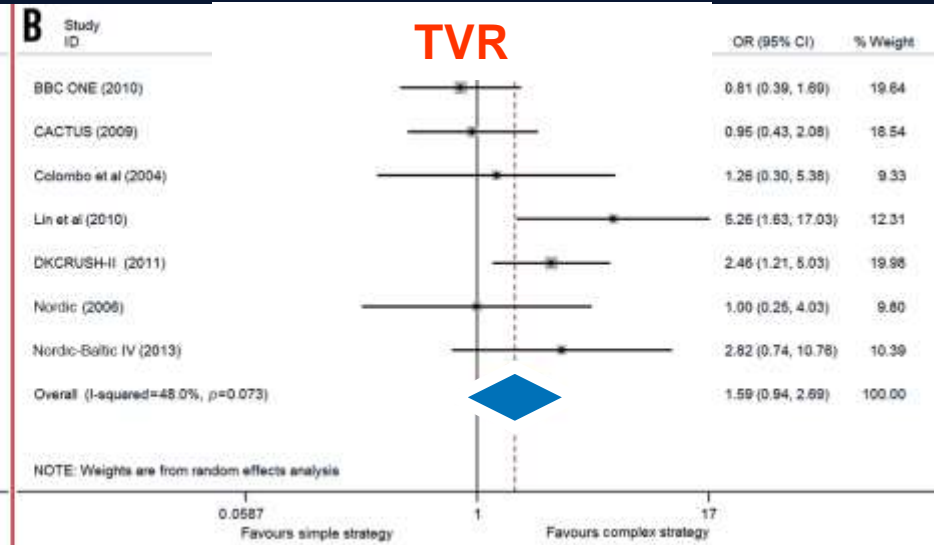
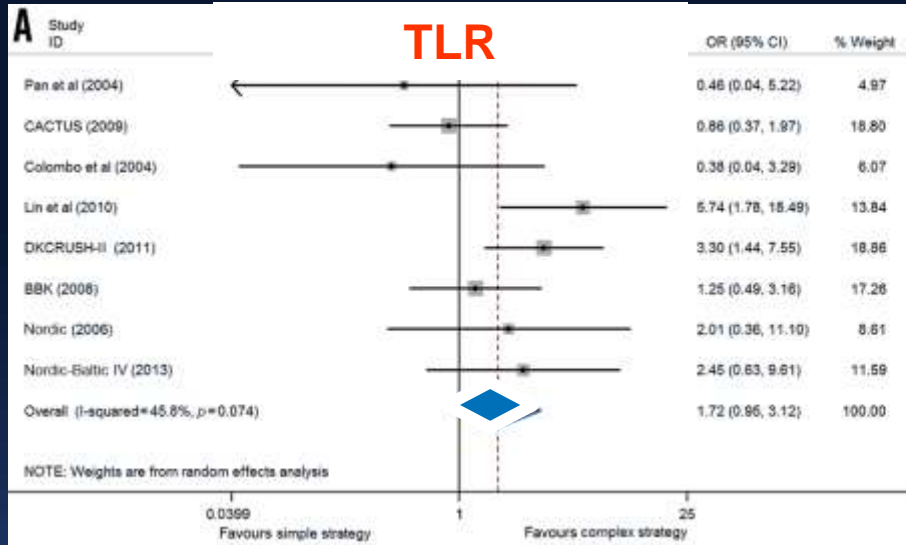
C



