Complex Bifurcation Stenting-- New Findings from Bench Test

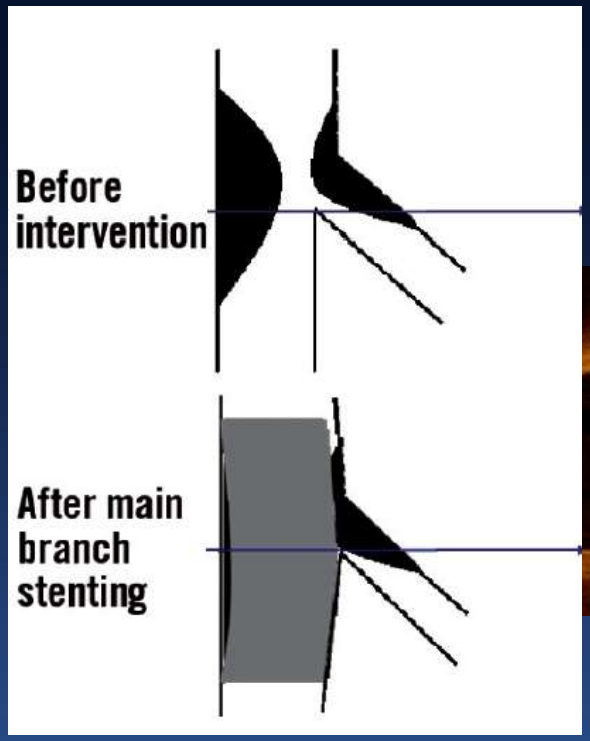
Jun-Jie Zhang, MD, FSCAI
Shao-Liang Chen, MD, FACC, FSCAI
Nanjing First Hosptial
Nanjing Medical University

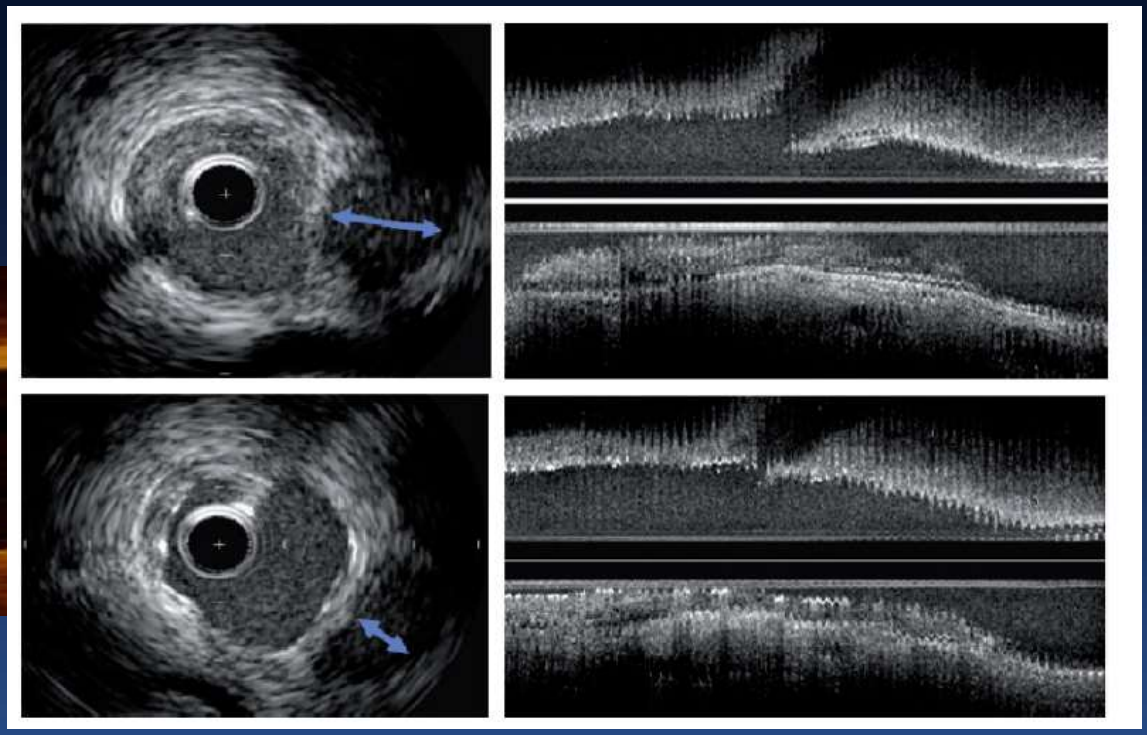
Nanjing First Hospital
Nanjing Medical University

C8S
Left Main & Coronary
Bifurcation Summit

Stent sizing question in bifurcation

Anatomy of Bifurcations : Murray's law





Risk of carina shift

BK Koo. Eurointervention 2011

Consensus from the 5th European Bifurc

David Hildick-Smith[1]*, MD; Jens Flensted Lassen[2], MD; Remo Albi
Olivier Darremont[5], MD; Manuel Pan[6], MD; Miroslaw Ferenc[7], MD;
Yves Louvard[6], MD

– *In single stent techniques, the primary stent should be sized according to the distal main vessel diameter.*

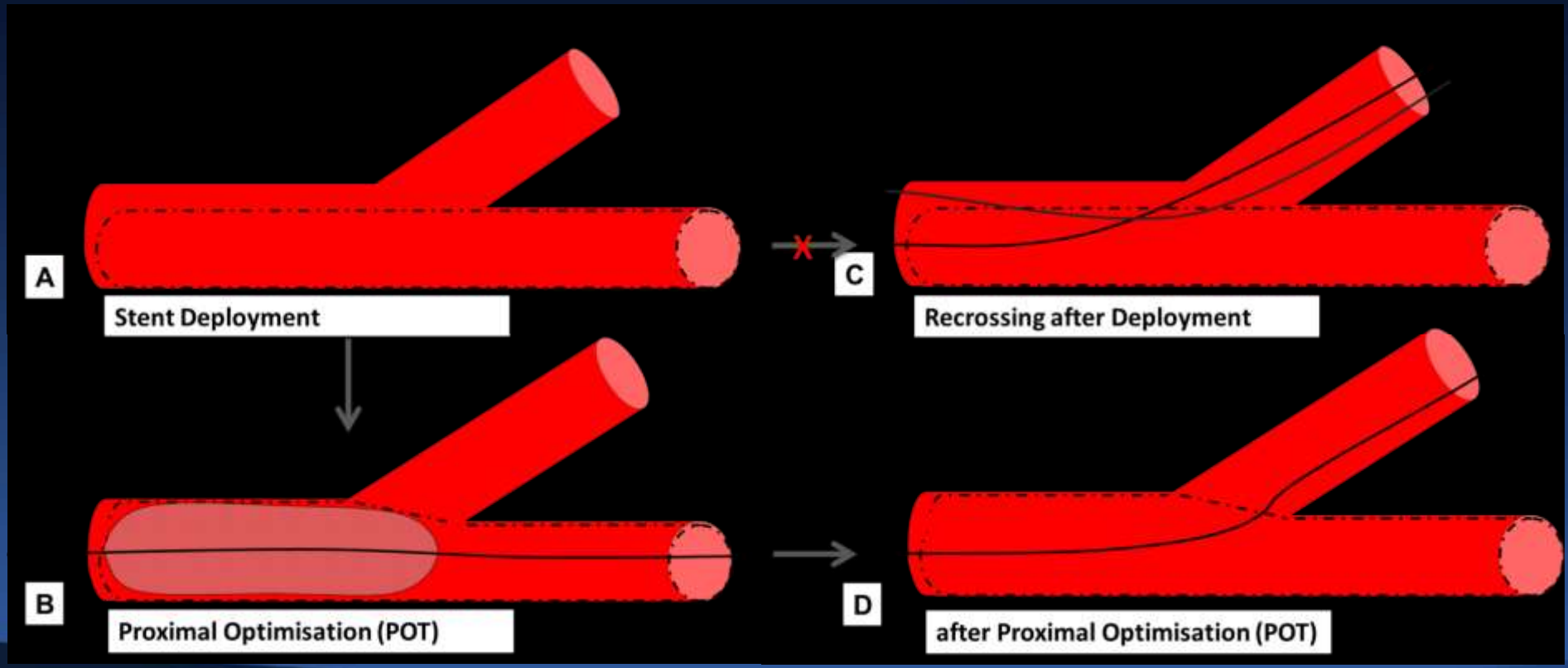
– *Postdilatation, or kissing balloon inflations, are required to optimise the proximal main vessel stent diameter.*

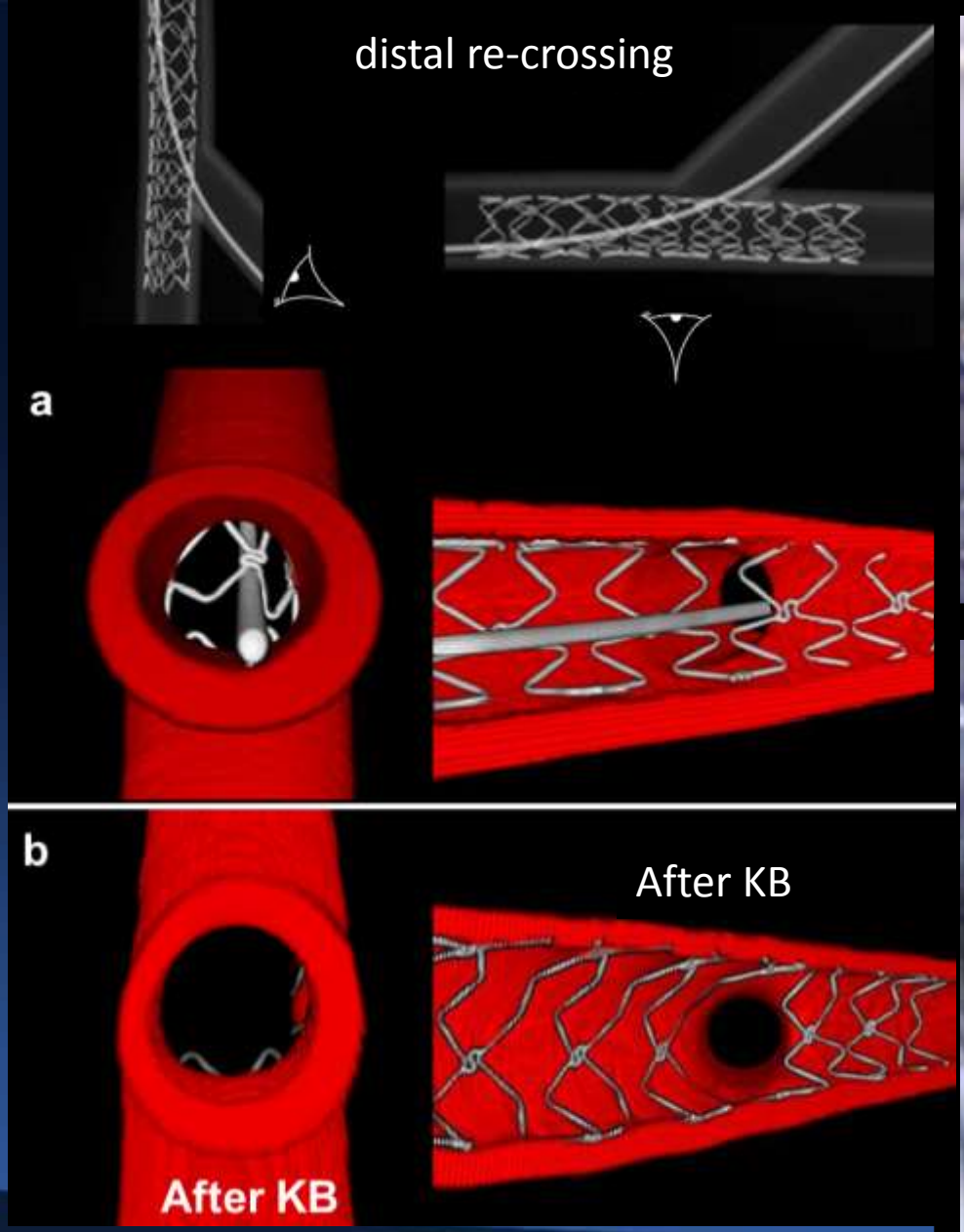
POT to complete stent expansion and reduce risk of complications

