

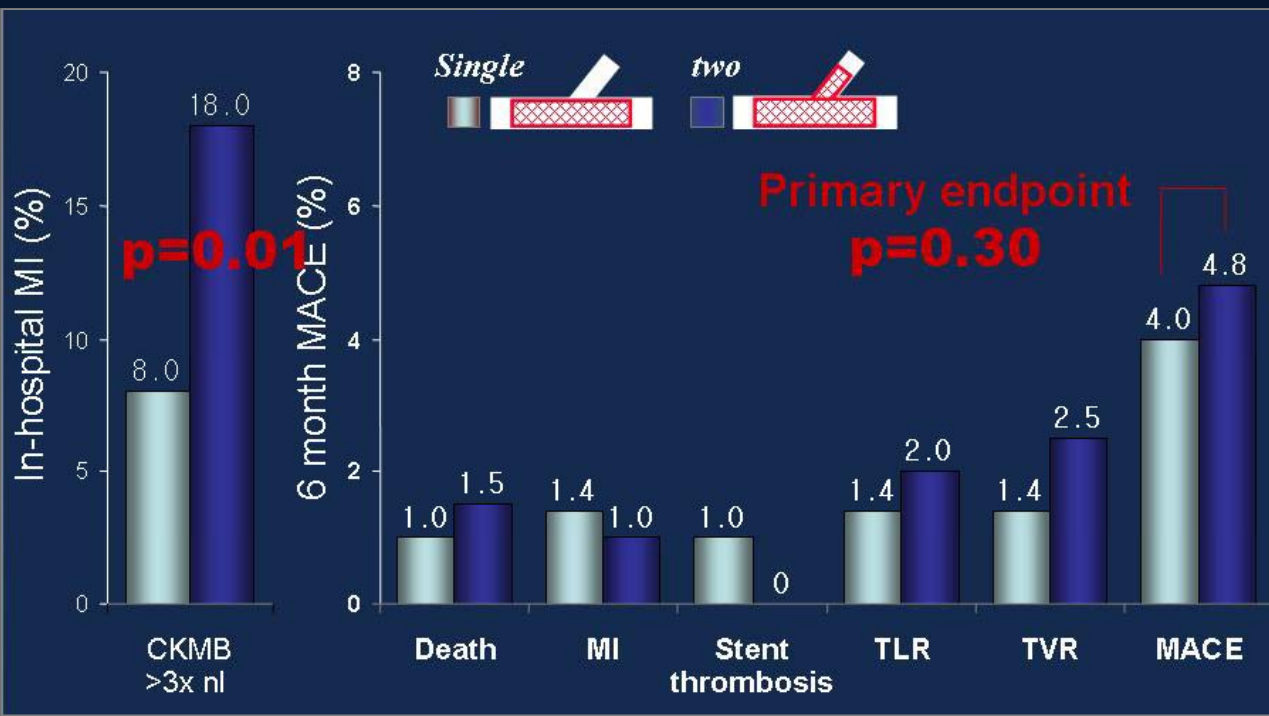
Insights from FFR and IVUS for Bifurcation PCI

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Disclosure

I have nothing to disclose



Nordic 1 Single vs. Two

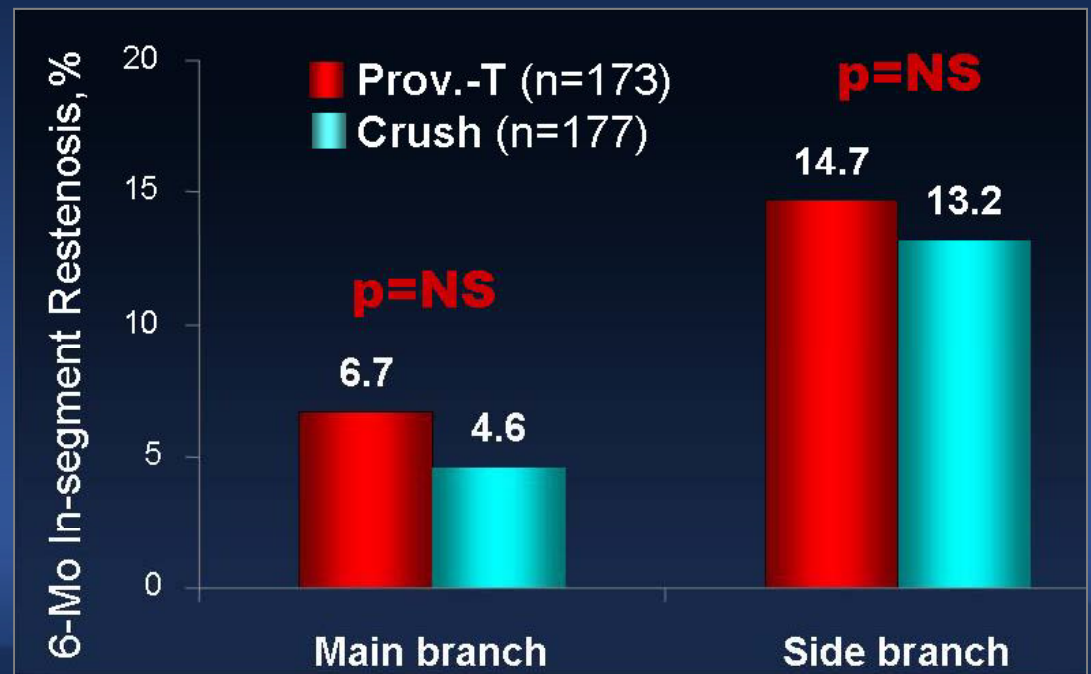
Steigen et al.
Circulation 2006;114:1955-61

CACTUS

Provisional vs. Crush

No additive benefits of two-stent strategy as compared with a conventional single-stent strategy