Single-stent      Two-stent

# Another Meta-Analysis of 9 RCT, 2569 Patients

## 2 Stent Techniques Are Also Good !

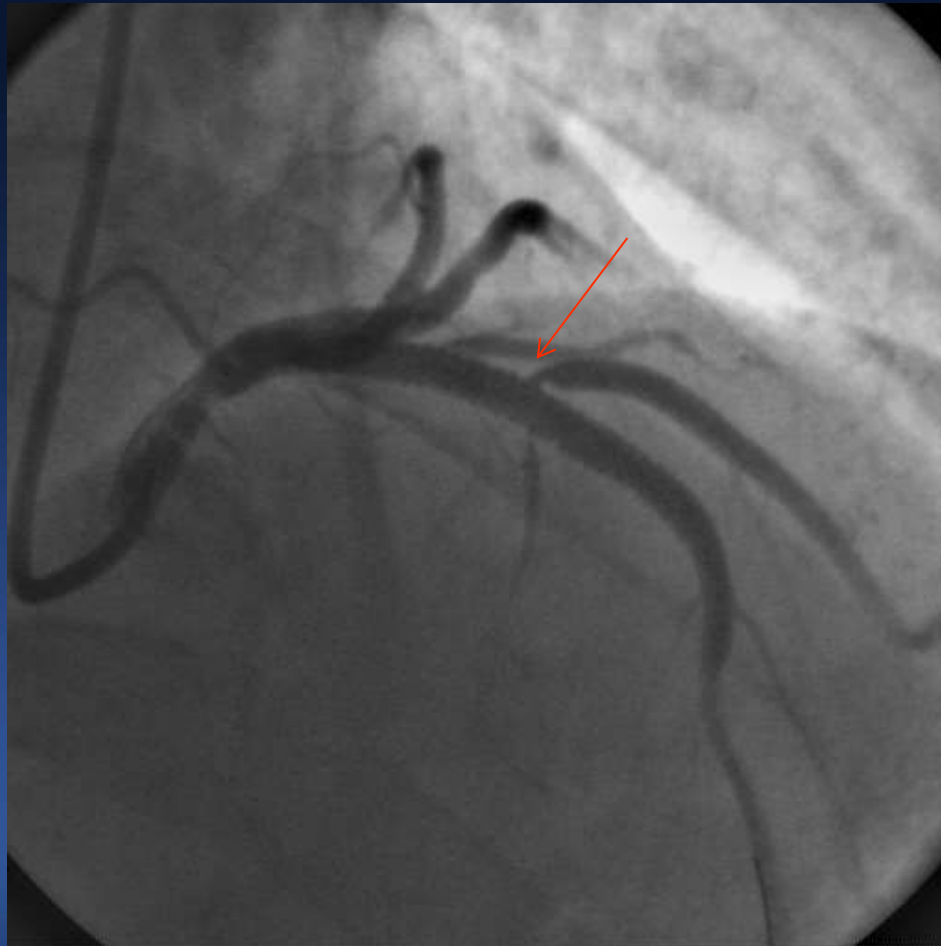


# Non-LM Bifurcation PCI

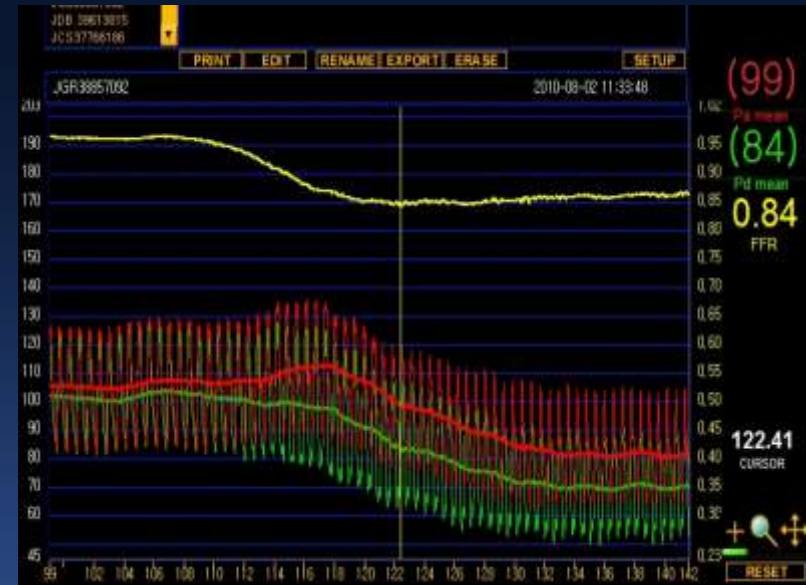
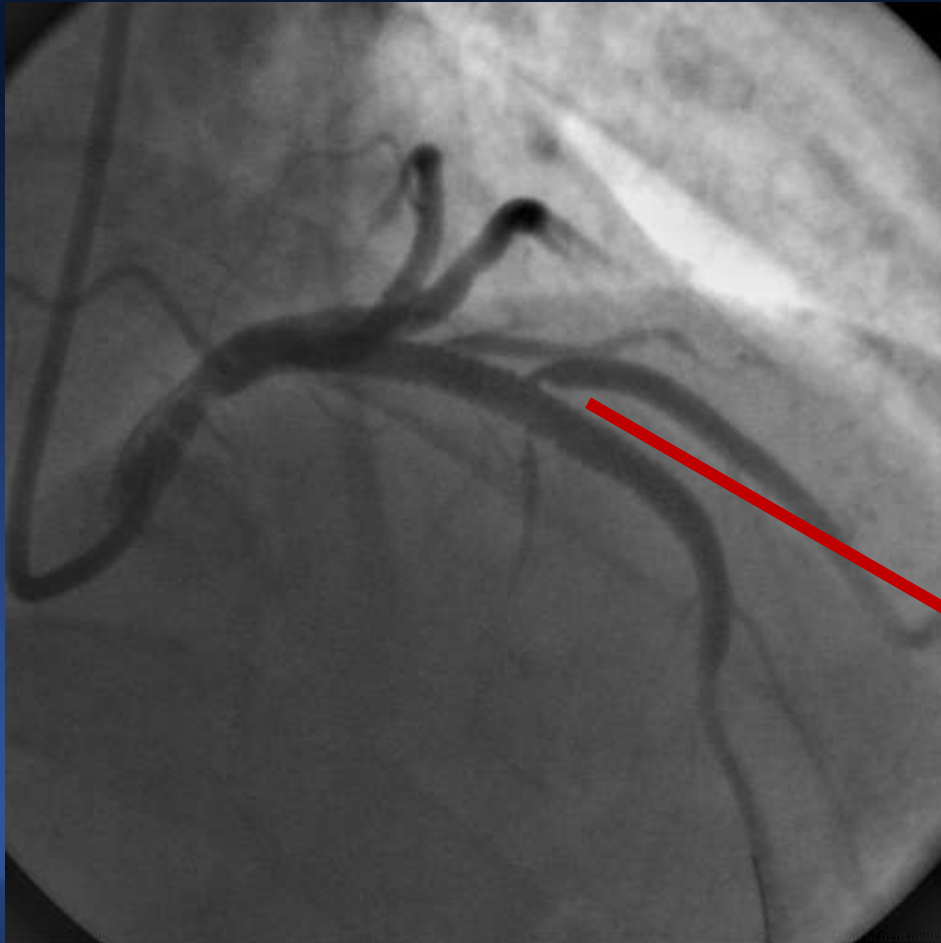
## *How To Do ?*

- Both strategy, (1 or any 2 stent techniques) would be good in clinical outcomes in the era of 2<sup>nd</sup> DES.
- *But, Less is More ! Less invasive (one stent) strategy would be preferred.*

# *Side Branch Jailing After Main Branch Stenting To Treat or Not To Treat ?*



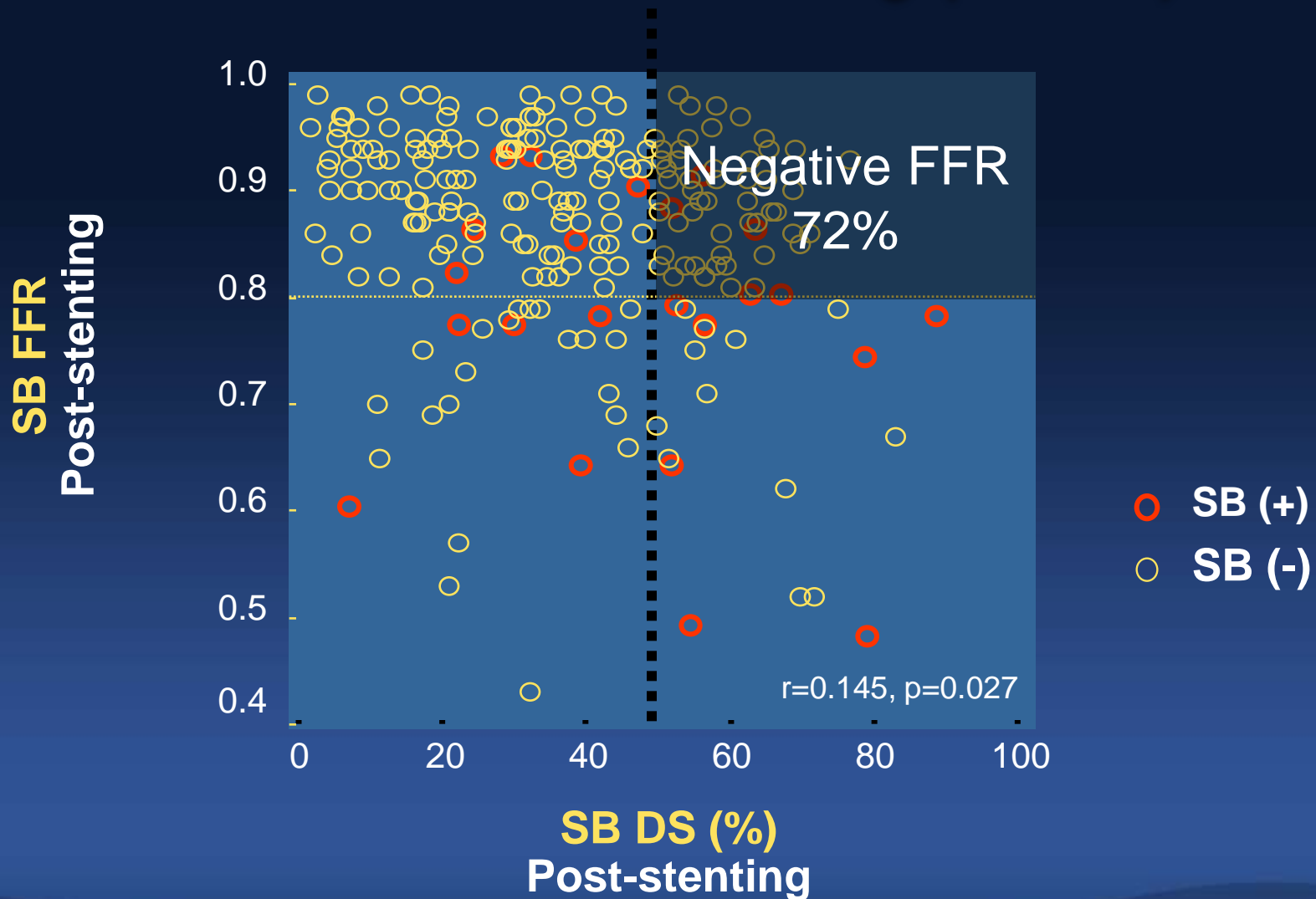
# Side Branch Jailing After Main Branch Stenting To Treat or Not To Treat ?