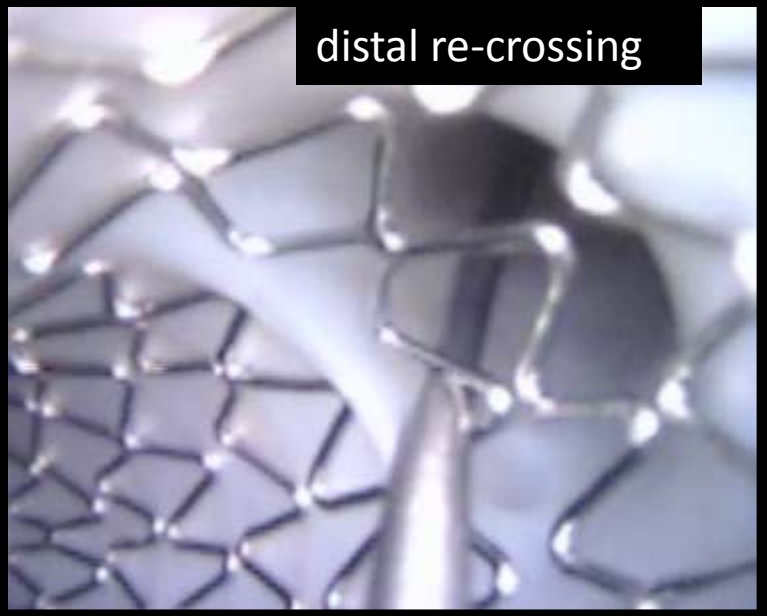
Courtesy of Foin

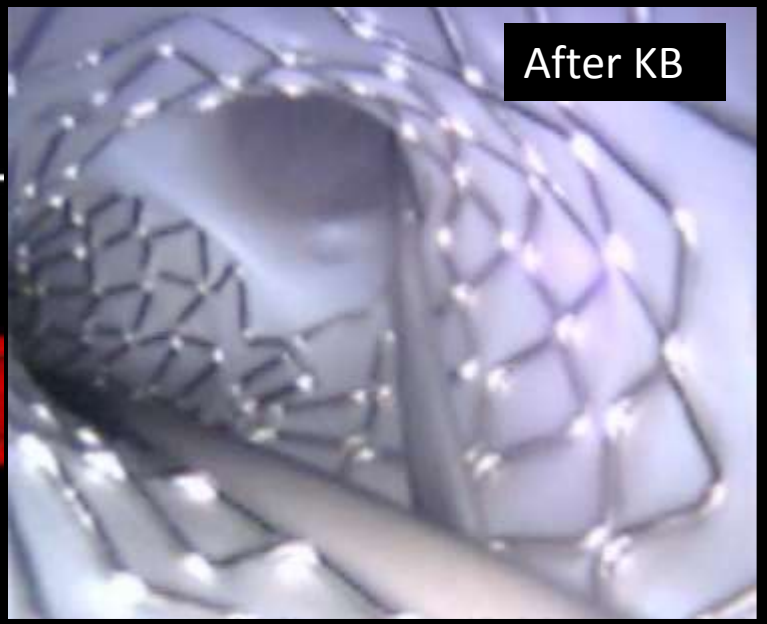
POT: What for ?

Proximal Optimisation Technique (POT), introduced by Dr. Darremont to facilitate SB access, is performed with a balloon matching the proximal stent segment.

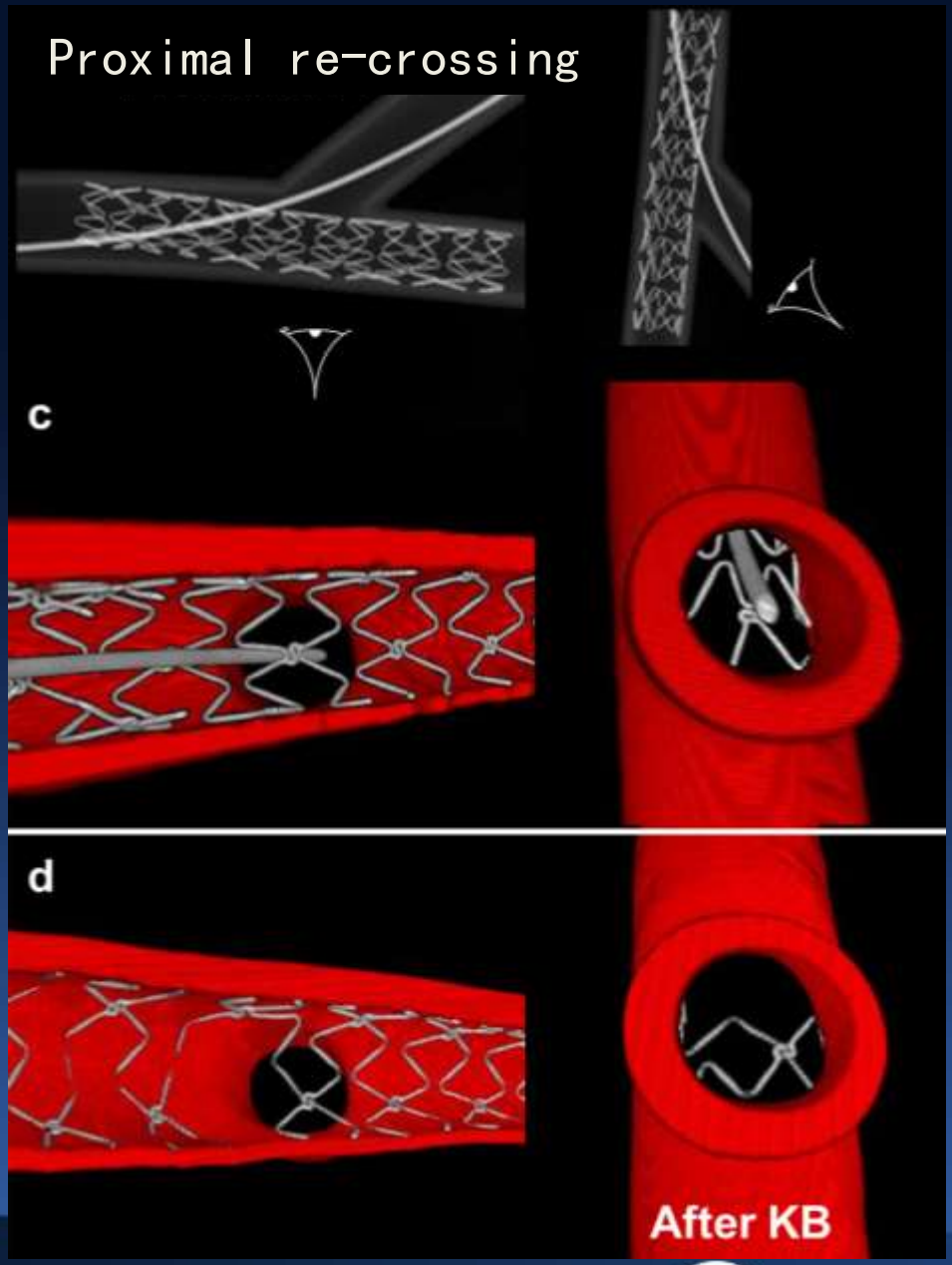








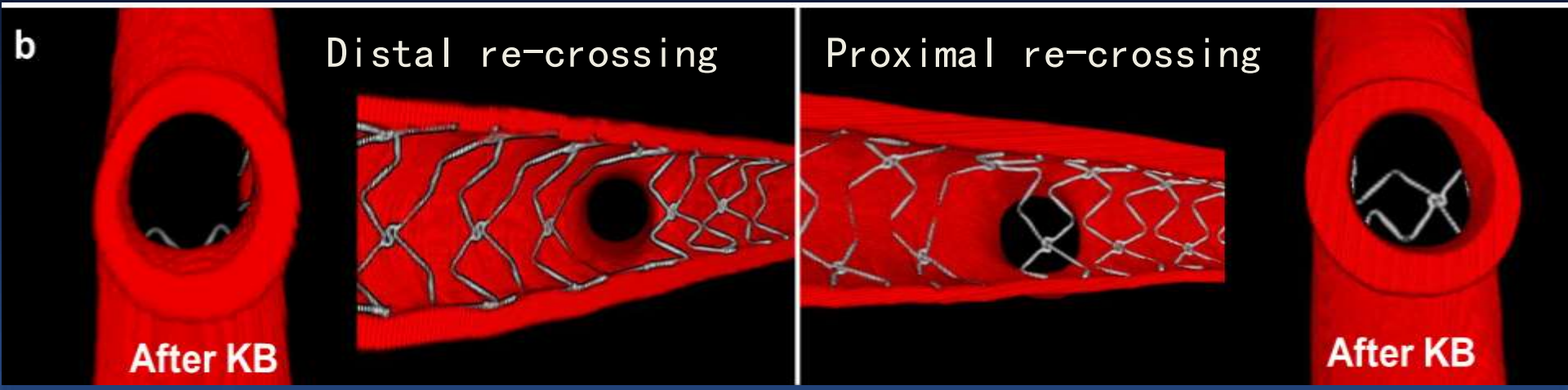
Courtesy of Foin



Foin et al., Int J. Card. 2013

Courtesy of Foin

Importance of cell re-crossing position on SB dilatation- Kissing results:

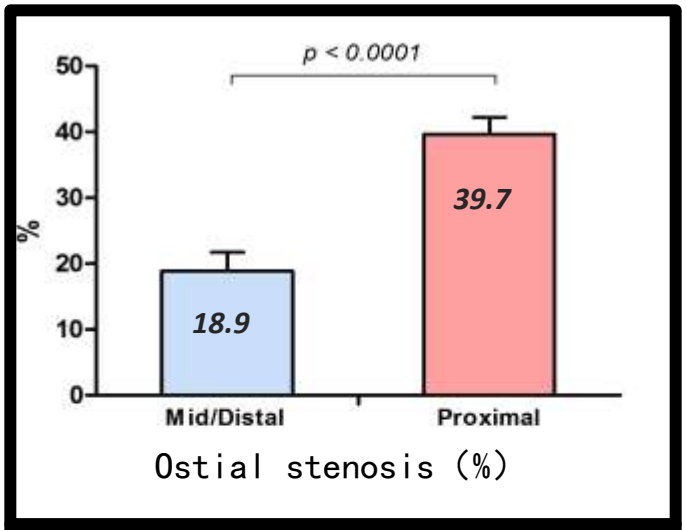


Nanjing First Hospital
Nanjing Medical University

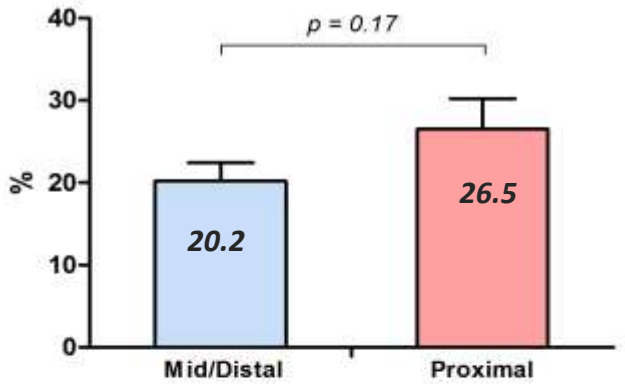
Courtesy of Foin

Courtesy of Foin

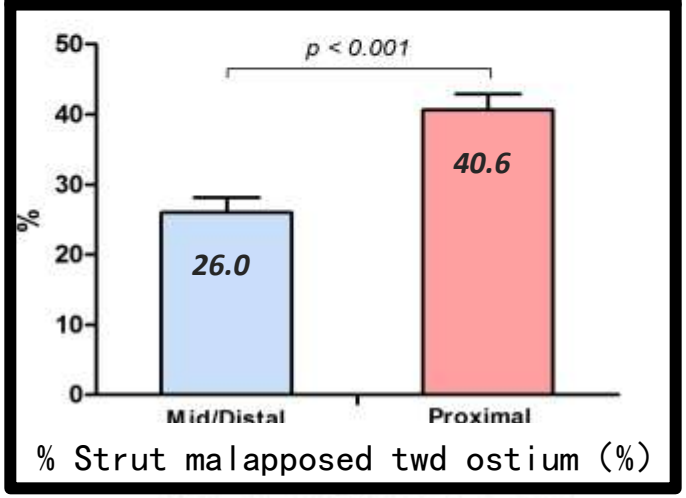
Importance of cell re-crossing position: micro-CT evidences