Colombo et al. *Circulation* 2009;119:71

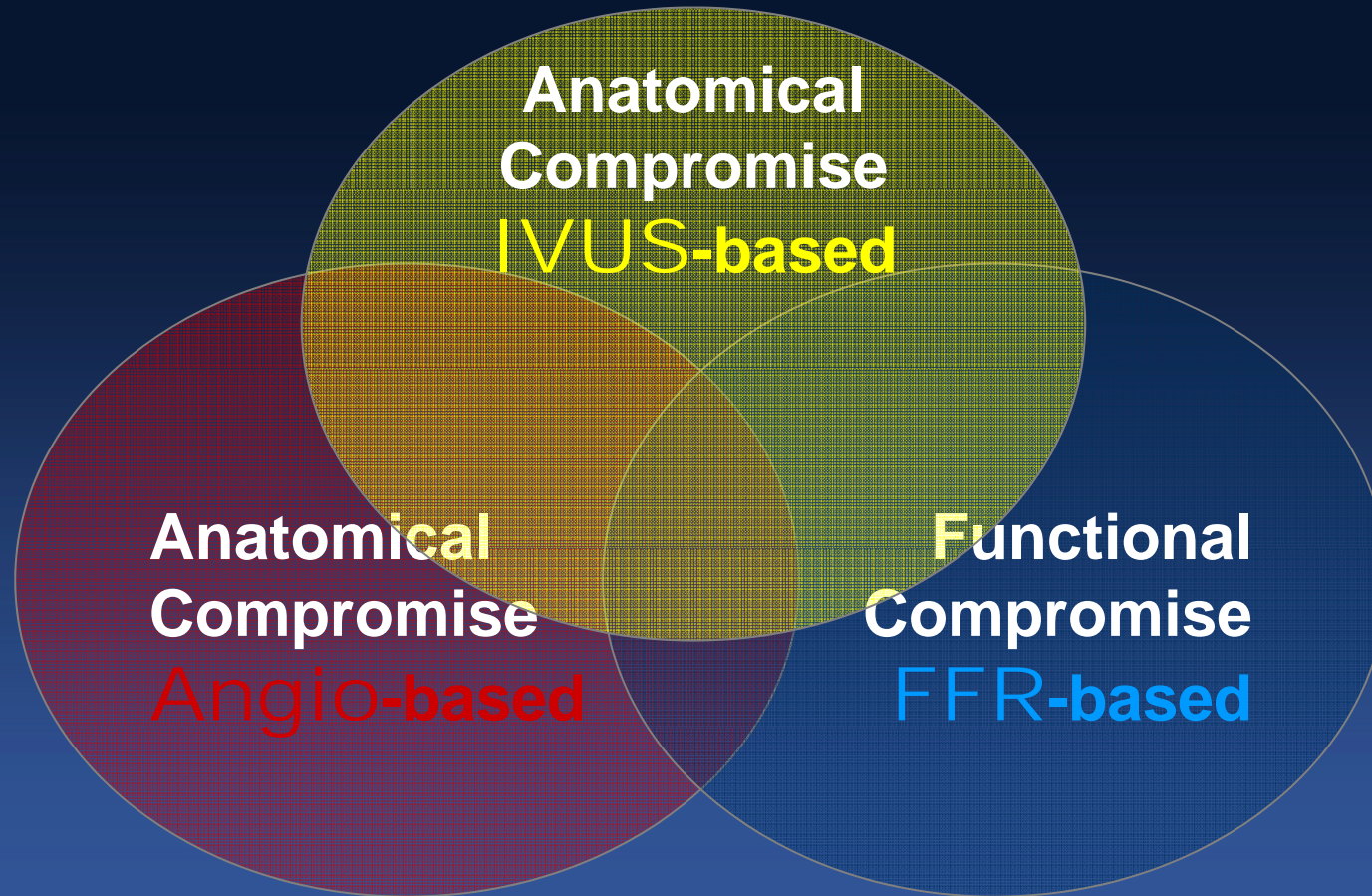


Mechanisms of SB Compromise

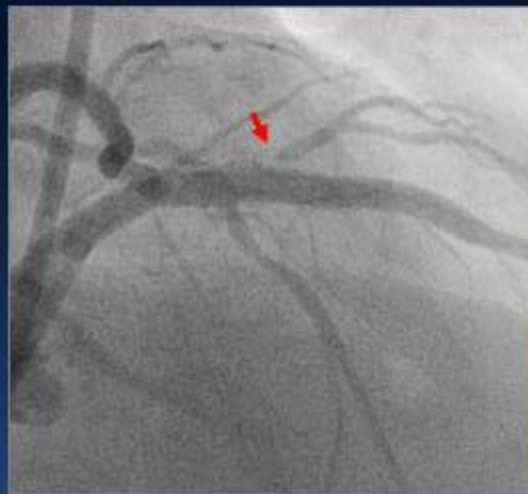
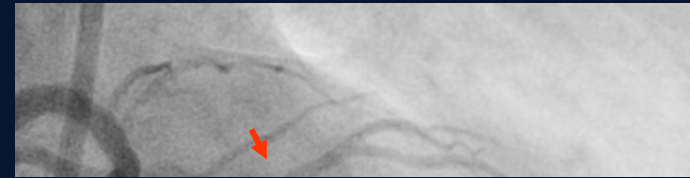
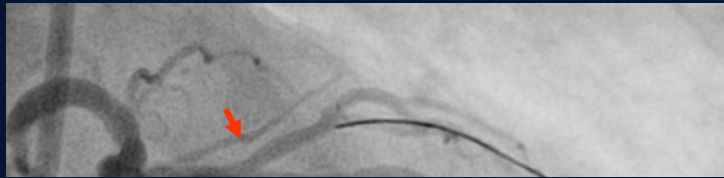
- Carina Shift
- Plaque Redistribution
- Stent strut artifact

April 28, 2011 Main & Bifurcation Summit
IVUS-Guided Provisional Stenting: Plaque or Carina Shift

Anatomical vs. Functional Assessment of SB Compromise



Anatomical vs. Functional Match

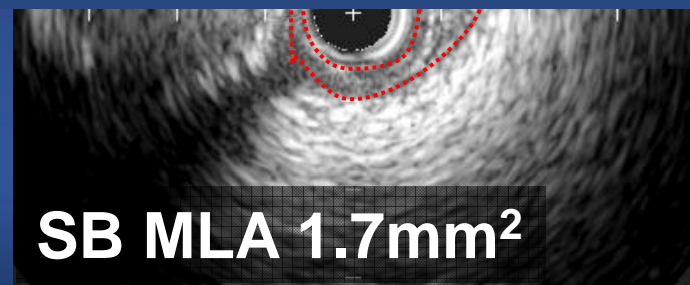
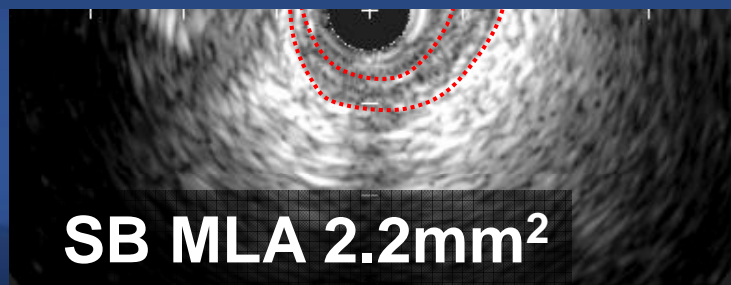


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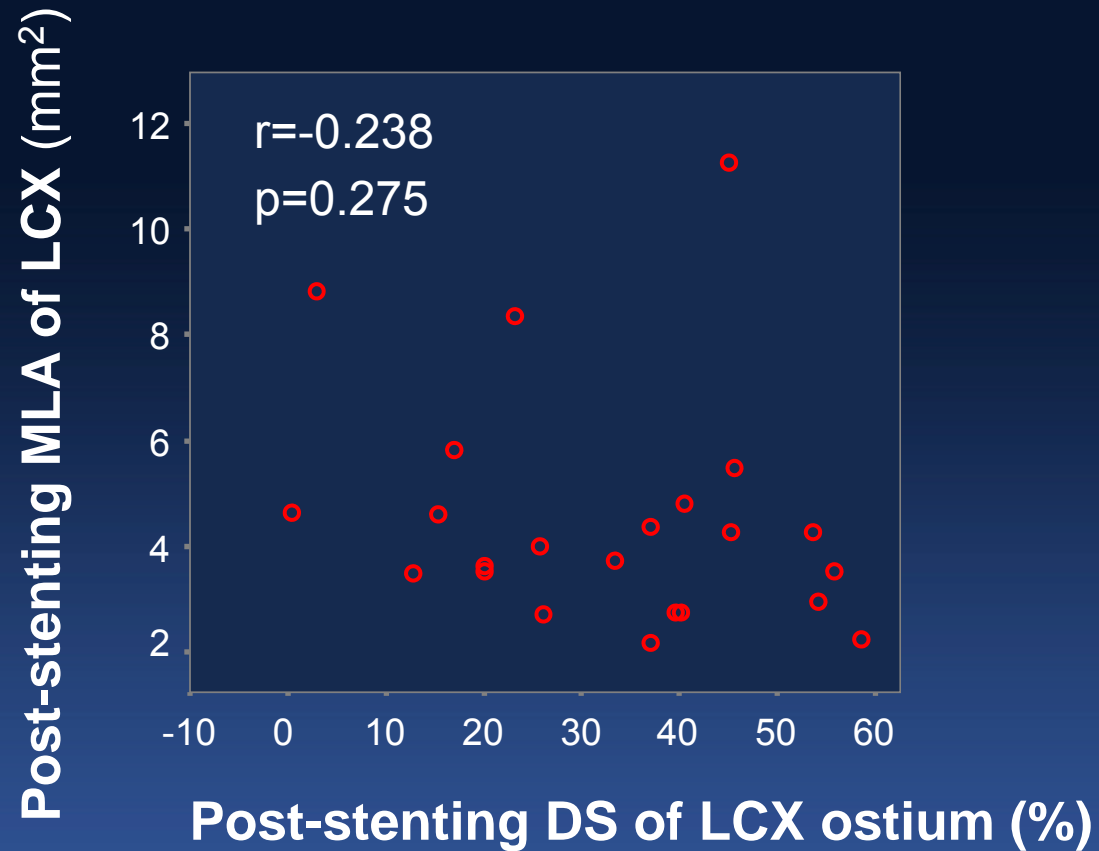