**FFR 0.84**

# Side Branch FFR

After Main Vessel Stenting (n=232)





# *Leave It Alone;* *Why It Is OK ?*

1. Negative FFR means *Excellent Prognosis (0.6%/year, Cardiac Death and MI)*, even in the presence of any angiographically proven disease.
2. Routine Kissing Balloon Inflation Is Not Always Good due to Lack of Evidence of Clinical Benefit.

# ***When ?***

## **2 Stents Are Needed**

***1 Stent***  
**Provisional**  
**(>70%)**

Normal Side Branch, Whatever Size Is,  
(Medina 1.1.0., 1.0.0), or  
Focal Diseased Side Branch

***2 Stent***  
**Technique**

***Large SB ( $\geq 2.5$  mm) → Large amount  
of myocardium***  
***Diffusely Diseased Side Branch***  
***(Medina 1.1.1., 1.0.1)***



# *Many Factors* Influencing 2 Stent Techniques

- MB and SB size
- Bifurcation angle
- Plaque distribution and location
- Operator experience and expertise  
(most comfortable techniques)

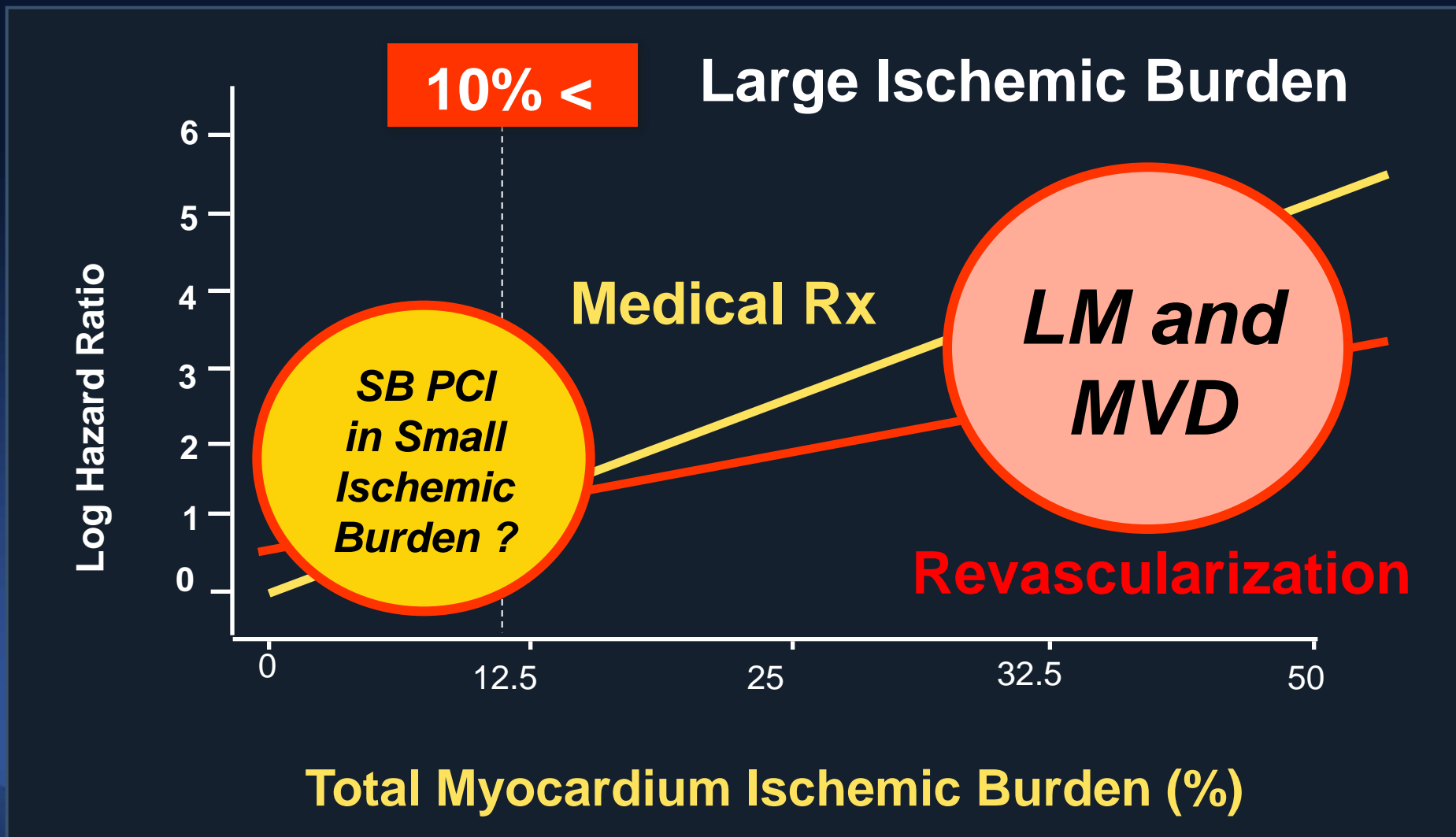
# *Many Different* 2 Stent Techniques

- T-stent, modified T-stent or TAP
- Mini-crush (or step crush), DKCRUSH
- Culotte
- V-stent
- Y-stent (SKS-simultaneous kissing stents)
- Dedicated Bifurcation Stent

# *Why Not, Any Different Outcomes ?* with Different 2 Stent Techniques

- Different Indications,
- Very Limited Data,
- *Small Ischemic Myocardium of SB* Can Not Make an Any Hard Endpoint Difference (Death and MI). Only Difference would be in *Soft End Point* (TLR).