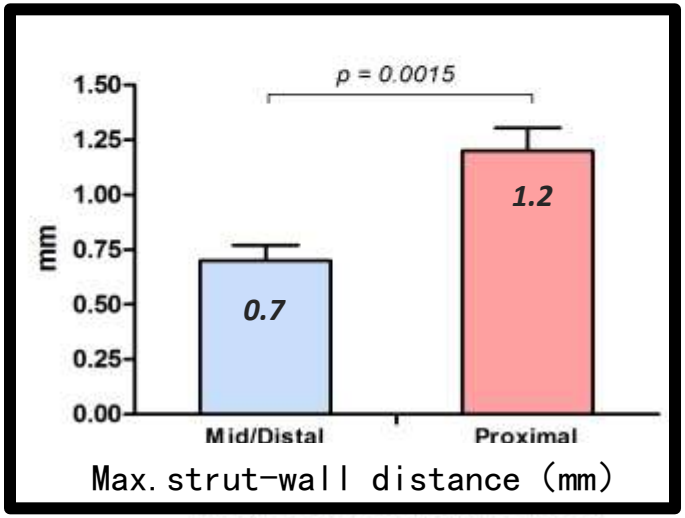
Ostial stenosis (%)



% Strut malapposed in bifurcation



% Strut malapposed twd ostium (%)

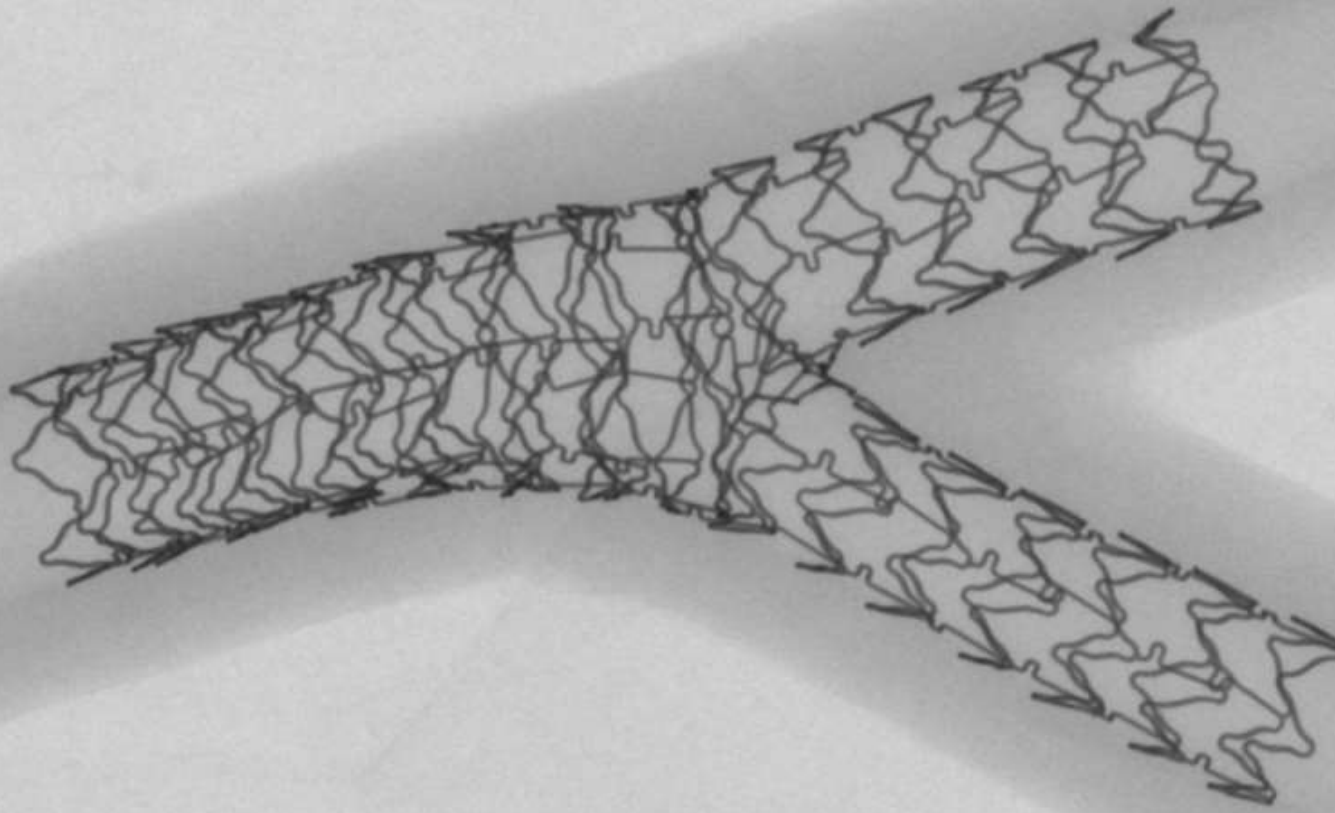


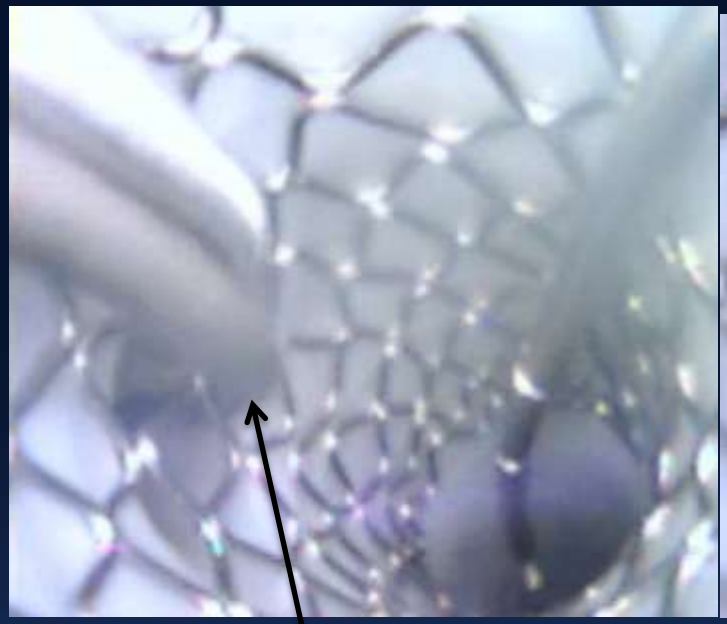
Max. strut-wall distance (mm)

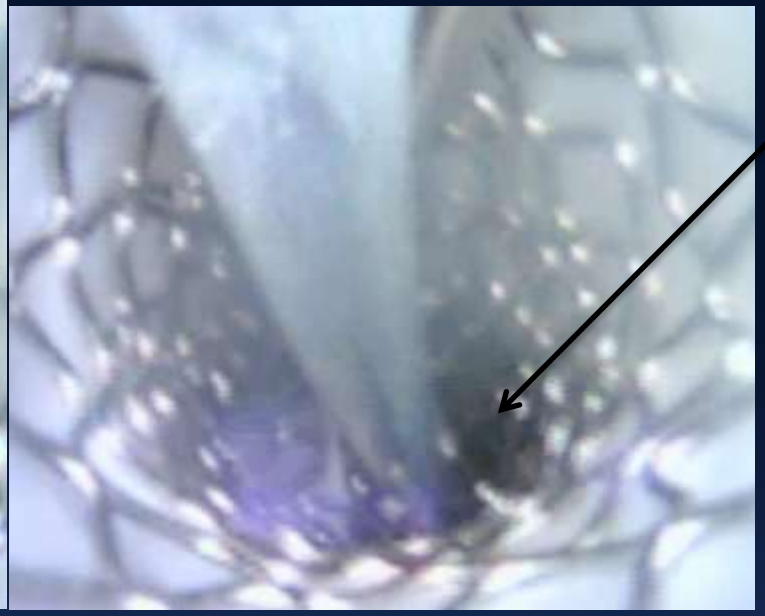
Series of DES optimised after either distal or proximal cell recrossing to the SB (n=8 in each group)