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FFR 0.70

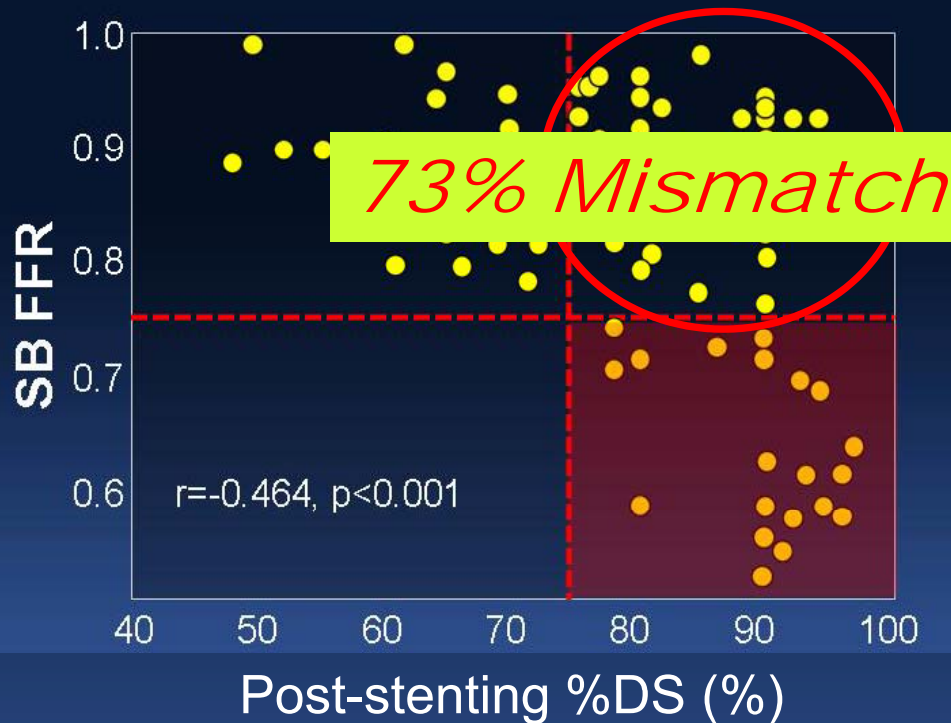


QCA-DS vs. IVUS-MLA after LM Cross-over

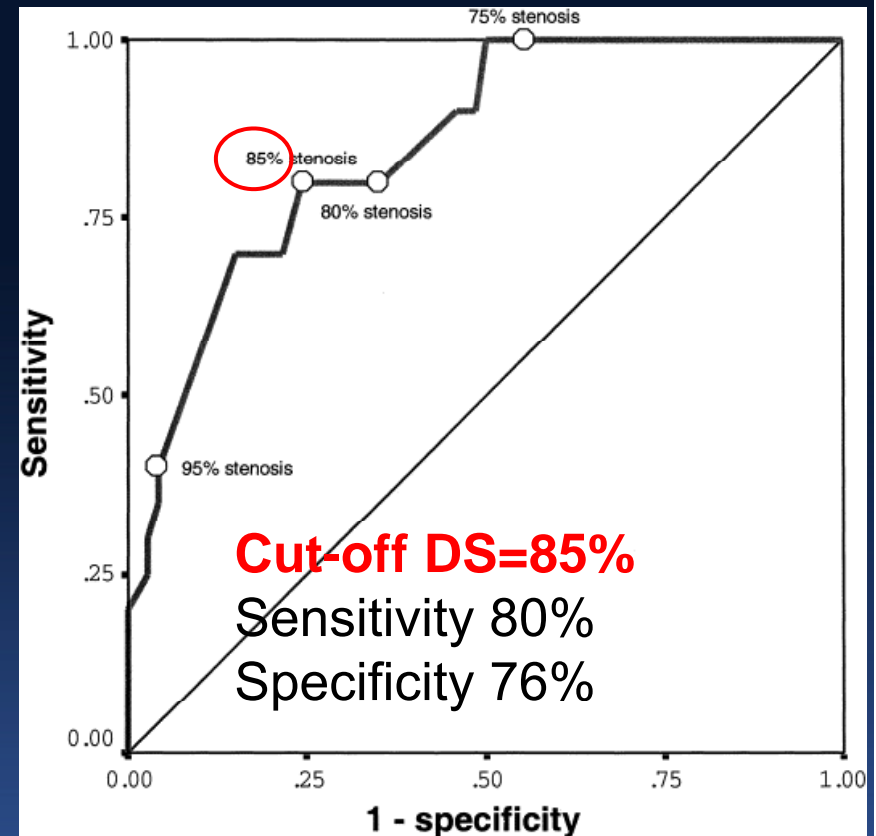


Kang et al. Circ Cardiovasc Interv 2011 Accepted

SB DS vs. SB FFR Post-stenting



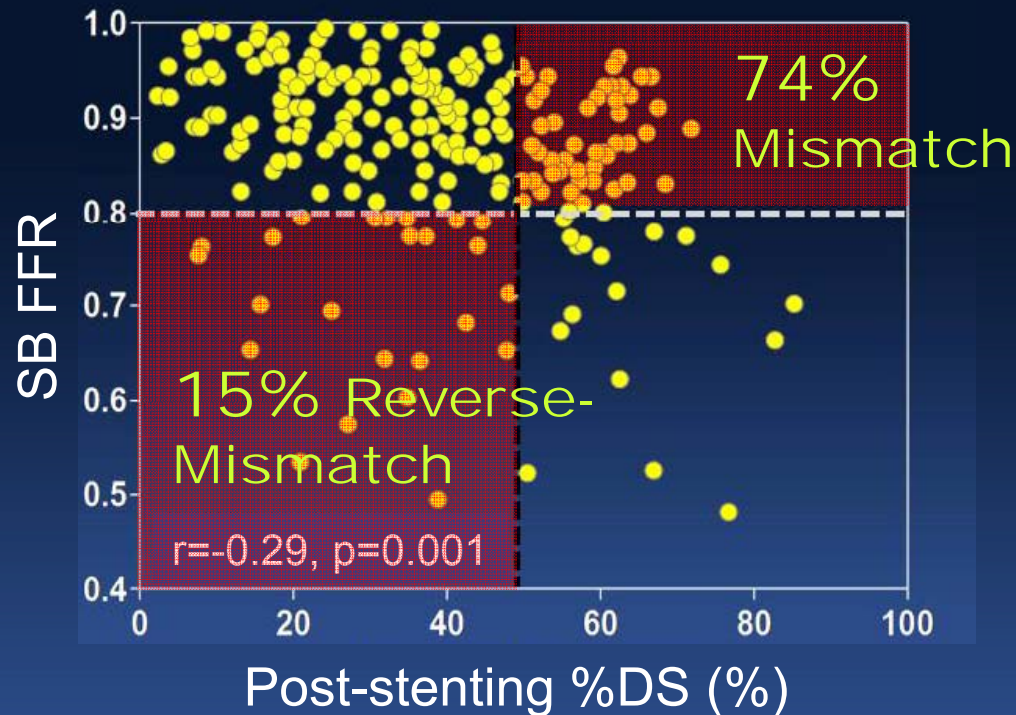
*Only 27% with SB DS > 75% had FFR < 0.75
Conversely, 73% were mismatched*