# Survival Benefit of Revascularization, Where Is It, Side Branch PCI ?



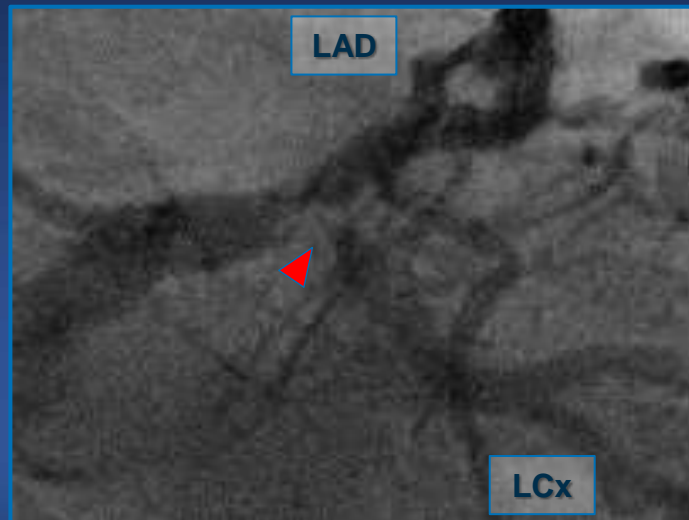
***What Really Matters  
in Non-LM Bifurcation PCI ?  
Conceptual Key Message***

***FFR Guided or FFR-Trained  
Concept Is Crucial for Bifurcation PCI !***

*by the Status of MB rather than Angiographic  
Appearance of the SB.*

# *LM Bifurcation PCI How To Do ?*

1. 1 stent cross over,  
with provisional stenting of SB
2. Planned 2 stent strategy



# ***When ? 1 vs. 2 Stents***

## **Conventional Concept for distal LM bifurcation**

### **Provisional Stenting (>70%)**

#### ***Normal LCX (Medina 1.1.0., 1.0.0)***

Normal or Diminutive LCX

Small LCX with < 2.5 mm in diameter

Focal disease in distal LCX

### ***2 Stent Technique***

#### ***Diseased LCX (Medina 1.1.1., 1.0.1)***

Large LCX with  $\geq$  2.5 mm in diameter

Diseased left dominant coronary system

Concomitant diffuse disease in distal LCX

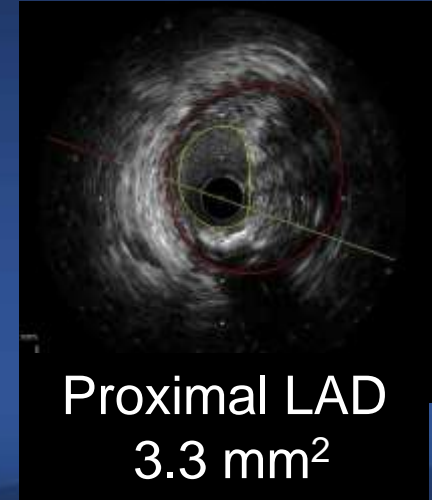
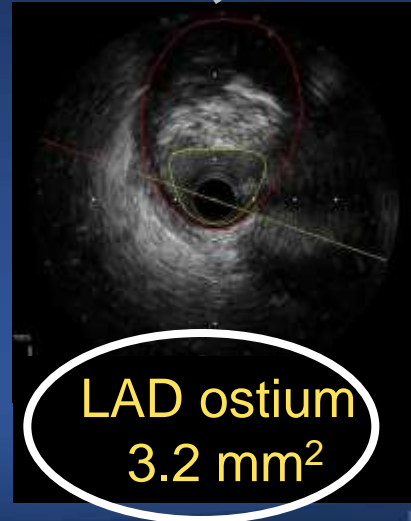
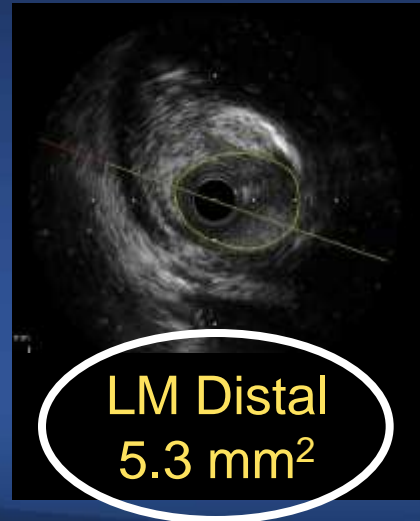
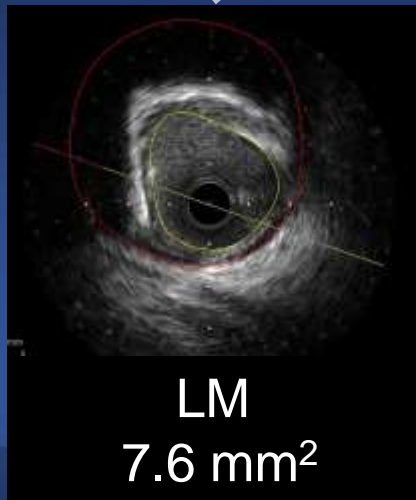
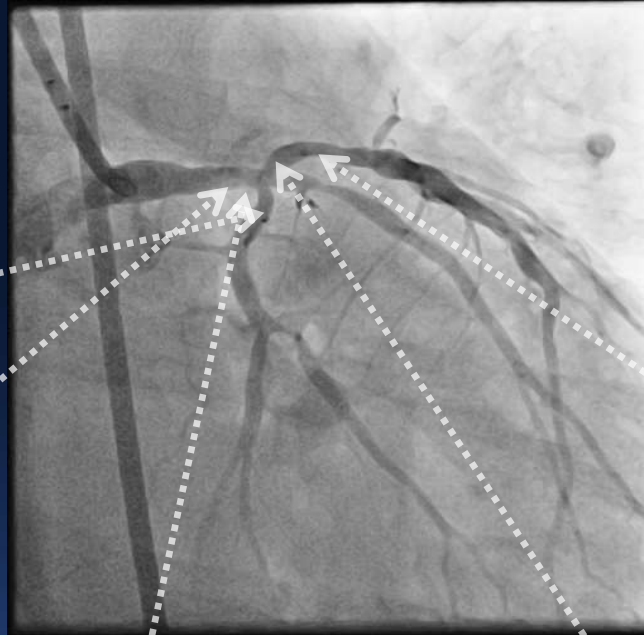
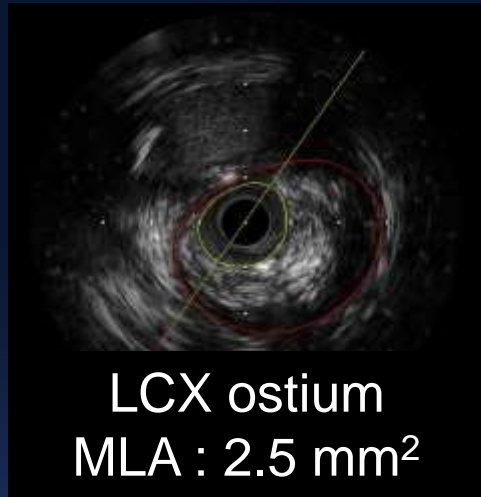
## Case 1, 55/M Effort Chest Pain