Foin et al., Int J. Card. 2013

Culotte stenting ---different rewiring location



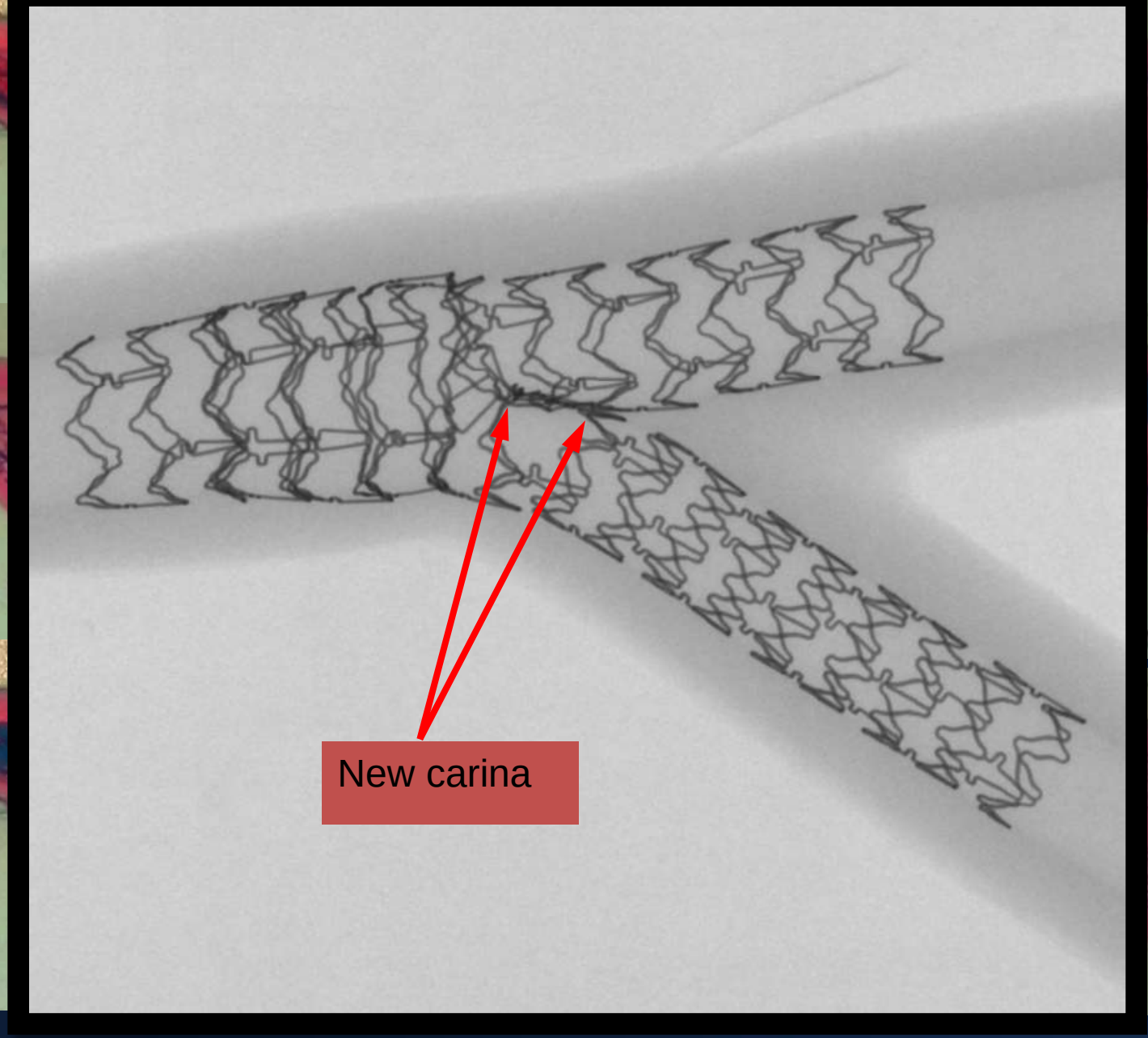




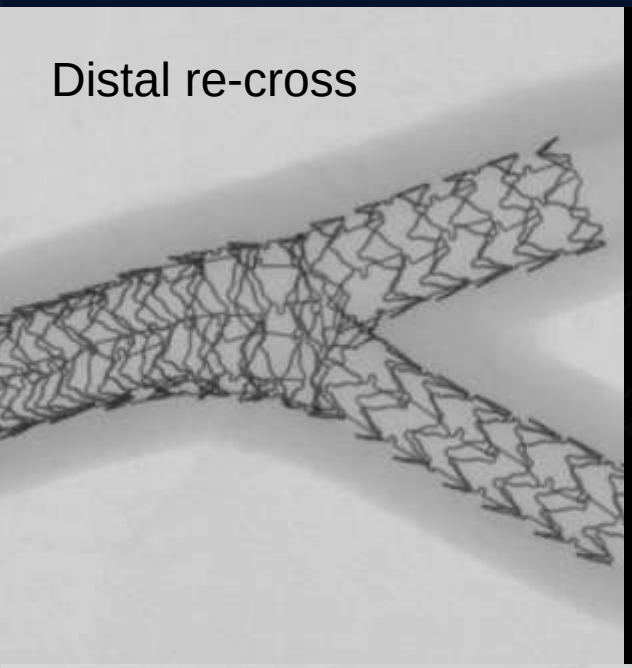
Distal re-cross

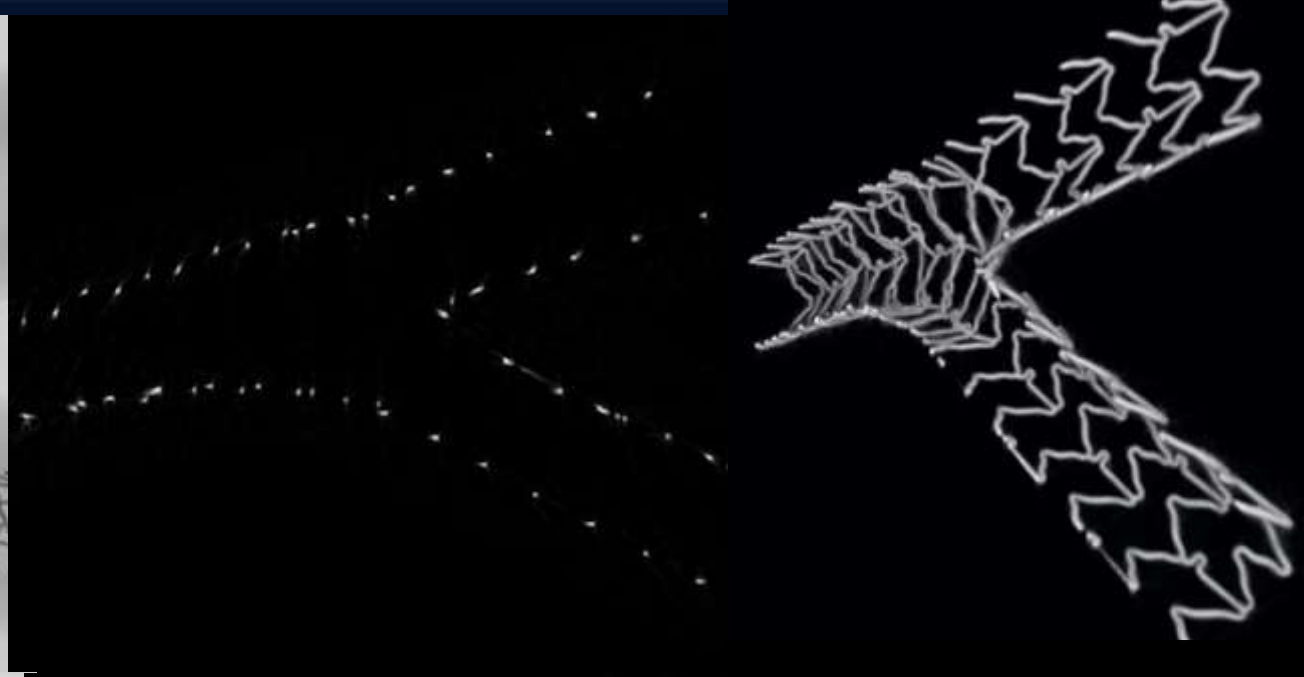
Distal re-cross

Result after FKBI

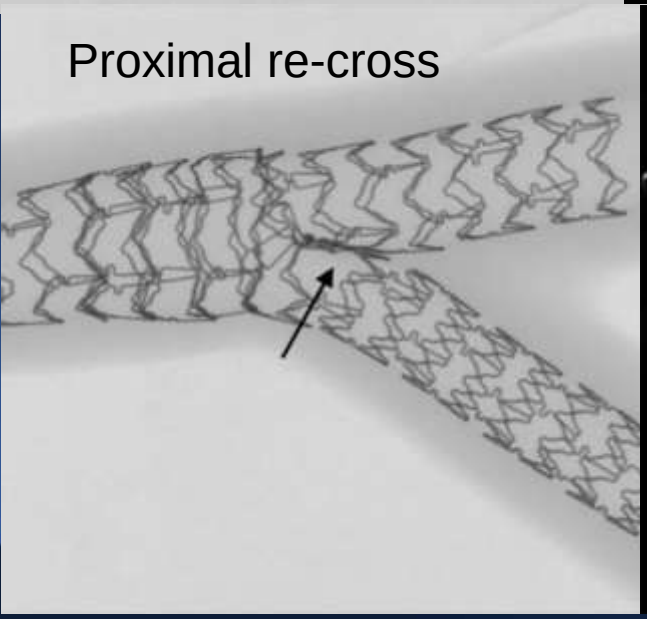

Proximal re-cross
New carina

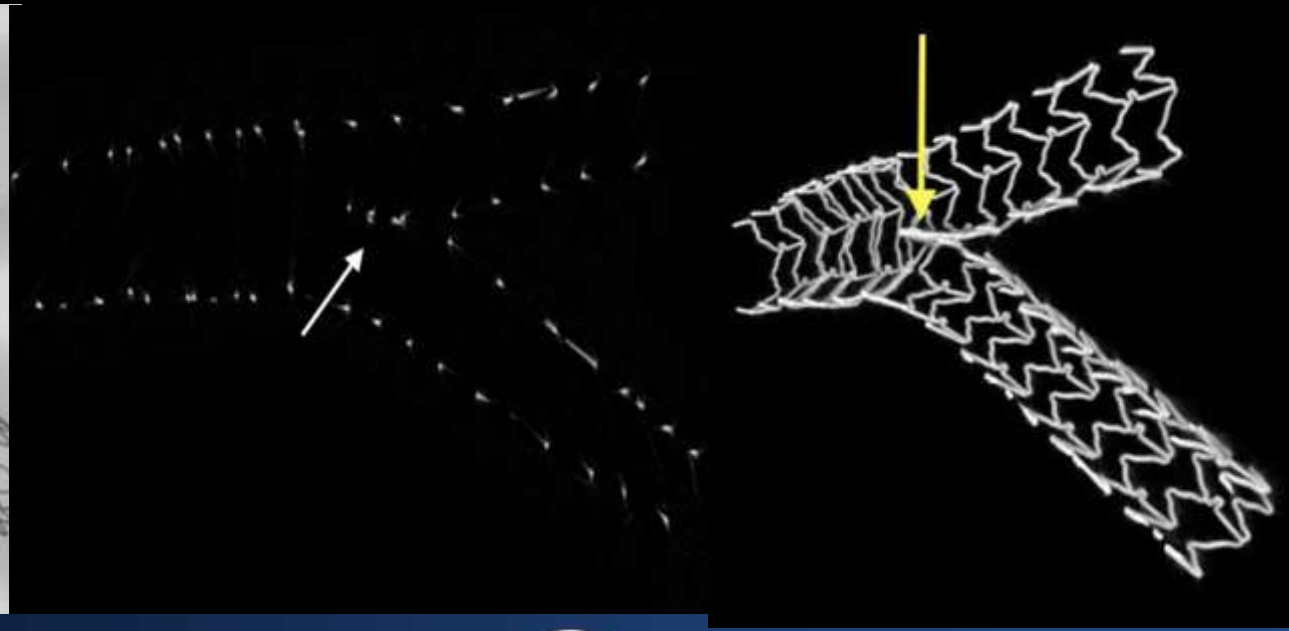
Distal re-cross



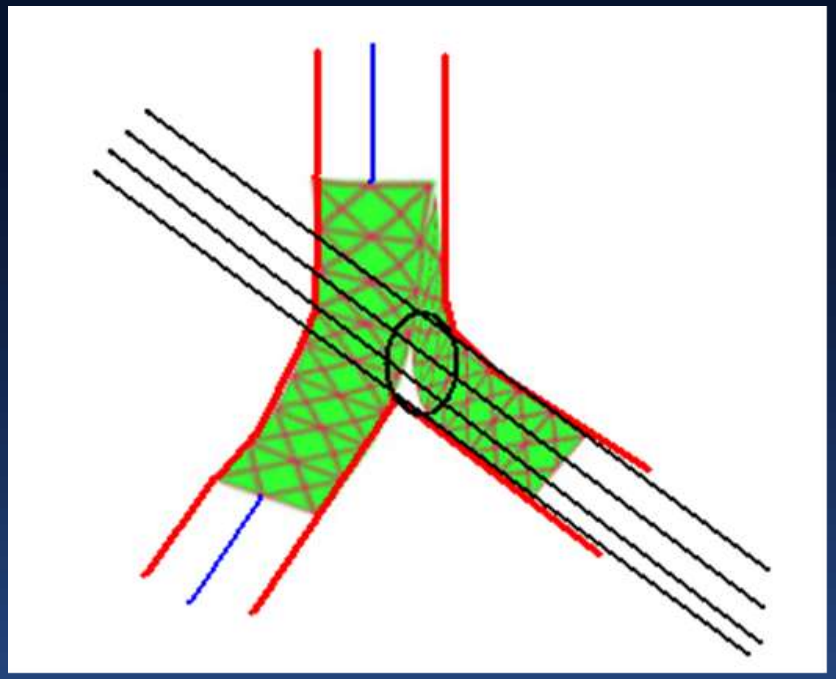


Proximal re-cross





Why does crush not work well?