QCA is unreliable to assess the functional severity of jailed SB. Most lesions are not functionally significant

SB DS vs. SB FFR Post-stenting (N=230)

Functional Jail (FFR<0.8) → 18%



74% with DS>50% → FFR>0.80 **“Mismatch”**

15% with DS≤50% → FFR≤0.80 **“Reverse-Mismatch”**

Angiography is not Reliable to Assess Anatomic and Functional Compromise

- Lesion eccentricity of SB
- Stent strut artifacts

→ *Although IVUS overcomes those limitations...*

Anatomical vs. Functional Mismatch

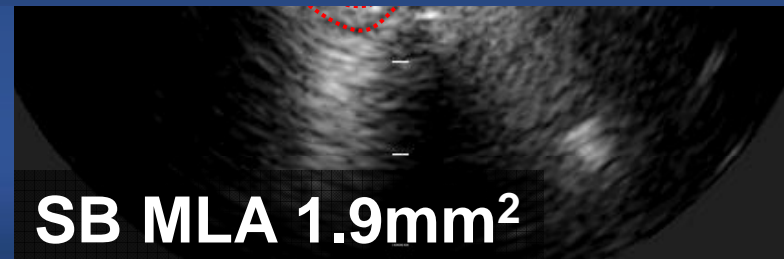
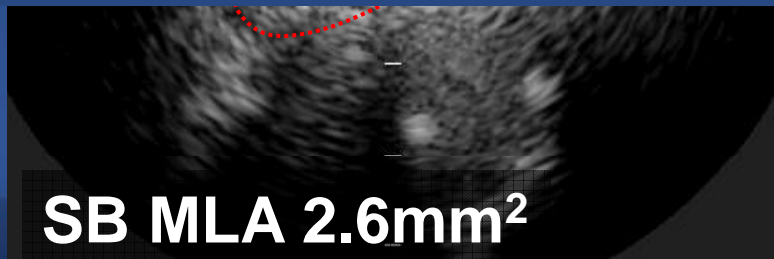


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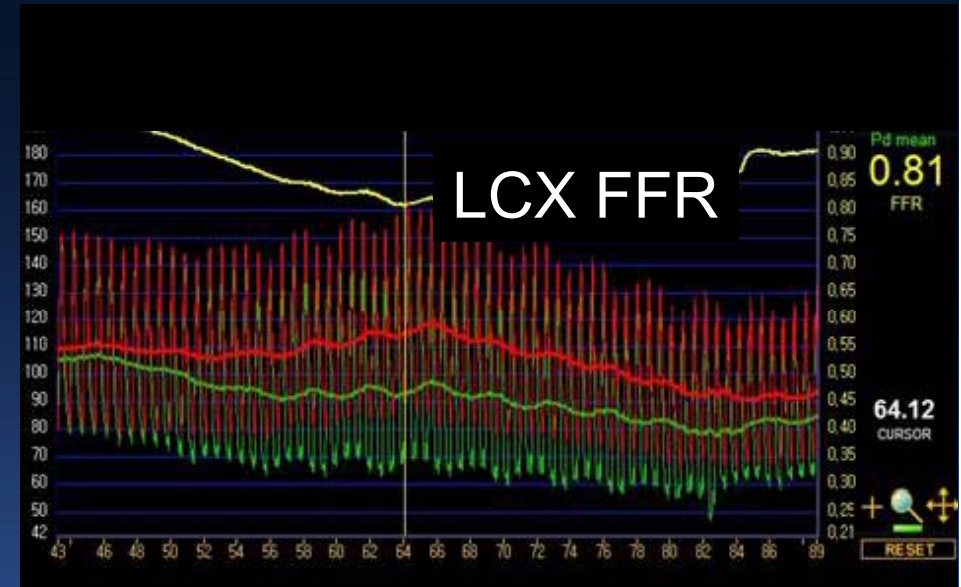
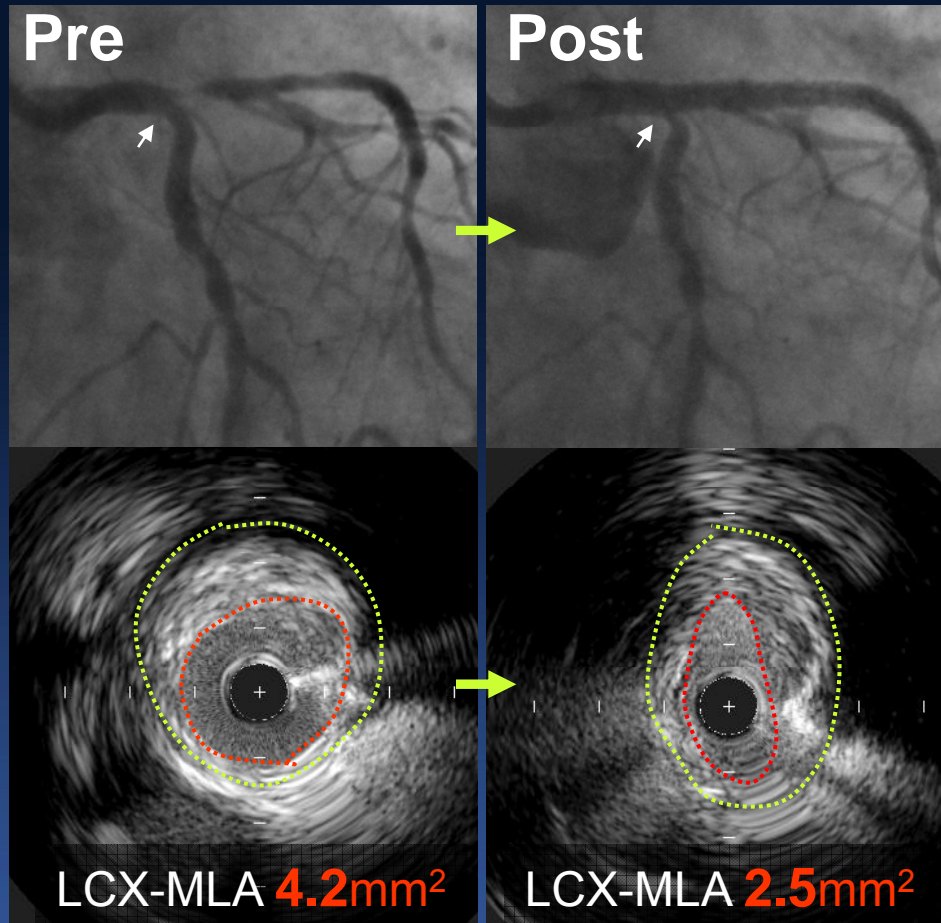