Is the Lesion Functionally Significant ?  
How to Treat ?



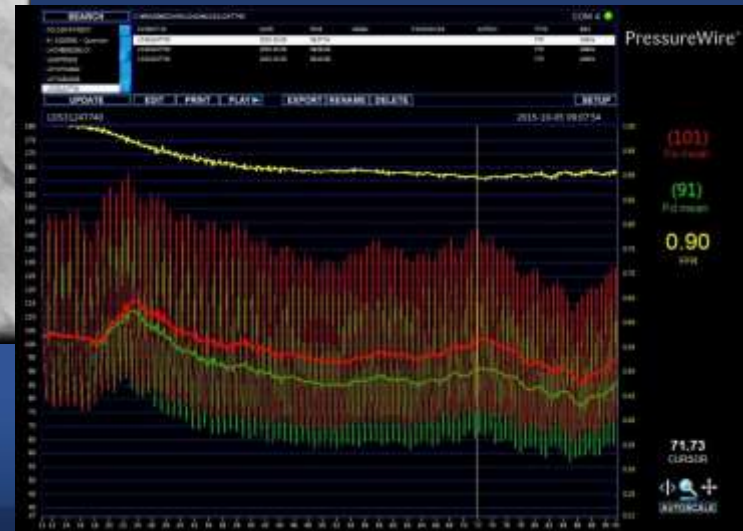
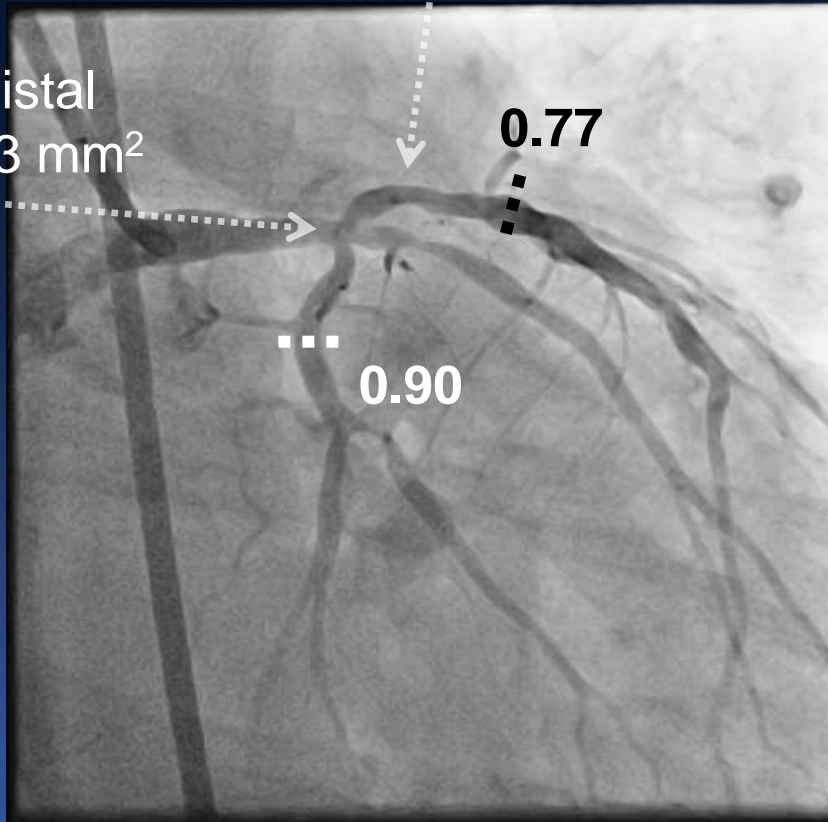
# IVUS