FKBI =70-80%

KUS (kissing unsatisfactory), SB wire under the SB stent

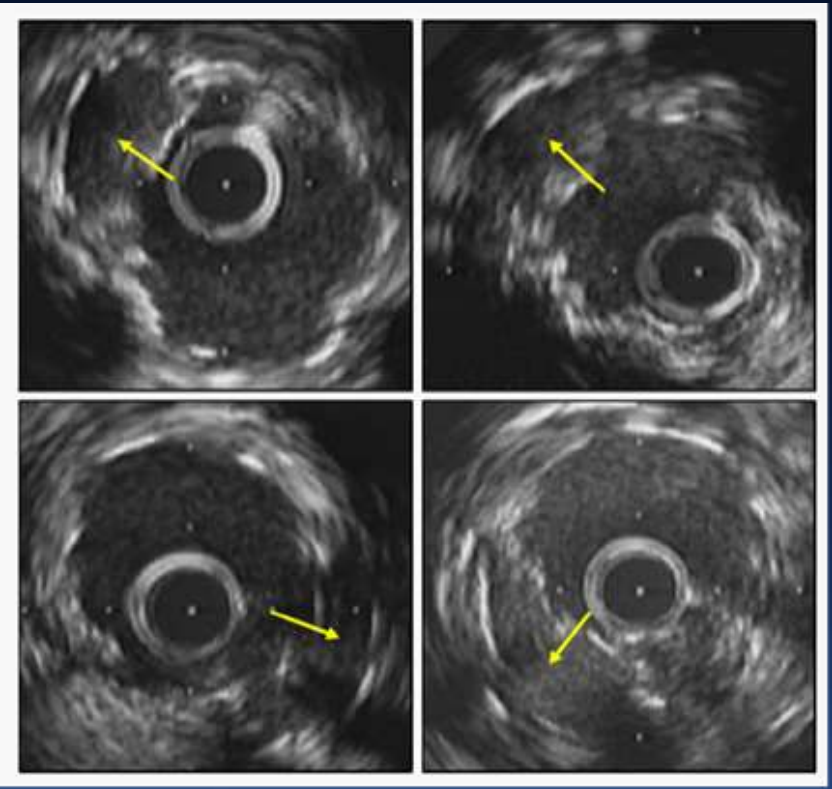
SL Chen et al. Chi M J 2005

SL Chen et al. JIC 2006

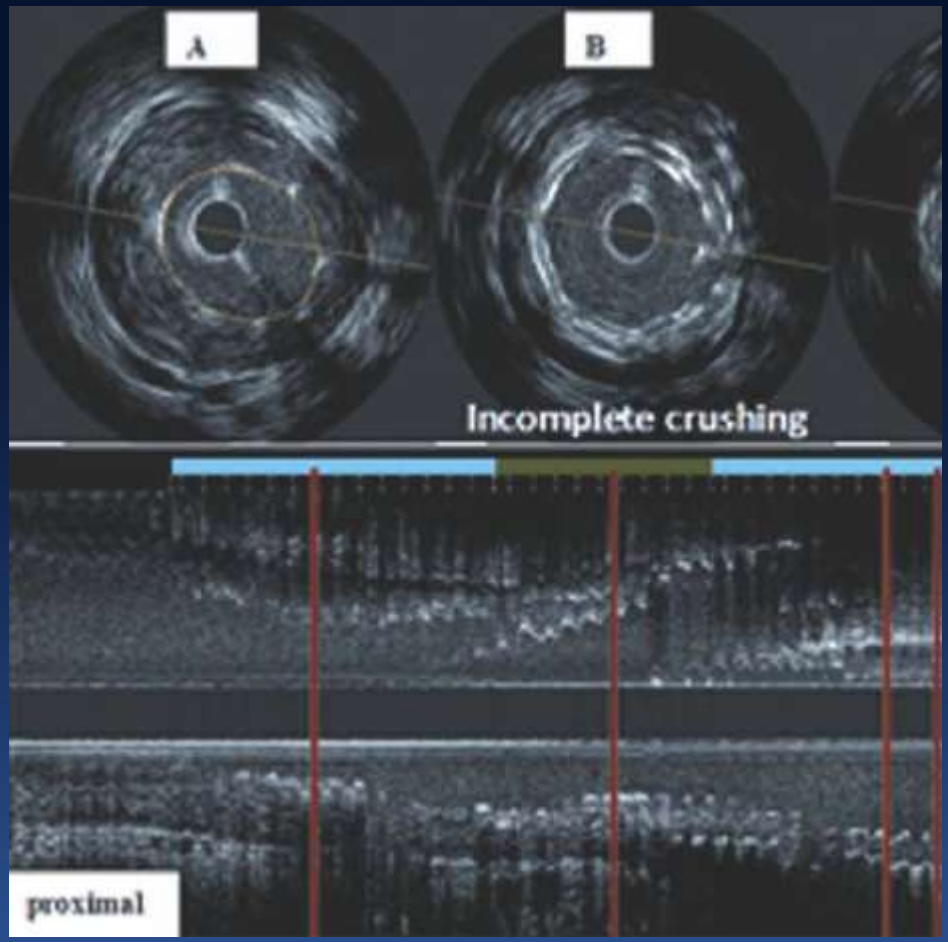
Nanjing First Hospital
Nanjing Medical University

CBS
Left Main & Coronary
Bifurcation Summit

Why does crush not work well?



More malaposition
Even after FKBI



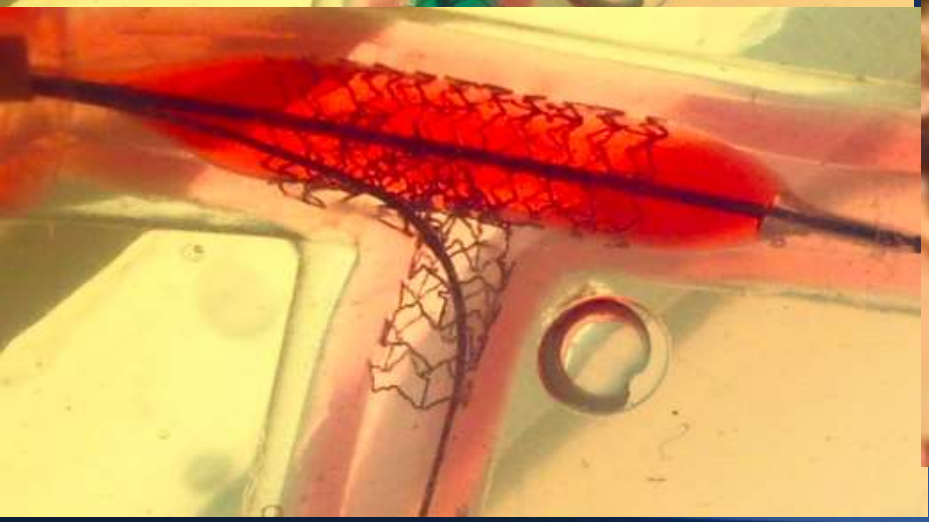
More incomplete crush

Costa et al. JACC 2006
SL Chen et al. cathe cardiov Interv 2011

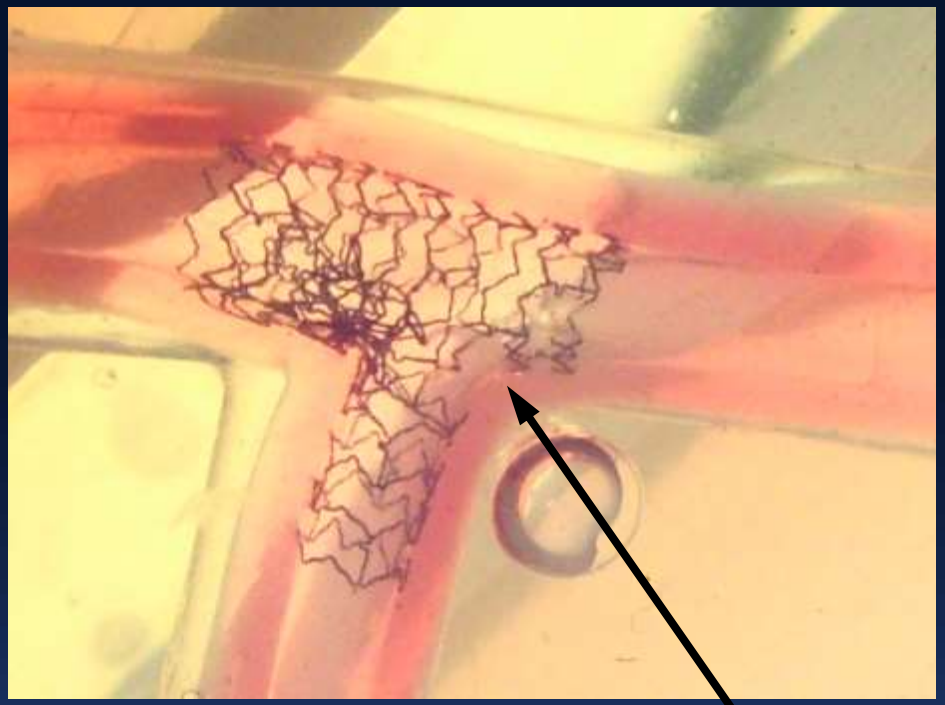
Nanjing First Hospital
Nanjing Medical University

CBS
Left Main & Coronary
Bifurcation Summit

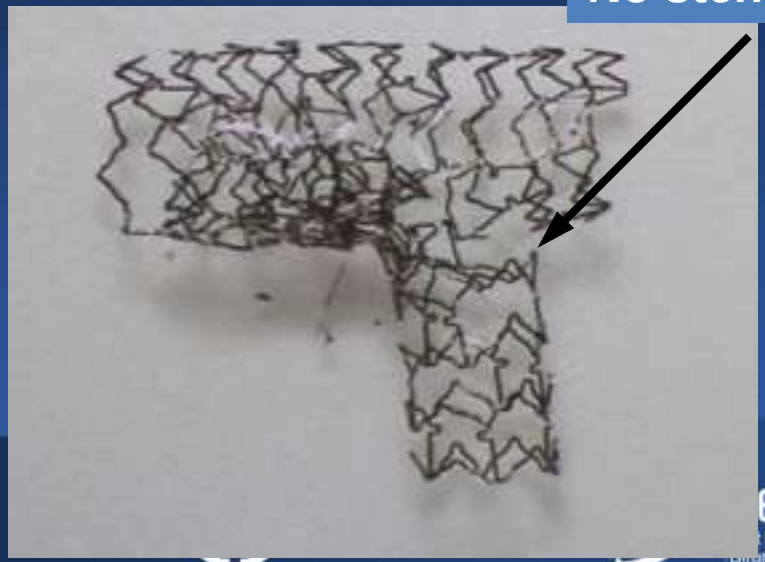
How is classical crush worse ?