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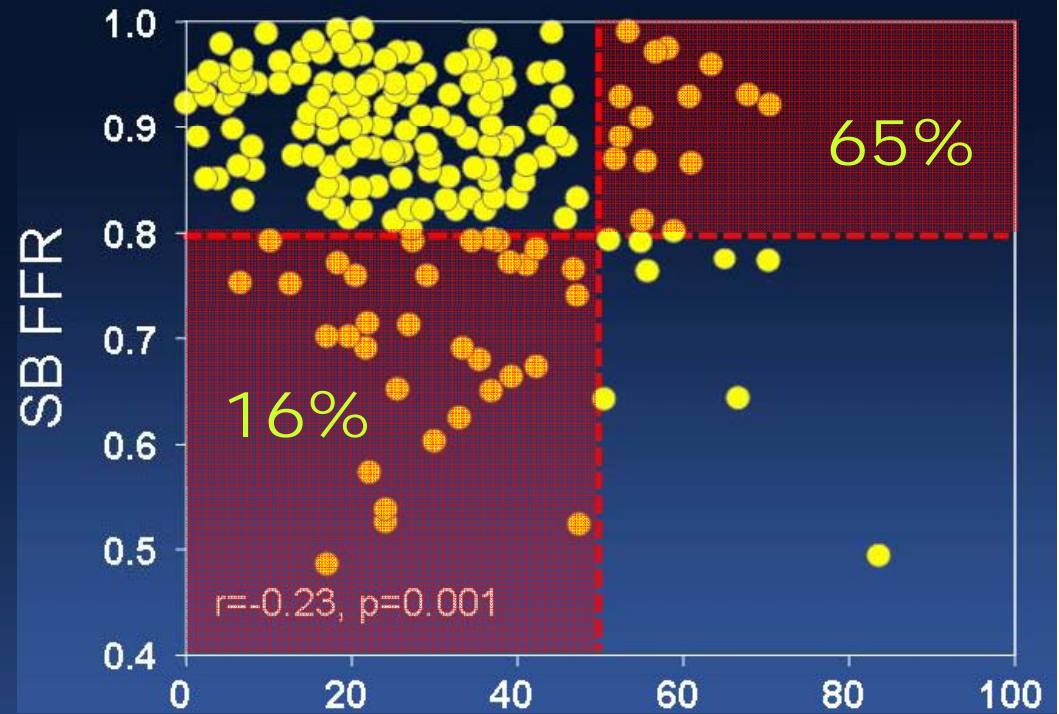
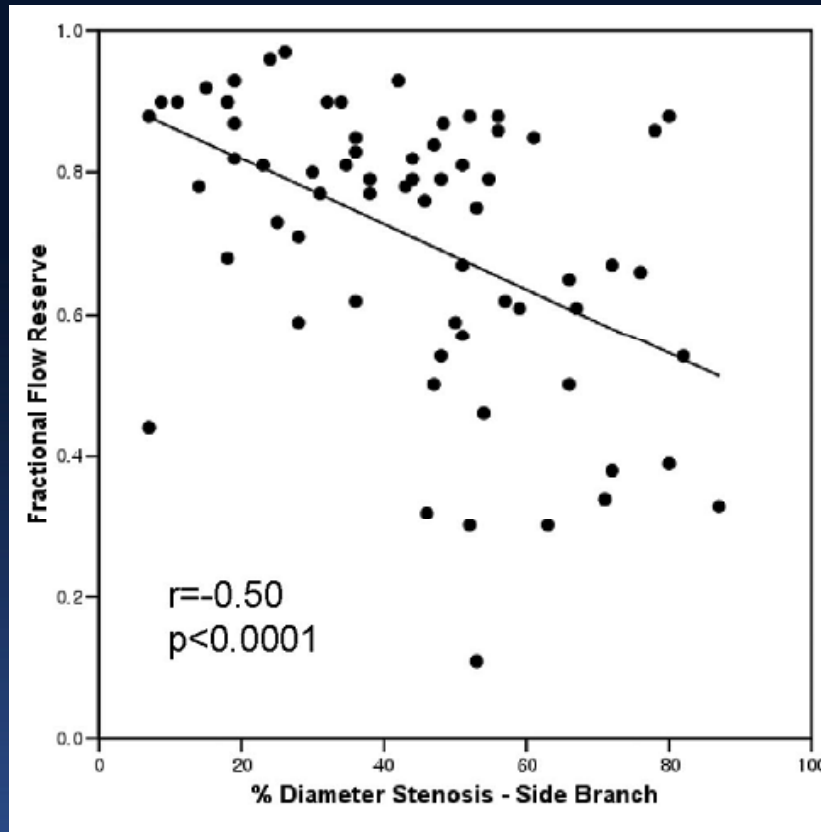
FFR 0.83



Anatomical vs. Functional Mismatch



Pre-PCI Predictors for SB FFR



Pre-procedural %DS (%)

Koo et al. Circ Cardiovasc Interv 2010;3:113-9

AMC Data

Preintervention Angiographic and Intravascular Ultrasound Predictors for Side Branch Compromise After a Single-Stent Crossover Technique

Soo-Jin Kang, MD, PhD^a, Gary S. Mintz, MD^b, Won-Jang Kim, MD^a, Jong-Young Lee, MD^a, Duk-Woo Park, MD, PhD^a, Seung-Whan Lee, MD, PhD^a, Young-Hak Kim, MD, PhD^a, Cheol Whan Lee, MD, PhD^a, Seong-Wook Park, MD, PhD^a, and Seung-Jung Park, MD, PhD^{a,*}

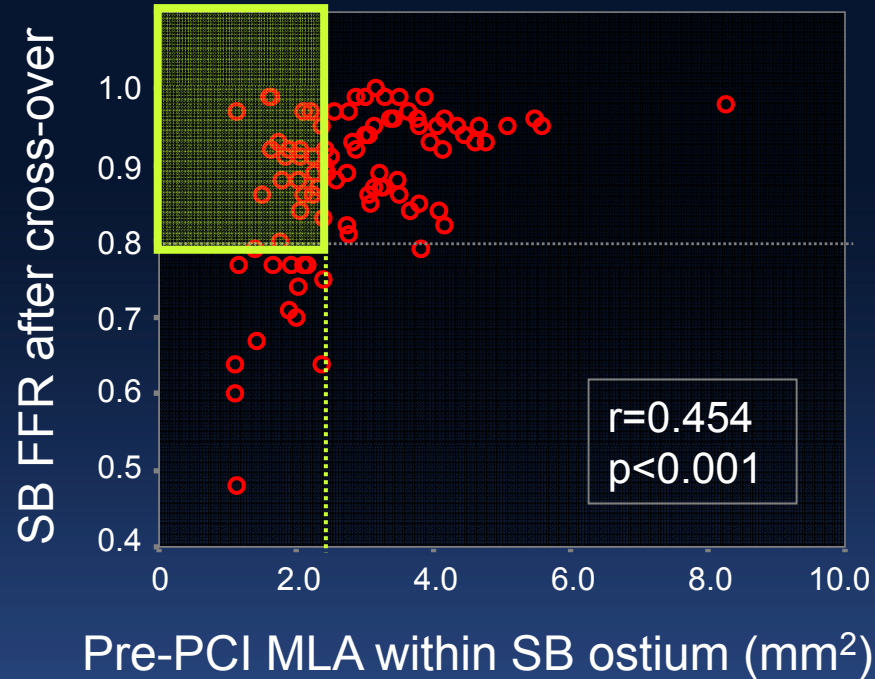
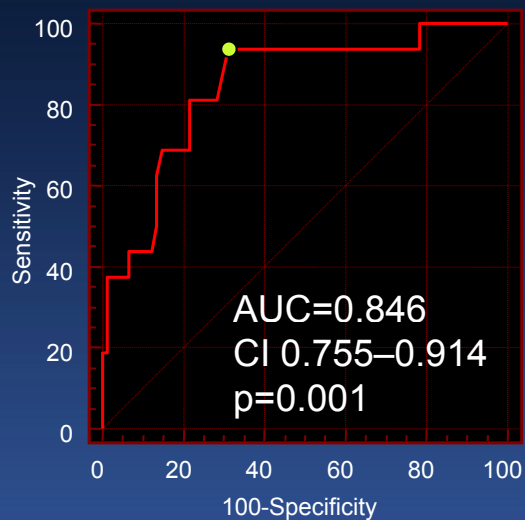
SB FFR <0.80: 16 of 90 lesions (18%)