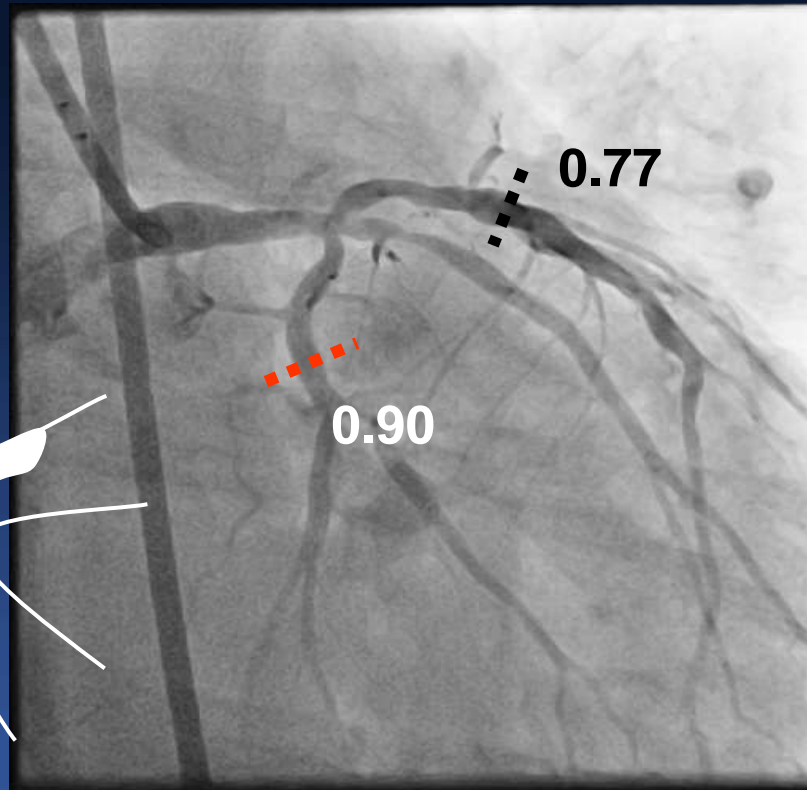
# IVUS vs. FFR

LAD Os  
MLA 3.2 mm<sup>2</sup>

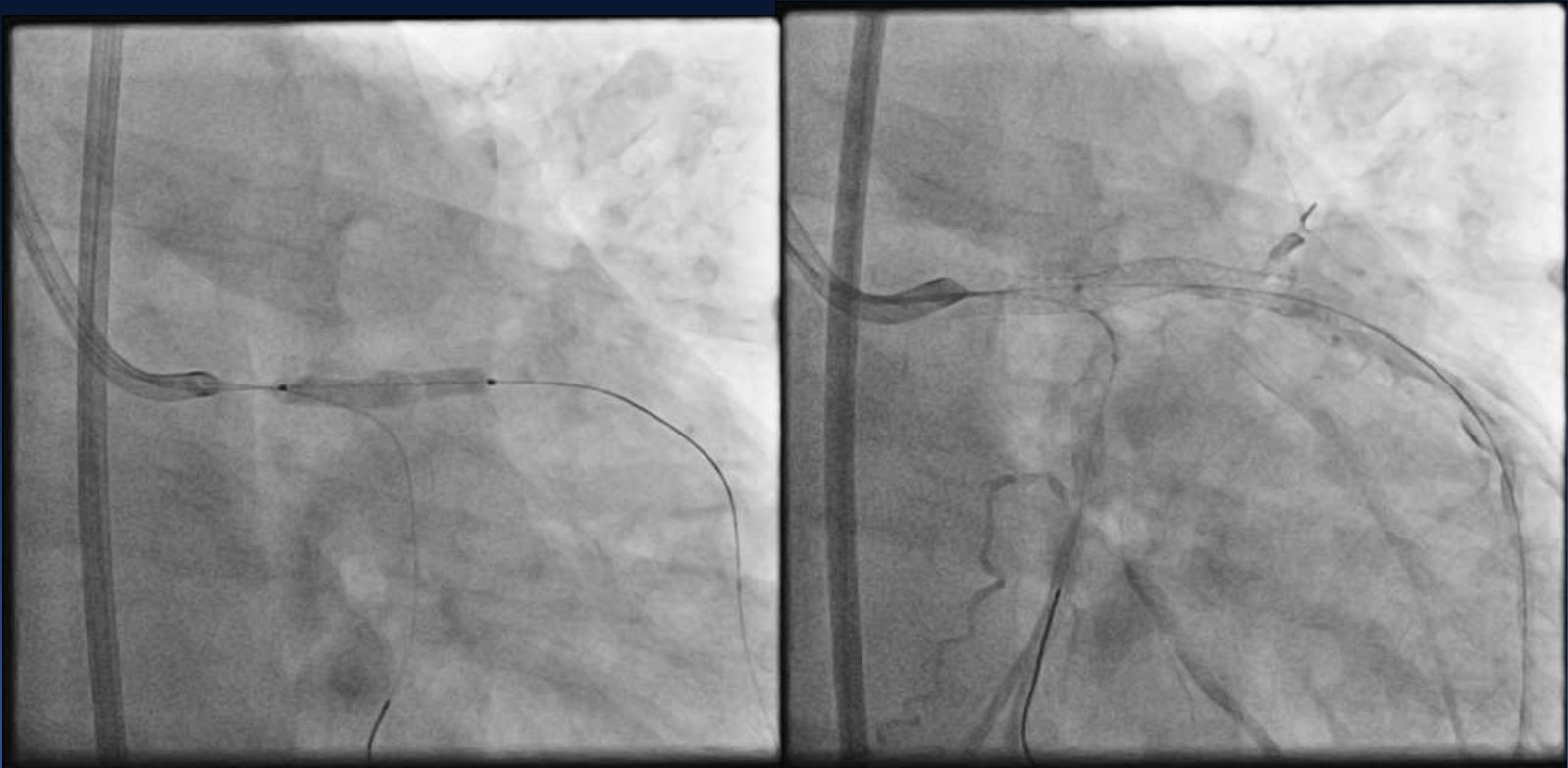
LM Distal  
MLA 5.3 mm<sup>2</sup>



# *How To Treat ?* **1 or 2 Stent ?** **for distal LM bifurcation**



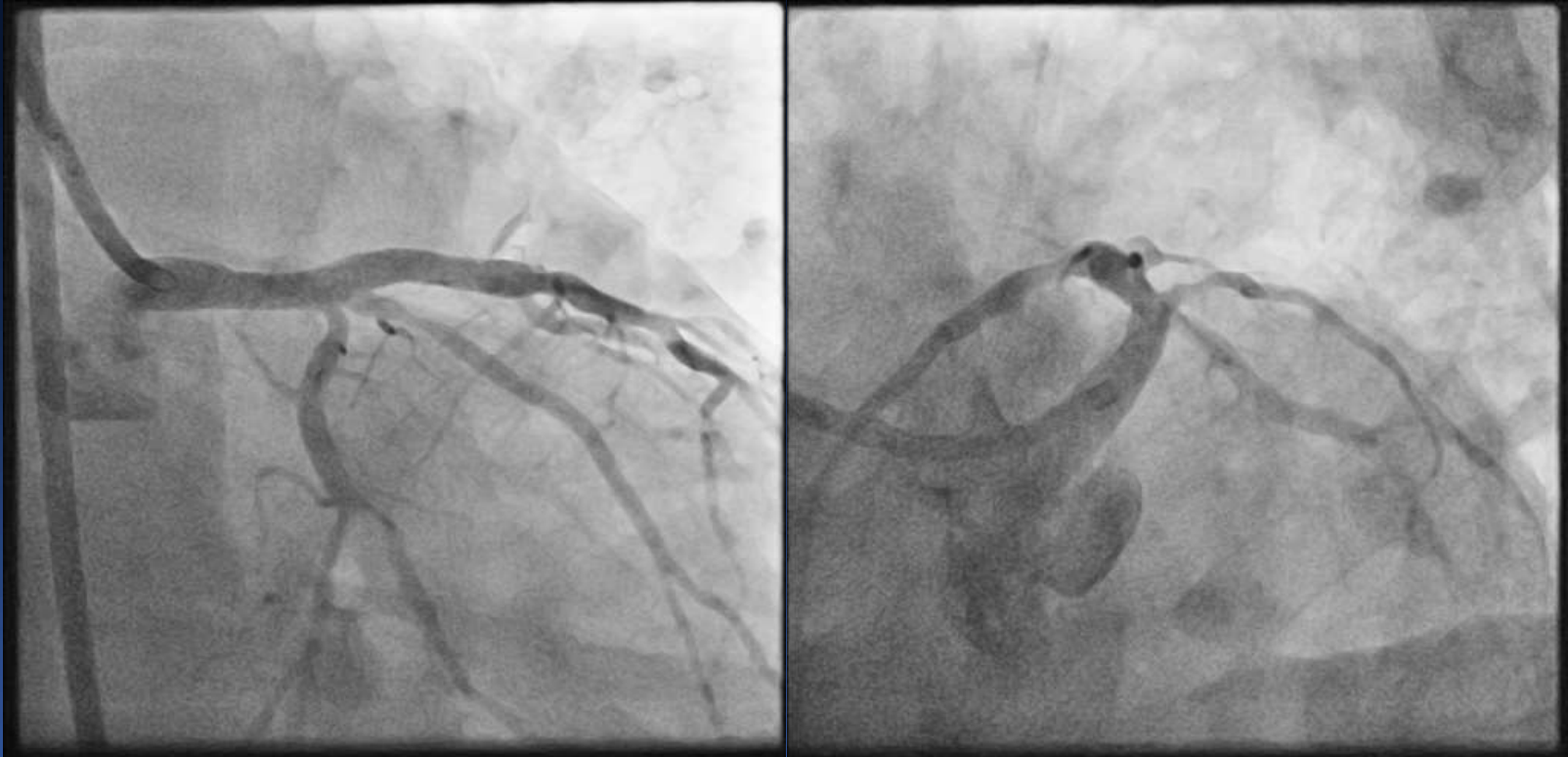
# Single Stent Crossover



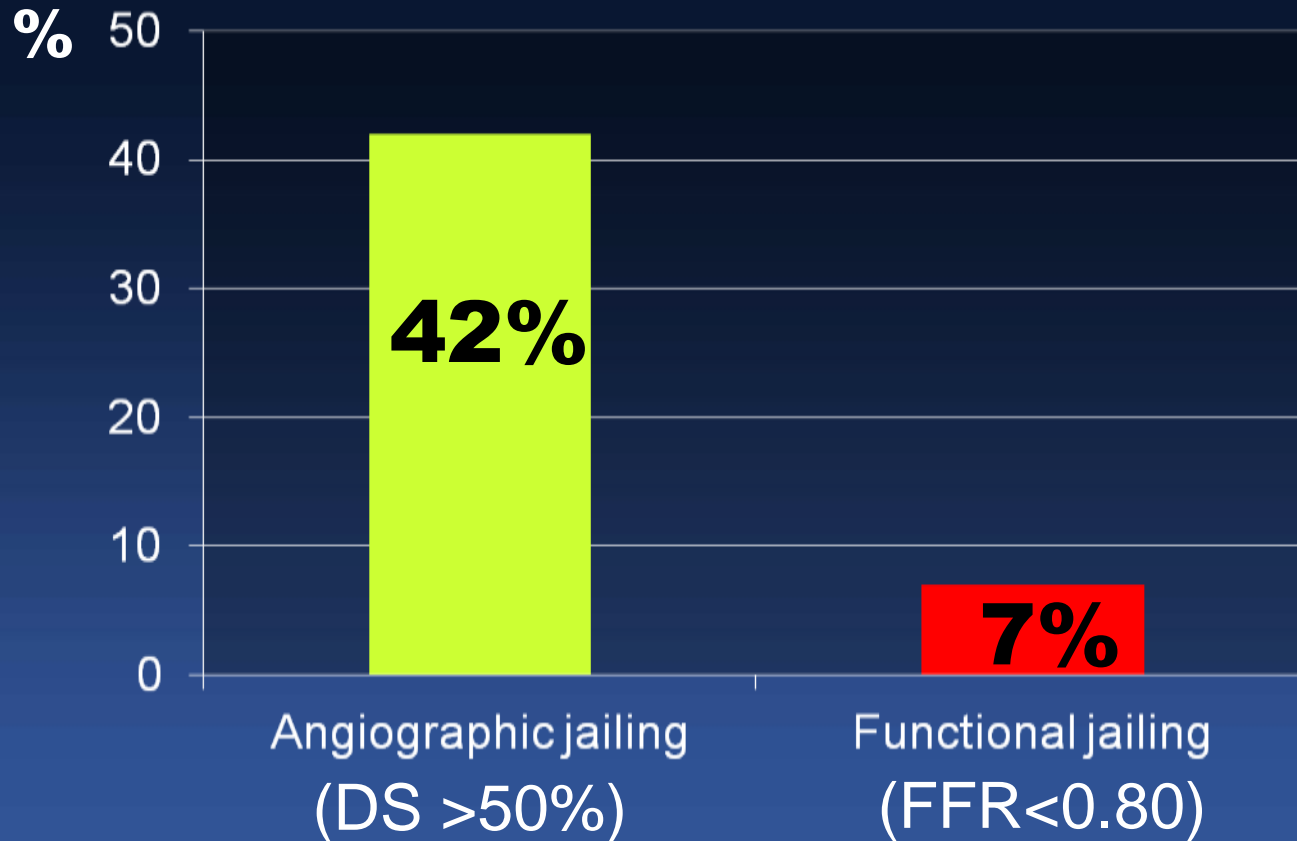
XIENCE Alpine  
4.0mm x 30mm



# Final Angiogram

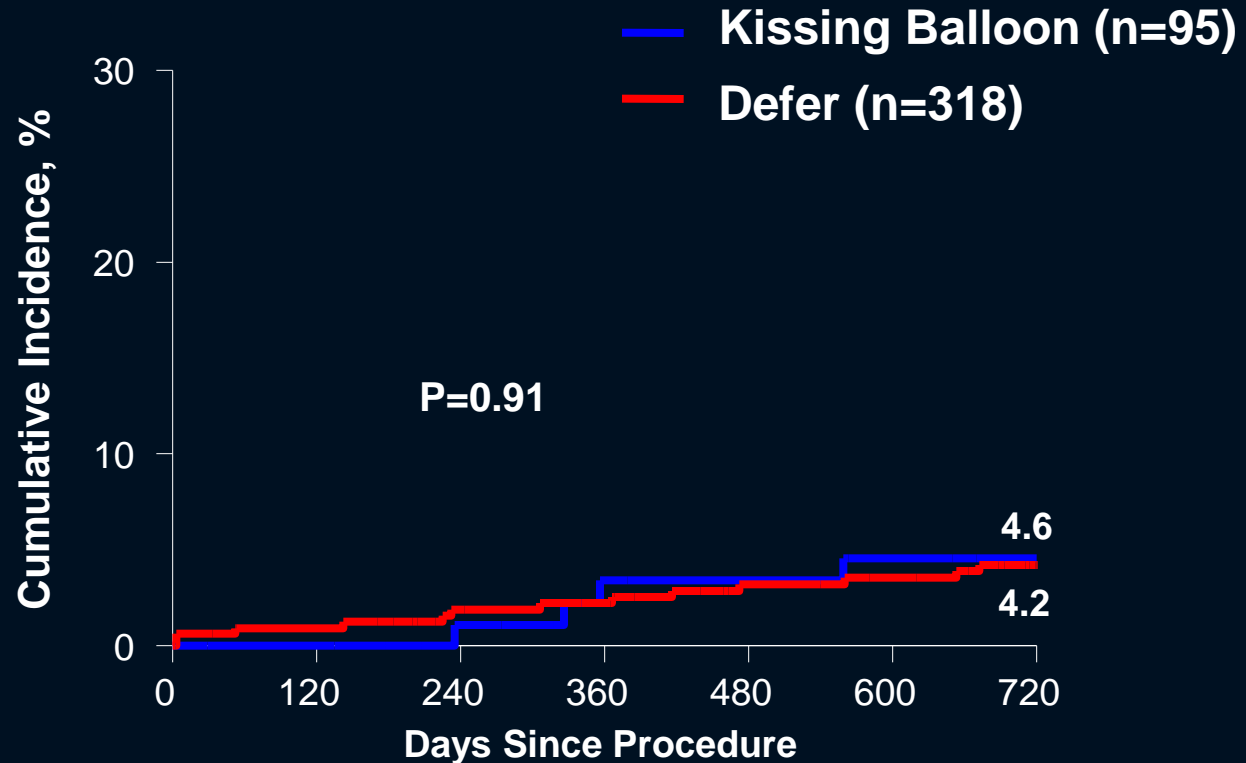