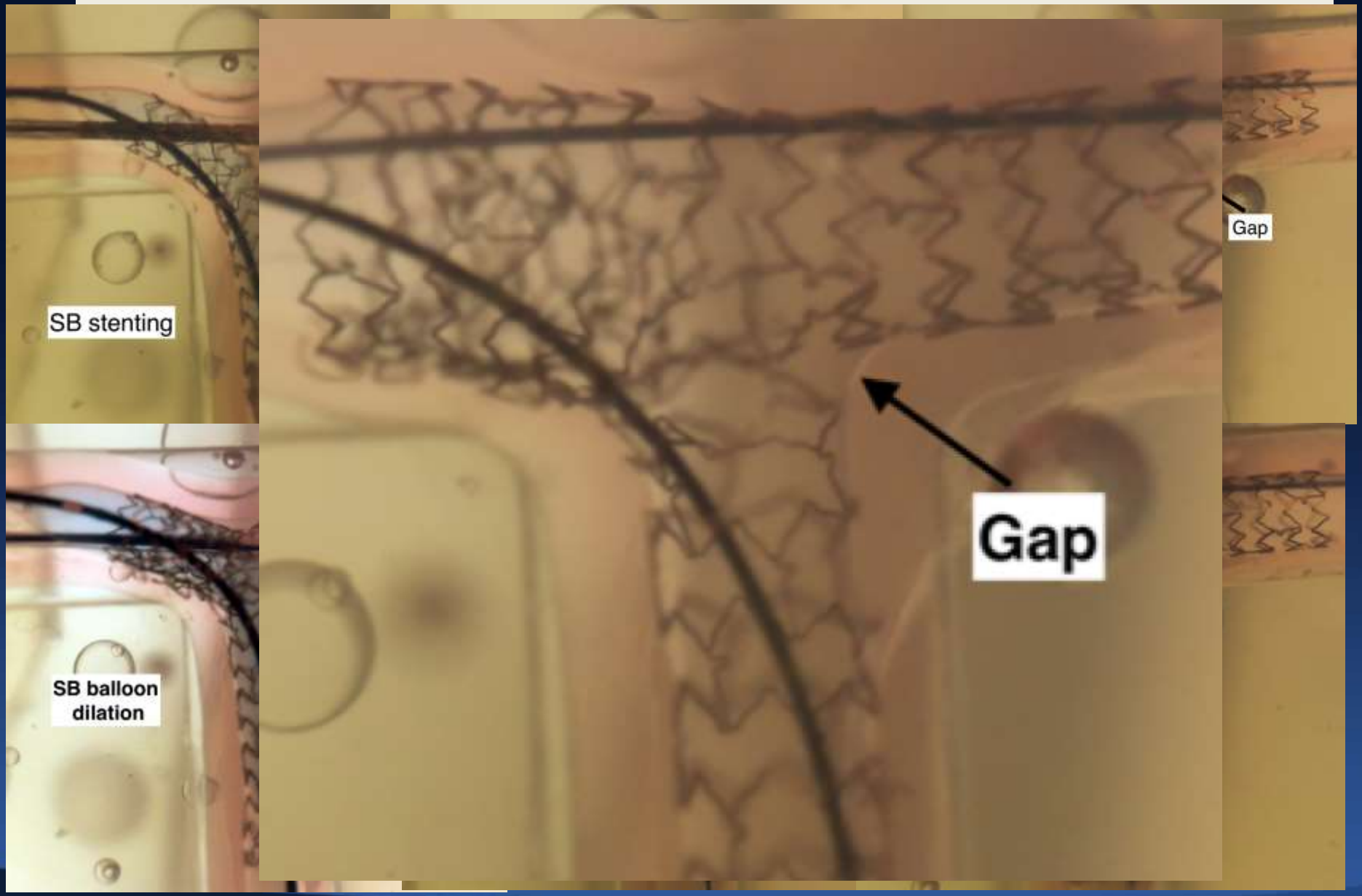


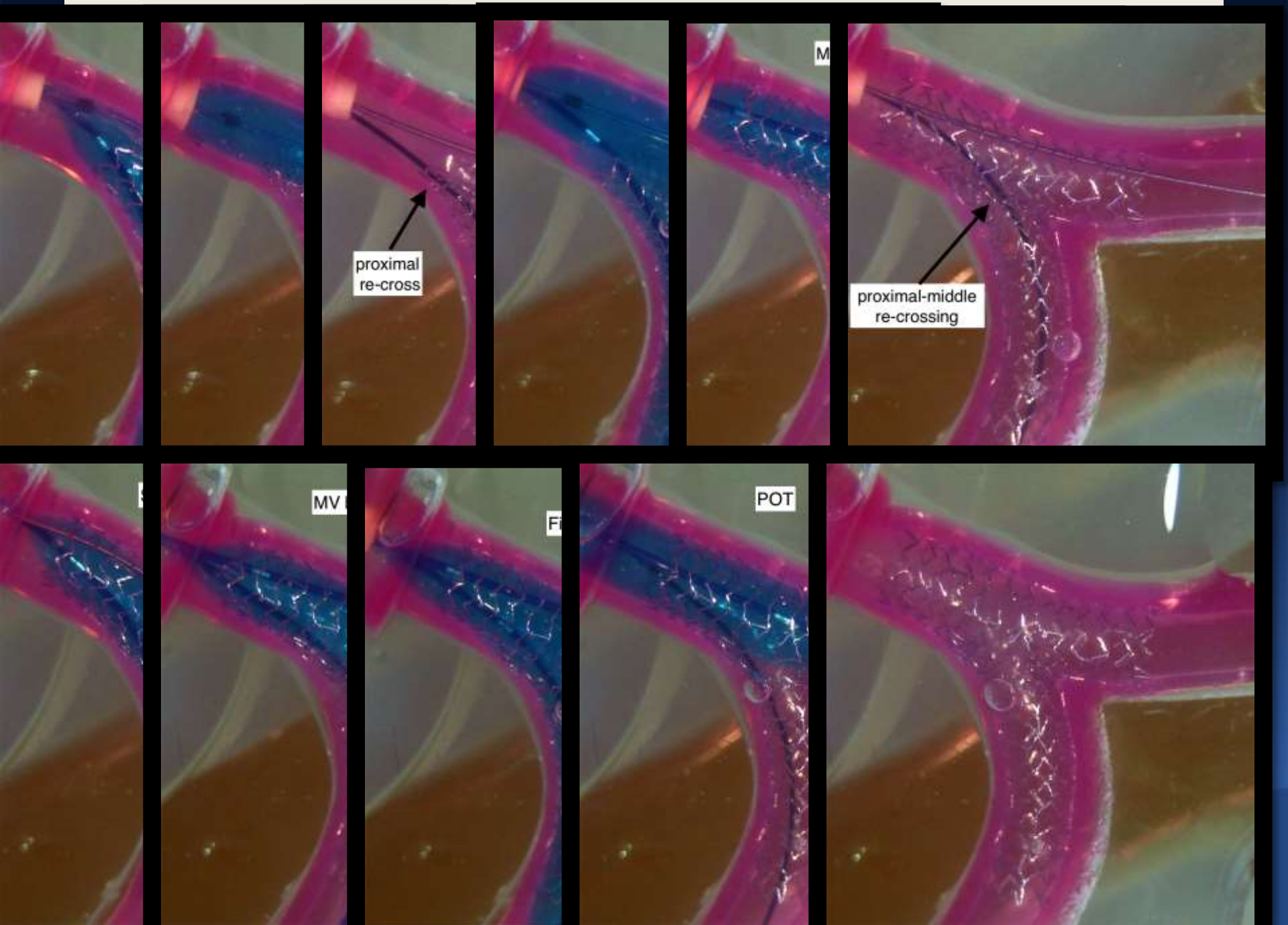
Rewire from different cell



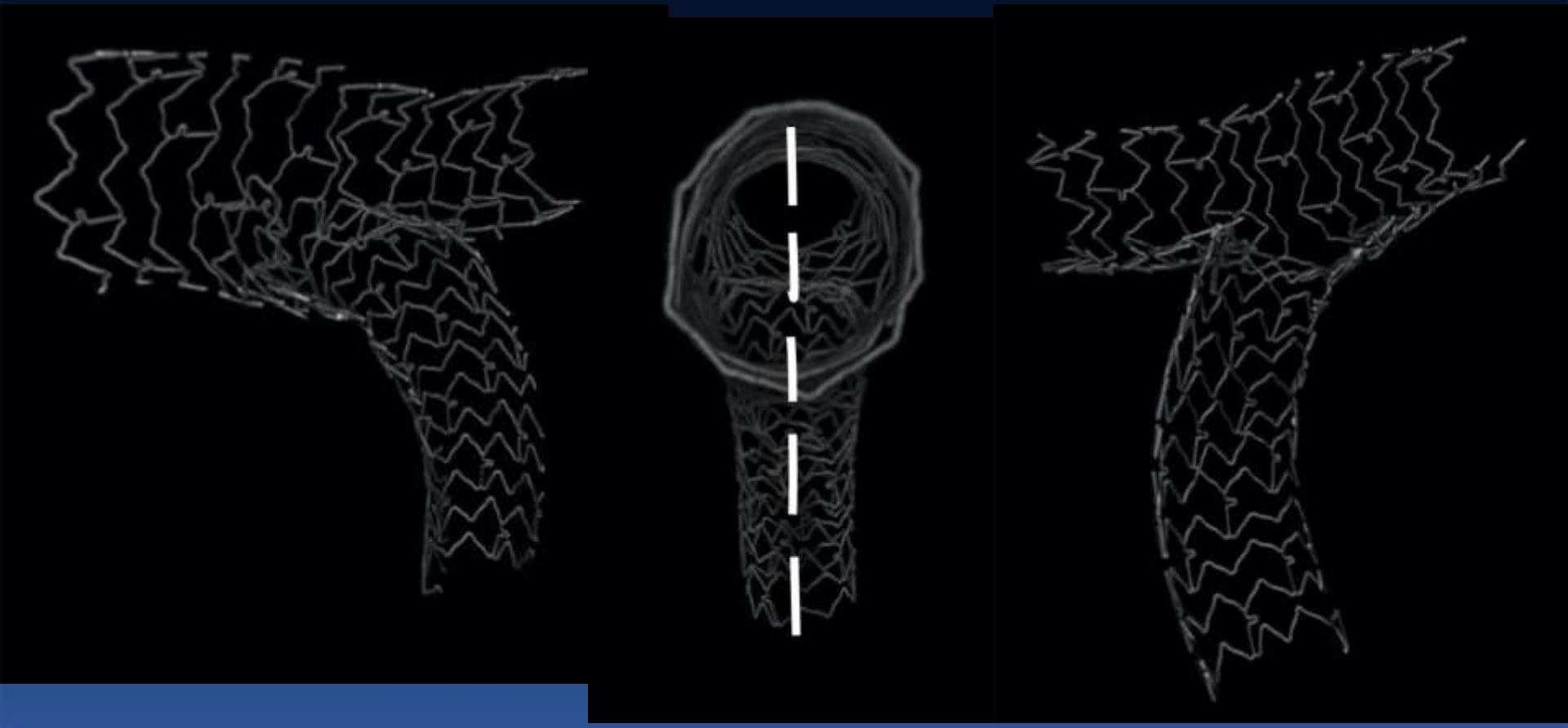
No stent strut



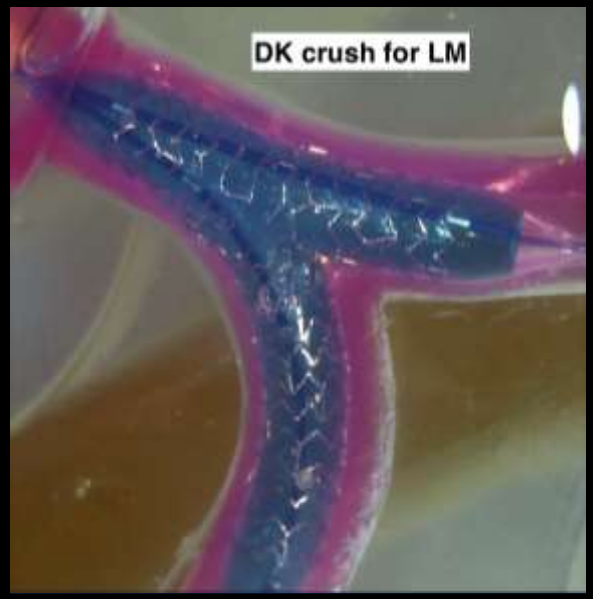

SB stenting
Gap
Gap
SB balloon dilation

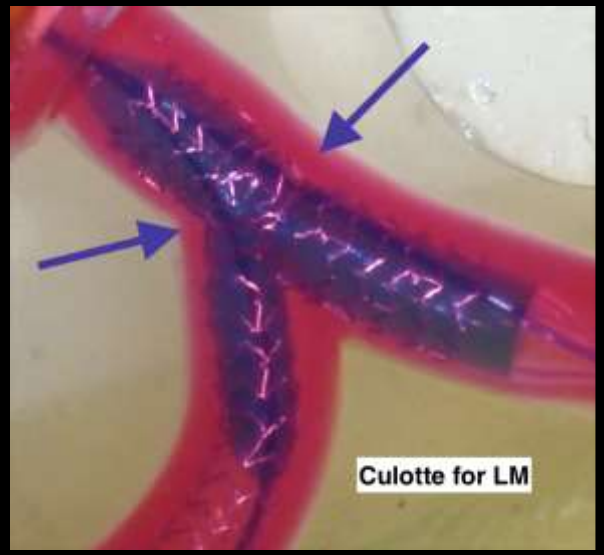

proximal
re-cross
proximal-middle
re-crossing
POT

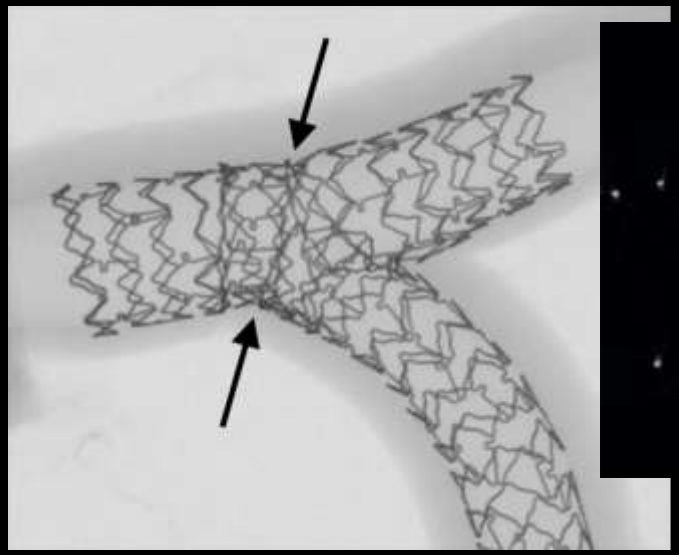
Electronically cut stent of DK crush



JJ Zhang ,et al, JCIC 2016







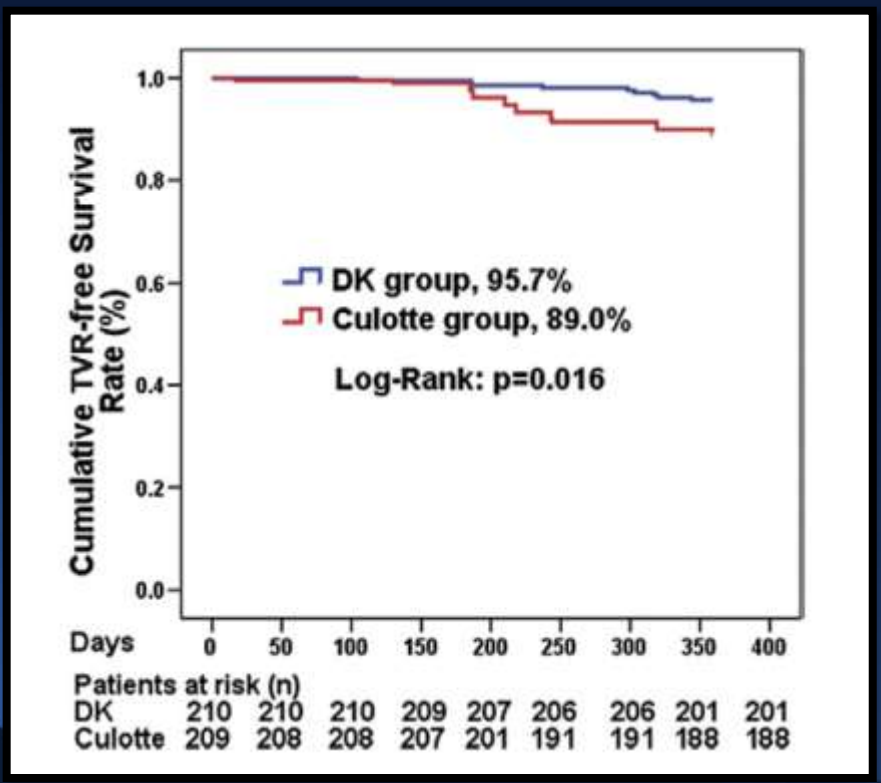
Significant “napkin ring” restriction (arrow)

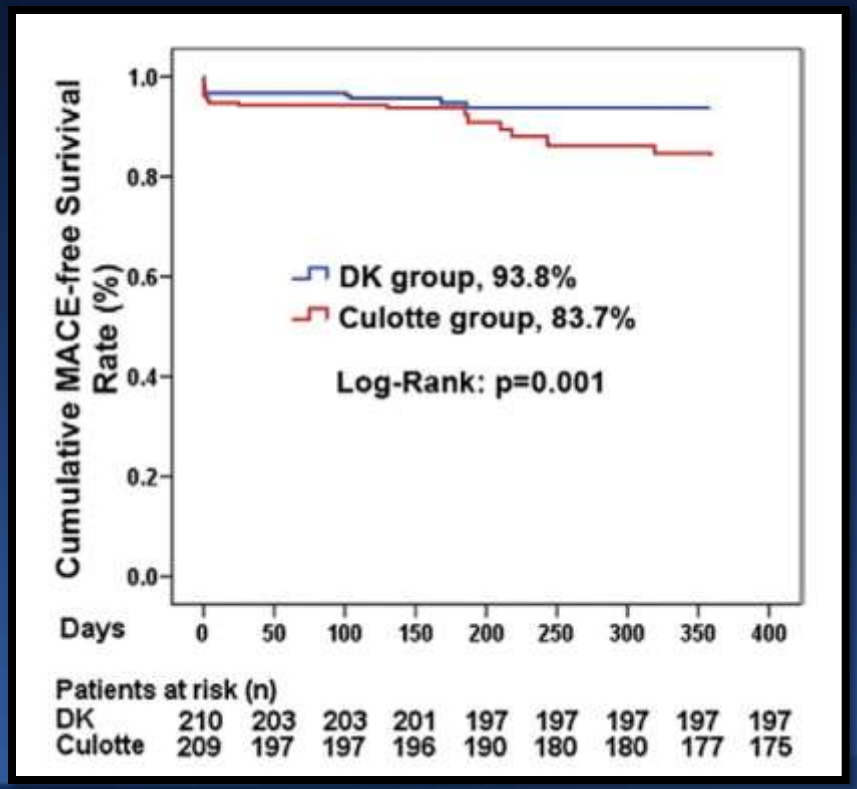
JJ Zhang ,et al, JCIC 2016