Independent Predictors for SB FFR	β	95% CI	p
Maximal balloon pressure	-0.265	-0.010 – -0.002	0.003
MLA of SB ostium pre-PCI	0.216	0.001 – 0.035	0.040
PB at SB ostium pre-PCI	-0.296	-0.003 – -0.001	0.005
MLA of MB distal to the carina	0.250	0.005 – 0.027	0.025

Kang et al. Am J Cardiol 2011 in press

Pre-procedural IVUS-MLA within SB Ostium Predicts Post-stenting SB FFR <0.80

MLA of SB Ostium
Cut-off = 2.4mm²

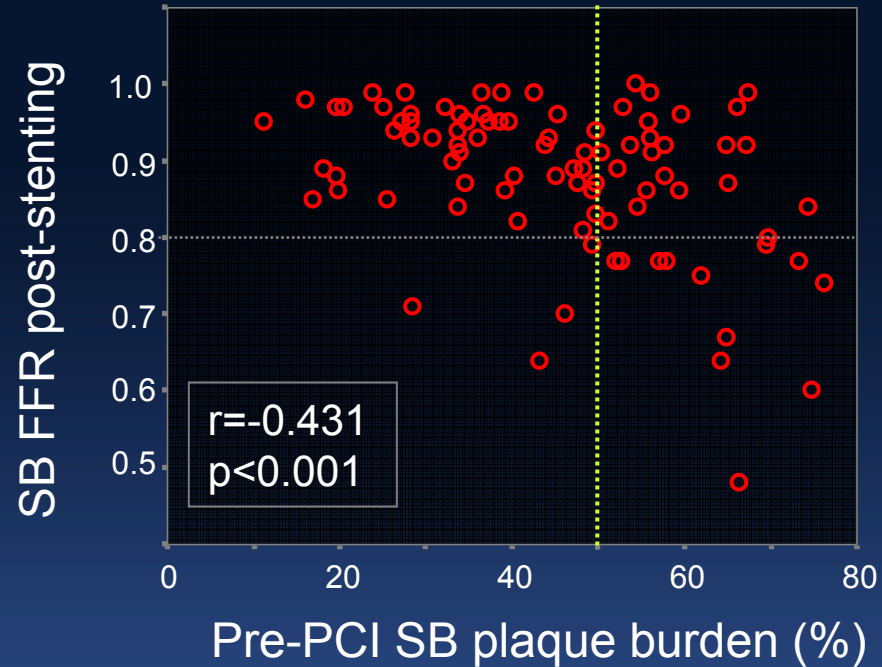
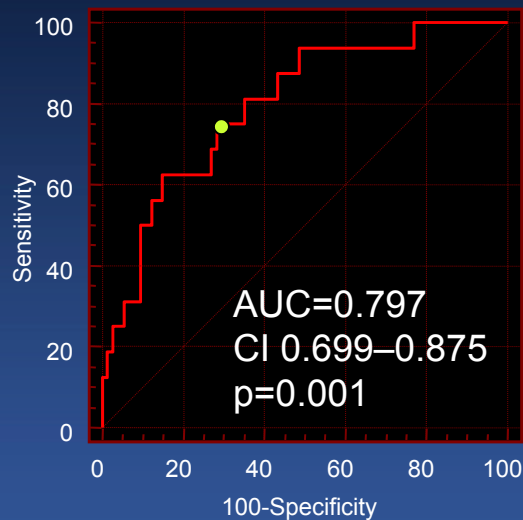


32% of SB lesions without functional significance may undergo unnecessary PCI

Kang et al. Am J Cardiol 2011 in press

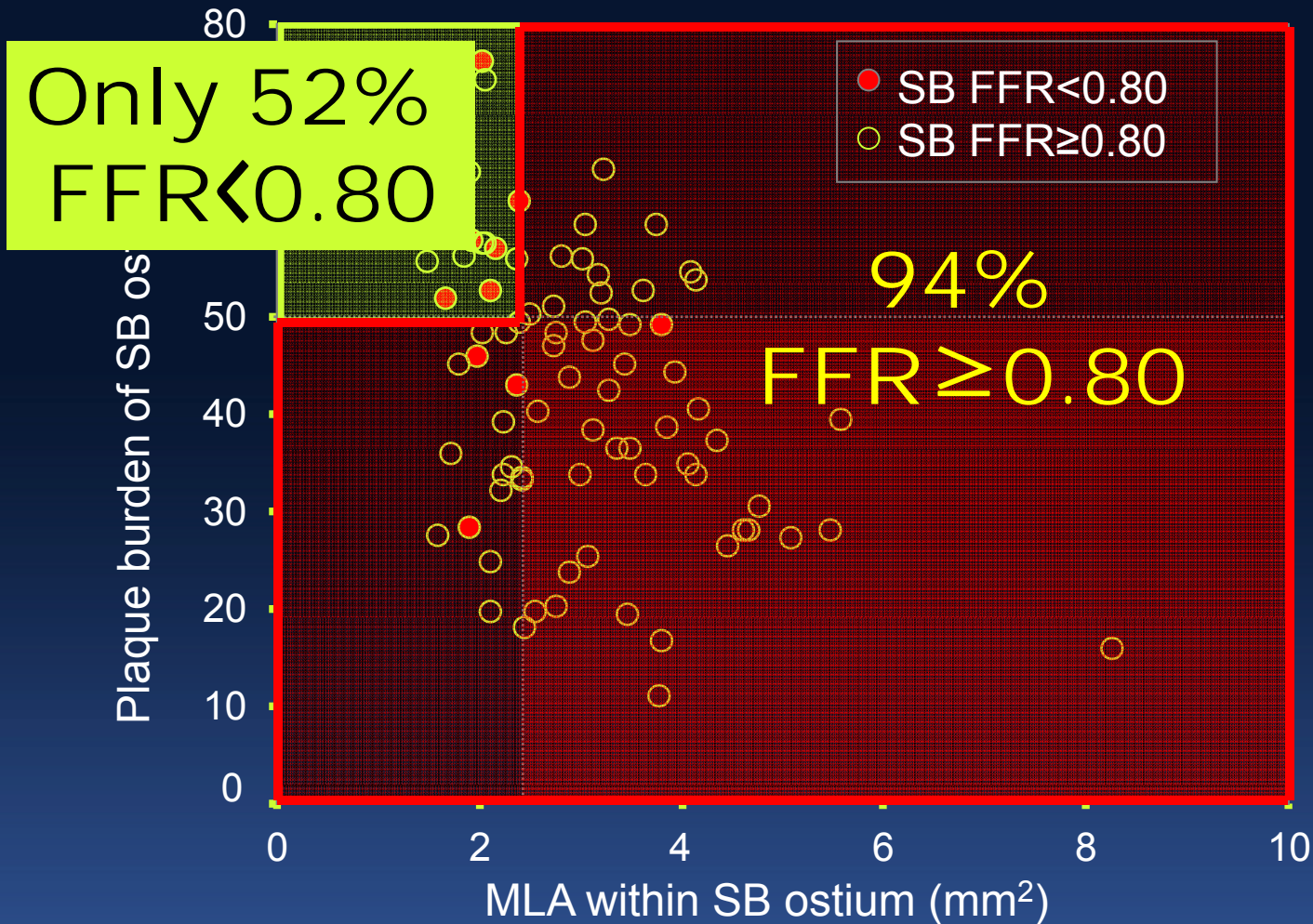
Pre-procedural Plaque Burden of SB Ostium Predicts Post-stenting SB FFR <0.80