# *Functionally Significant LCX Jailing* After Stent Crossover for LM Bifurcation



# Death or MI at 2 Years

## Jailing LCX Defer Is Safe and Good !



**No. at Risk**

FKB	95	85	80
No-FKB	318	300	278

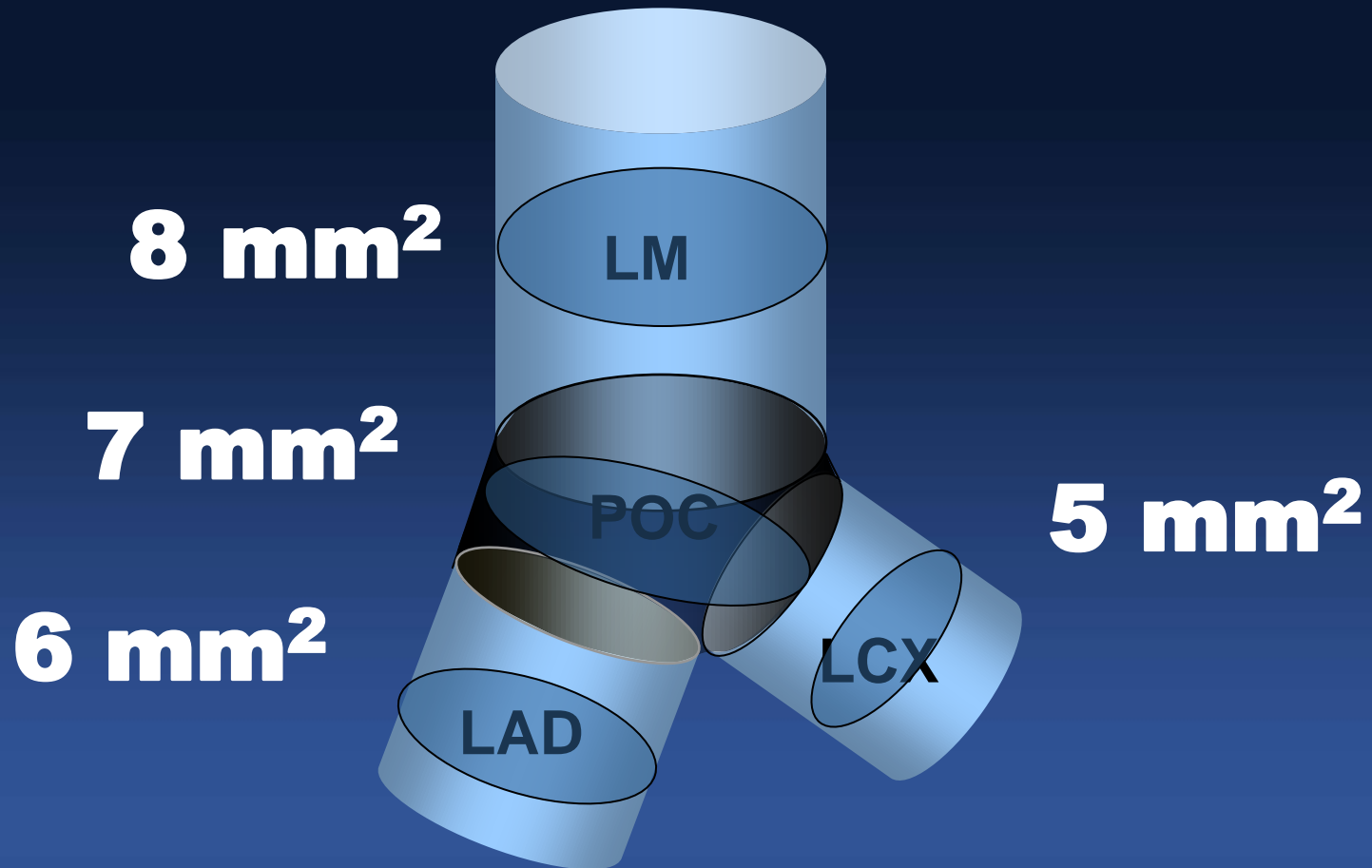
# 2 Stent Techniques for distal LM bifurcation

- T-stent, modified T-stent or TAP
- Mini-crush (or step crush)
- Culotte
- V-stent
- Y-stent (SKS-simultaneous kissing stents)



# Effective Stent Area (Rule of 5,6,7,8 mm<sup>2</sup>)

*Restenosis Rate < 5% and TLR < 2%*



# ***Bifurcation PCI***

## *How To Do ?*

### **for distal LM bifurcation**

- Both strategy (1 or any 2 stent techniques) would be OK in the era of 2<sup>nd</sup> DES. Side branch treatment with FFR guided or FFR trained concept can make a good clinical outcomes.
- *Whatever you used 2 stent technique, IVUS optimization (effective stent area, 5.6.7.8 mm<sup>2</sup>) can make a good clinical outcomes.*

# What Really Matters in Bifurcation PCI ?

***It's a Matter of Concept  
rather than Technique !***