Comparison of Double Kissing Crush Versus Culotte Stenting for Unprotected Distal Left Main Bifurcation Lesions

Results From a Multicenter, Randomized, Prospective DKCRUSH-III Study

Shao-Liang Chen, MD,* Bo Xu, MBBS,† Ya-Ling Han, MD,‡ Imad Sheiban, MD,§
Jun-Jie Zhang, MD,* Fei Ye, MD,* Tak W. Kwan, MD,‖ Chitprapai Paiboon, MD,¶



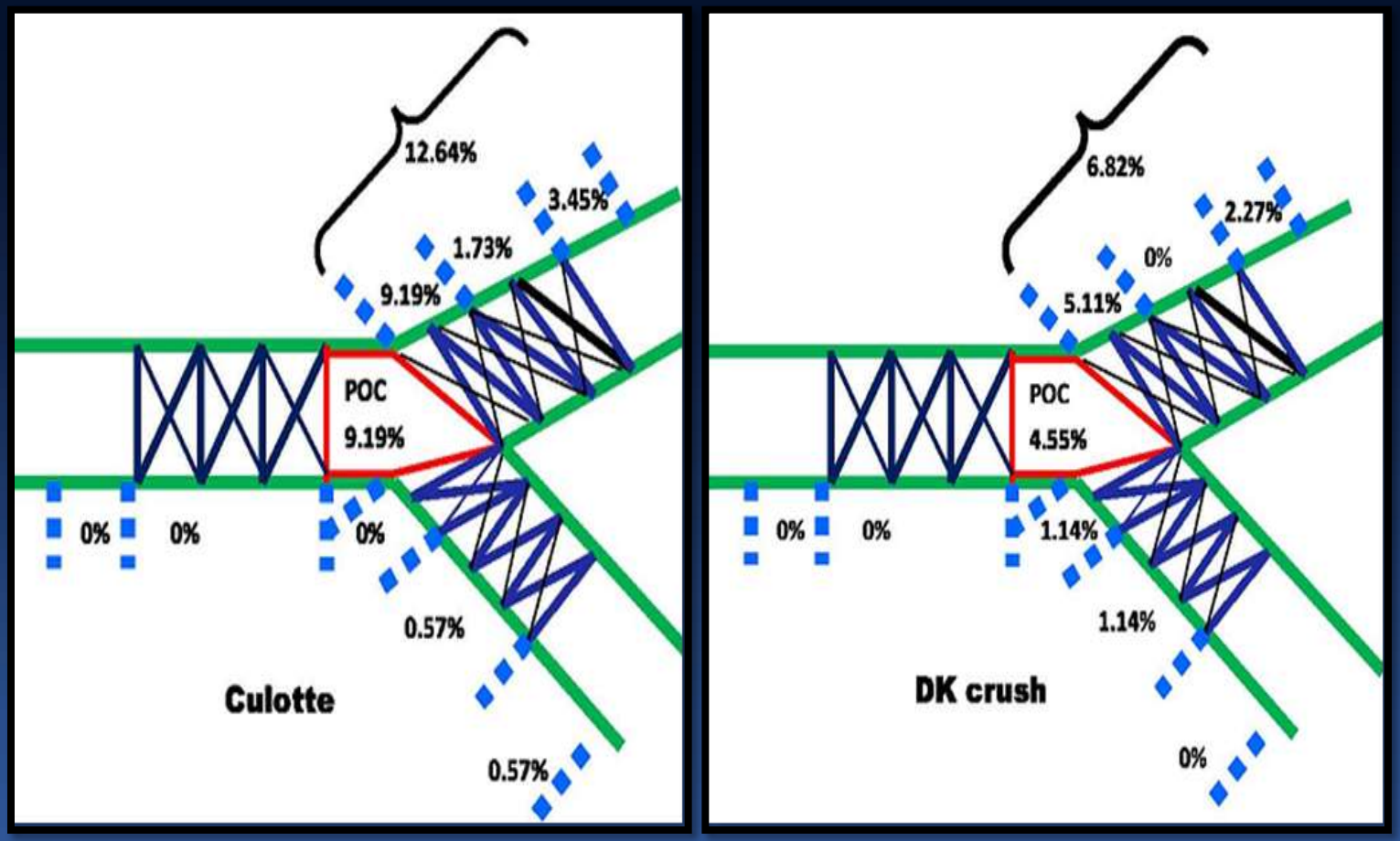


SL Chen, et al, JACC 2013

Nanjing First Hospital
Nanjing Medical University

CBS
Left Main & Coronary Bifurcation Summit

Location of ISR from DKCRUSH-III



SL Chen, et al, JACC 2013

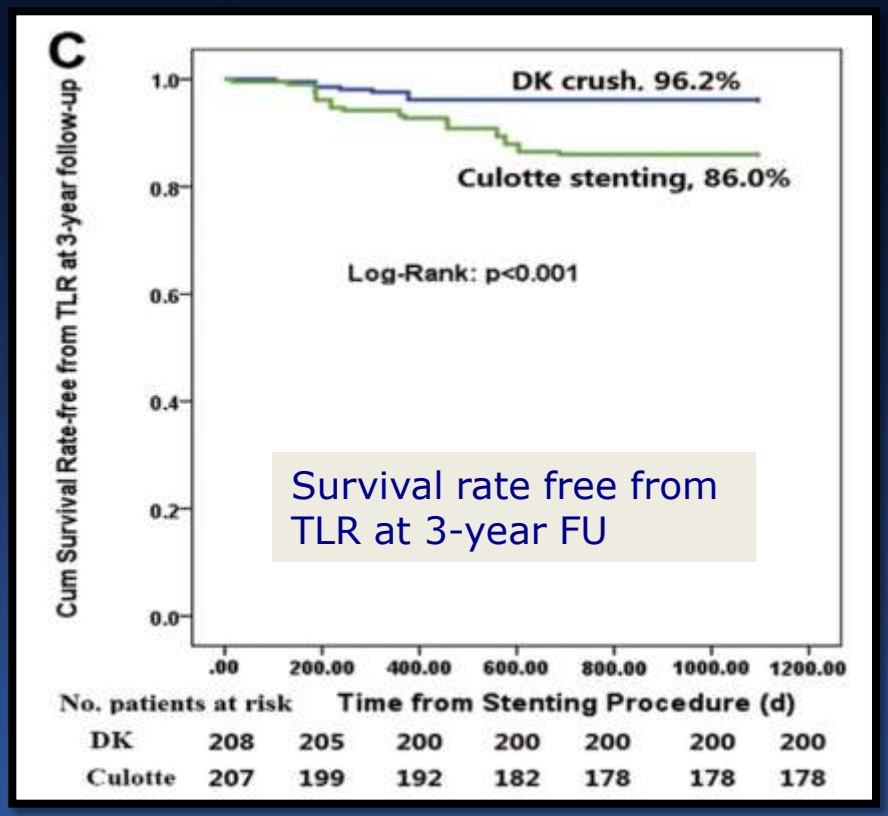
Nanjing First Hospital
Nanjing Medical University