Plaque burden
within SB ostium
Cut-off =50%



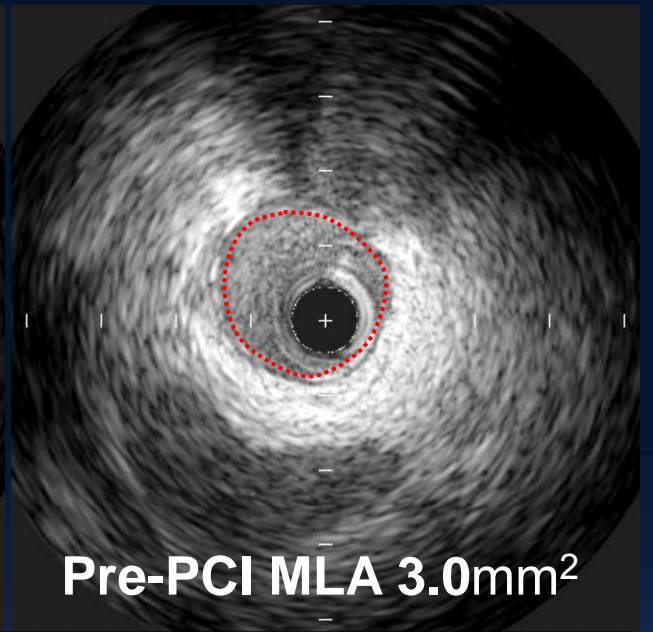
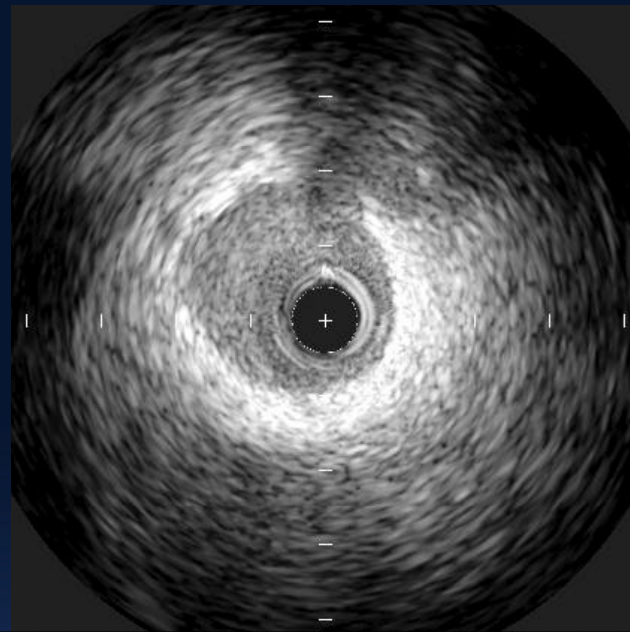
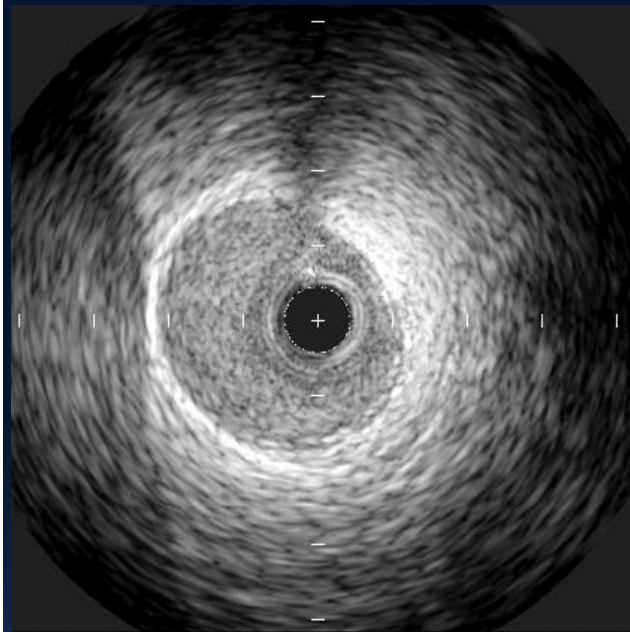
Sensitivity=75%
Specificity=71%
PPV=36%
NPV=93%

Kang et al. Am J Cardiol 2011 in press

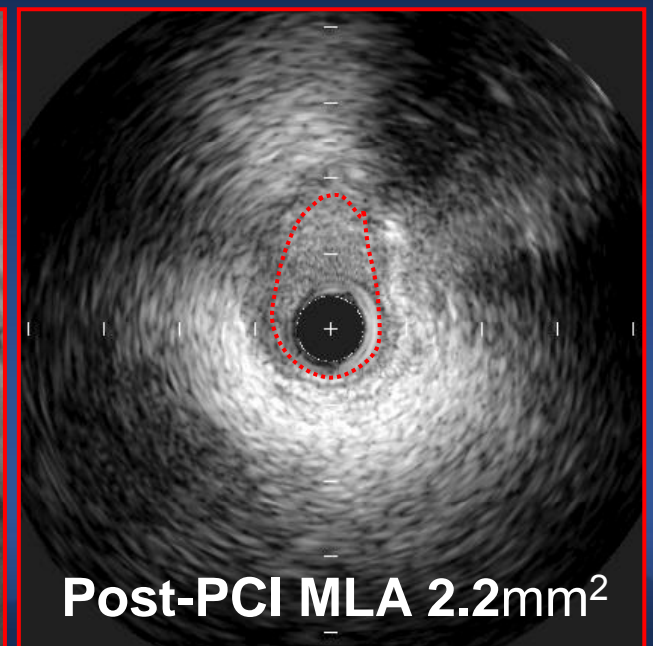
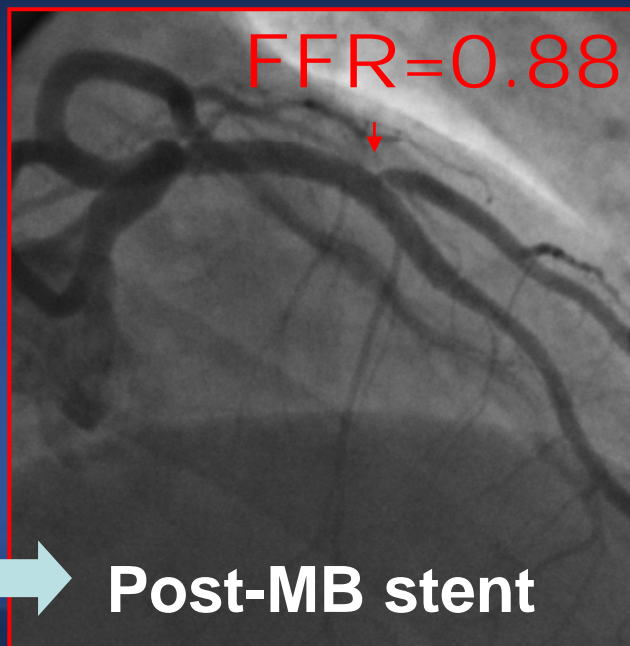
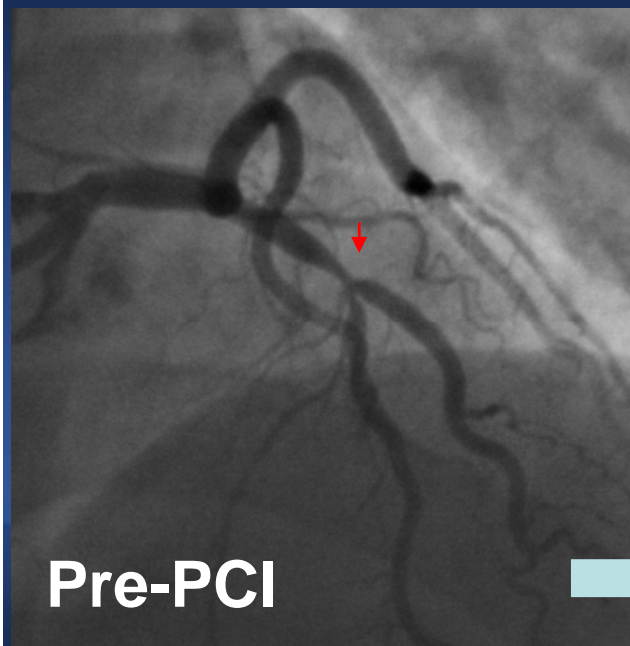


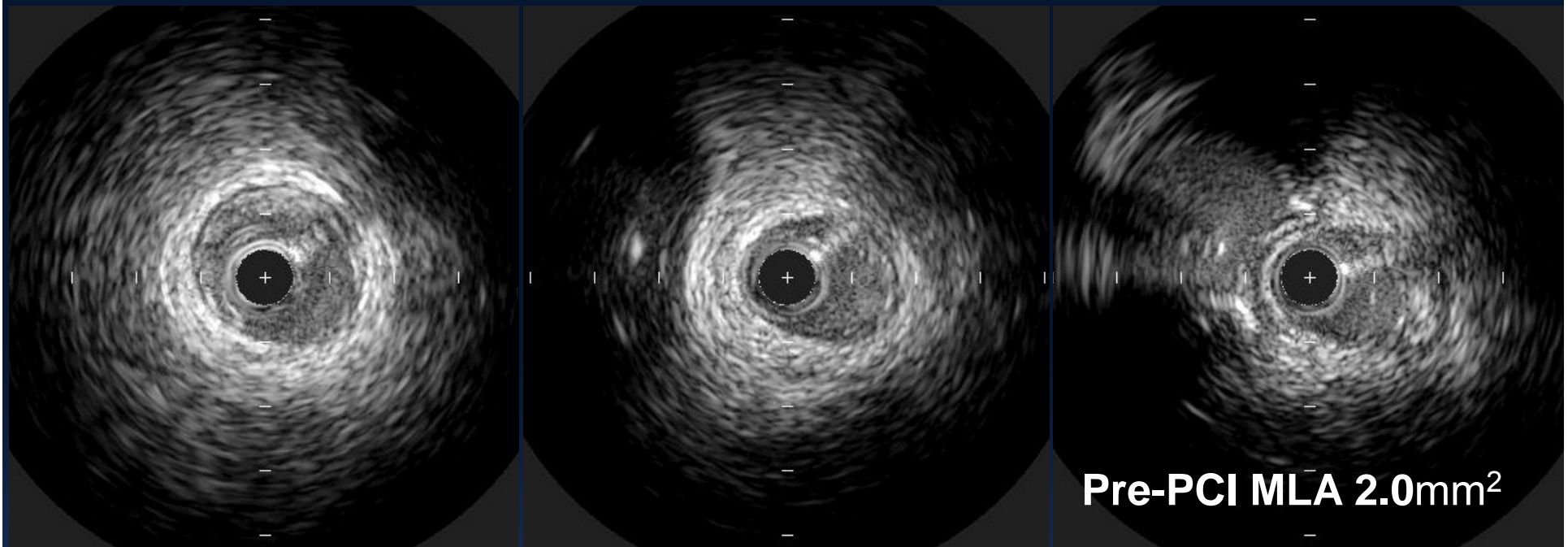
Combining pre-PCI IVUS-**MLA** and **plaque burden**, diagnostic accuracy predicting FFR < 0.80 was **83%**.

Kang et al. Am J Cardiol 2011 in press



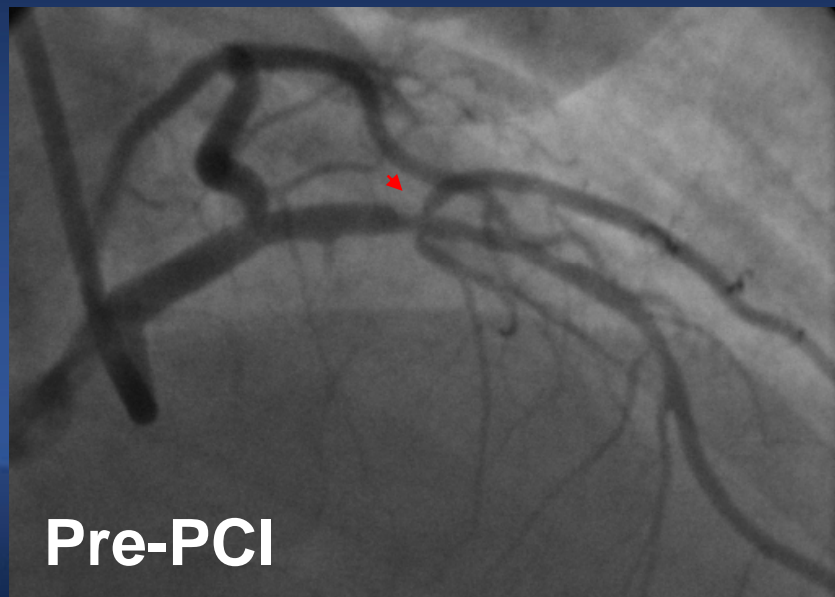
Isolated Negative Remodeling (RI=0.68)



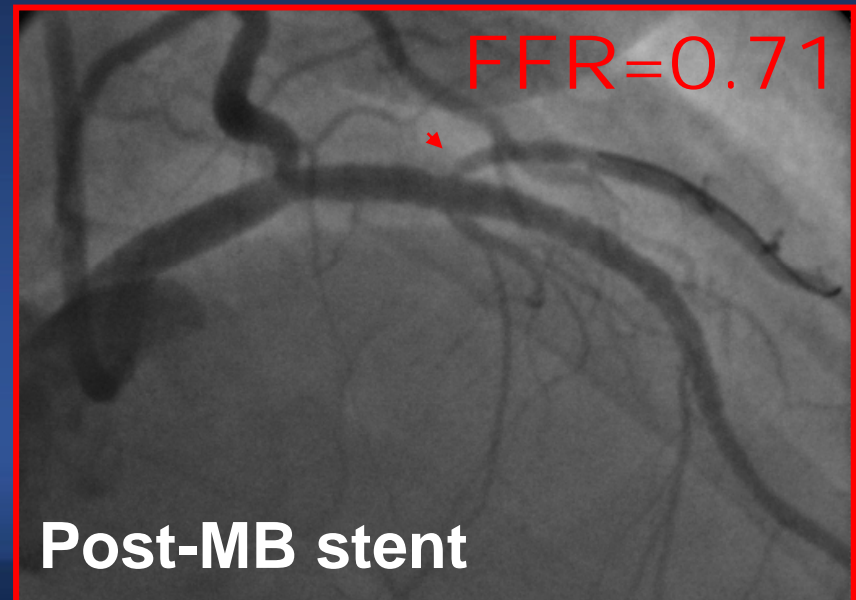


Pre-PCI MLA 2.0mm²

Negative Remodeling (RI=0.70) with Plaque



Pre-PCI



FFR=0.71

Post-MB stent

Negative Remodeling of SB Ostium

Can it predict SB FFR after MB stenting?

- Pre-PCI Remodeling Index (RI) <1 in 92%
- RI correlated with
 - Pre-PCI MLA within SB ostium ($r=0.34$, $p<0.001$)
 - Pre-PCI plaque burden at SB ostium ($p=NS$)
 - SB FFR after MB cross-over stenting ($p=NS$)

Although negative remodeling contributed to smaller MLA within SB ostium, it rarely affected SB FFR after MB cross-over without a significant plaque burden

Kang et al. Am J Cardiol 2011 in press

Summary

- Functional SB compromise was less frequent than anatomical jailing
- QCA-DS is unreliable in assessing both anatomical and functional compromise
- Although pre-PCI criteria combining MLA and PB confirm normal SB FFR after MB stenting, SB FFR <0.8 could not be predicted. Functional significance of SB jailing should be based on direct FFR measure