CBS
Left Main & Coronary Bifurcation Summit

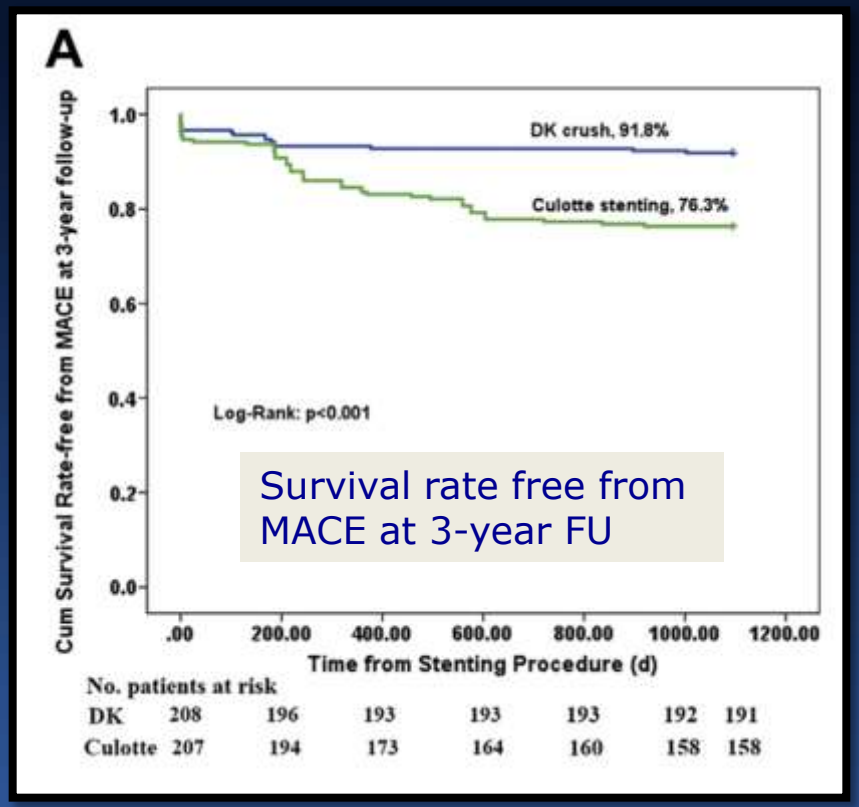
Clinical Outcome After DK Crush Versus Culotte Stenting of Distal Left Main Bifurcation Lesions

The 3-Year Follow-Up Results of the DKCRUSH-III Study

Shao-Liang Chen, MD,* Bo Xu, MBBS,† Ya-Ling Han, MD,‡ Imad Sheiban, MD,§ Jun-Jie Zhang, MD,* Fei Ye, MD,*



Survival rate free from TLR at 3-year FU



Survival rate free from MACE at 3-year FU

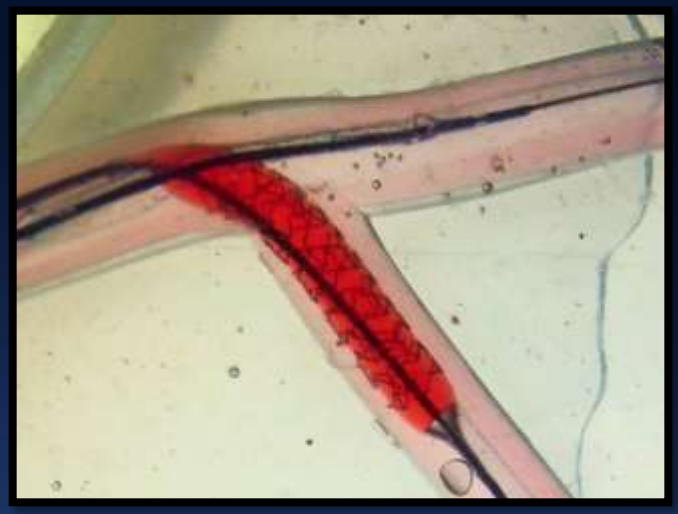
SL Chen, et al, JACC interv 2015

Nanjing First Hospital
Nanjing Medical University

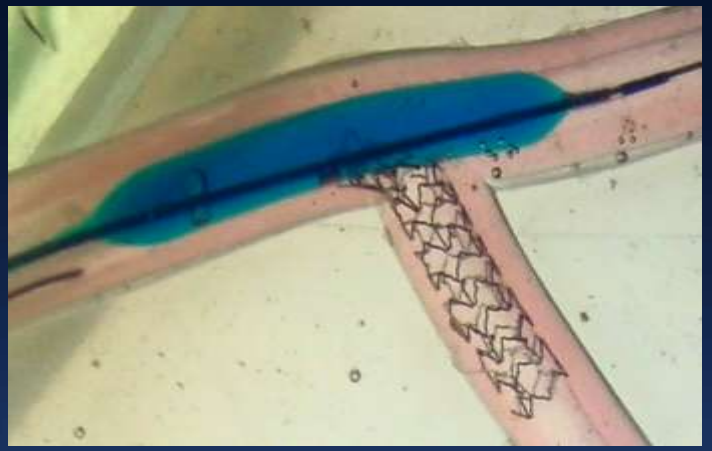
CBS
Left Main & Coronary Bifurcation Summit

Distal LM bifurcation

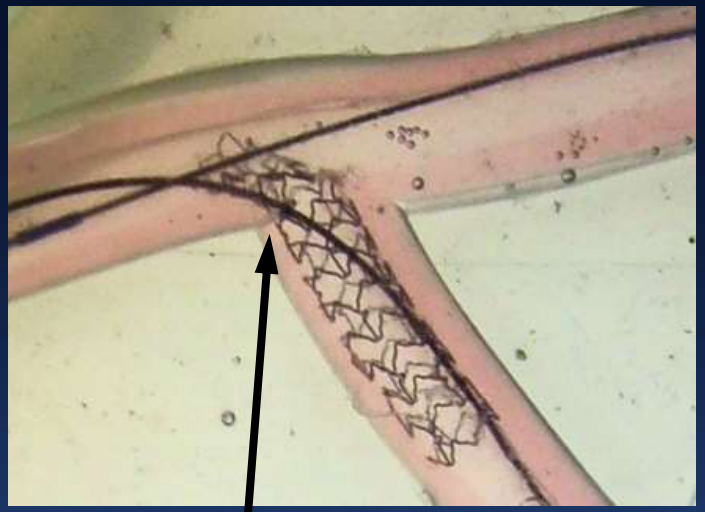
DK crush – Step 1: stenting SB



DK crush—Step 2: balloon crush

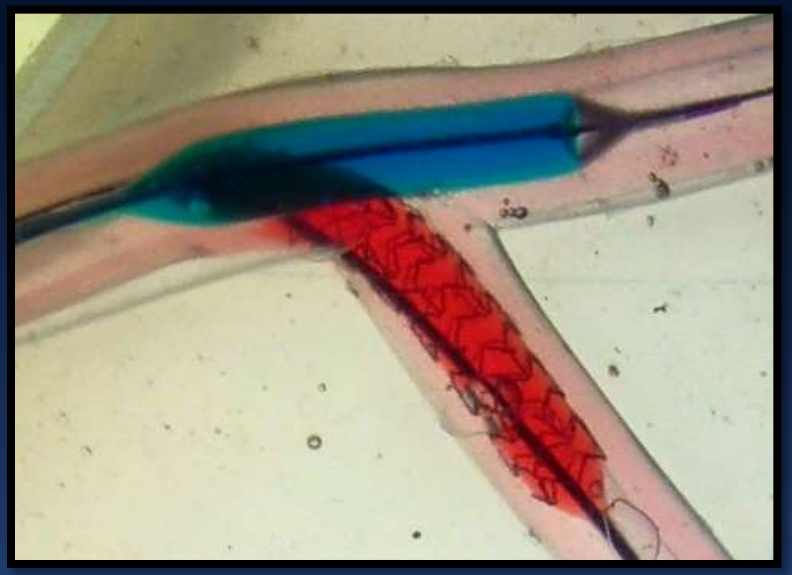


Tips of 1st rewiring SB

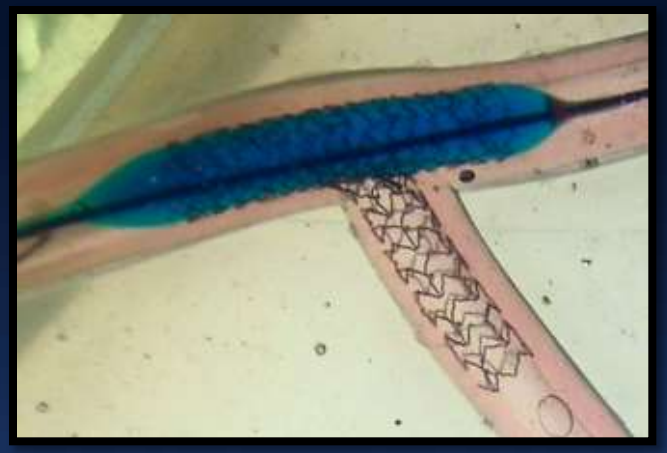


Proximal SB re-cross

DK crush—Step 3: first kissing

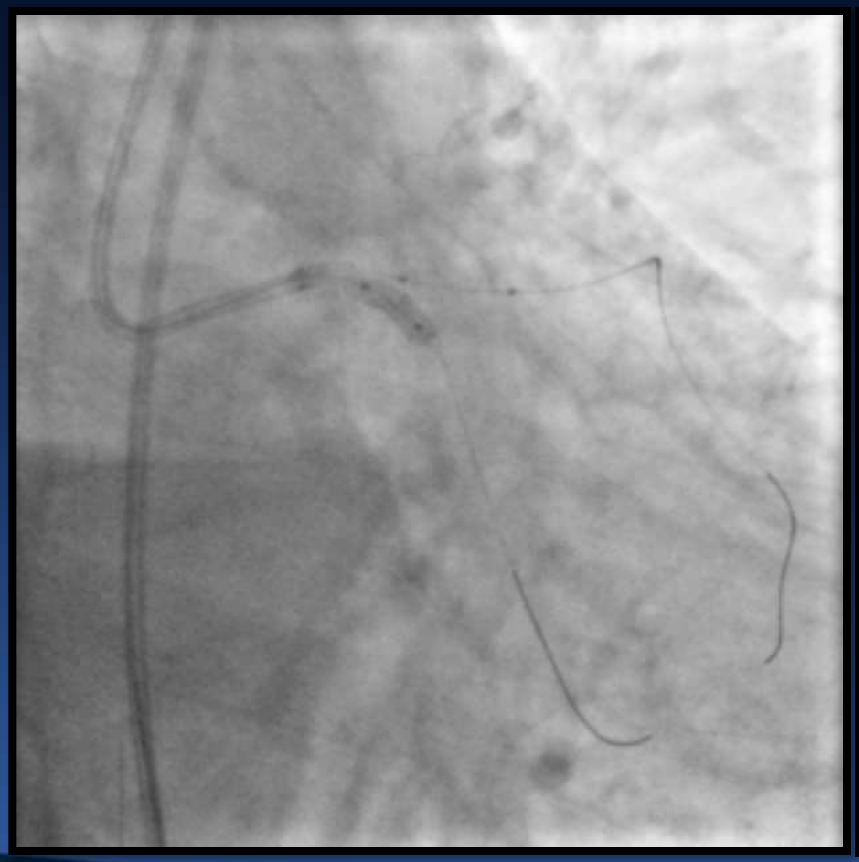


DK crush—Step 4: stenting MV

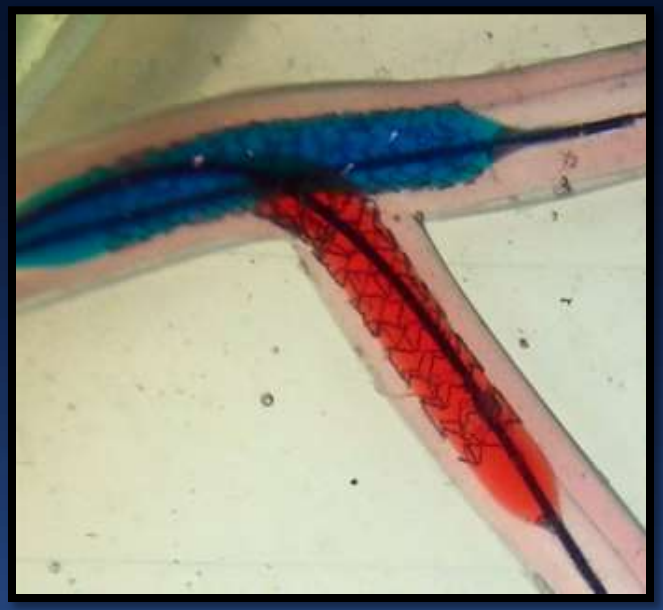


1st POT

Sequential post-dilating SB/MV at high pressure

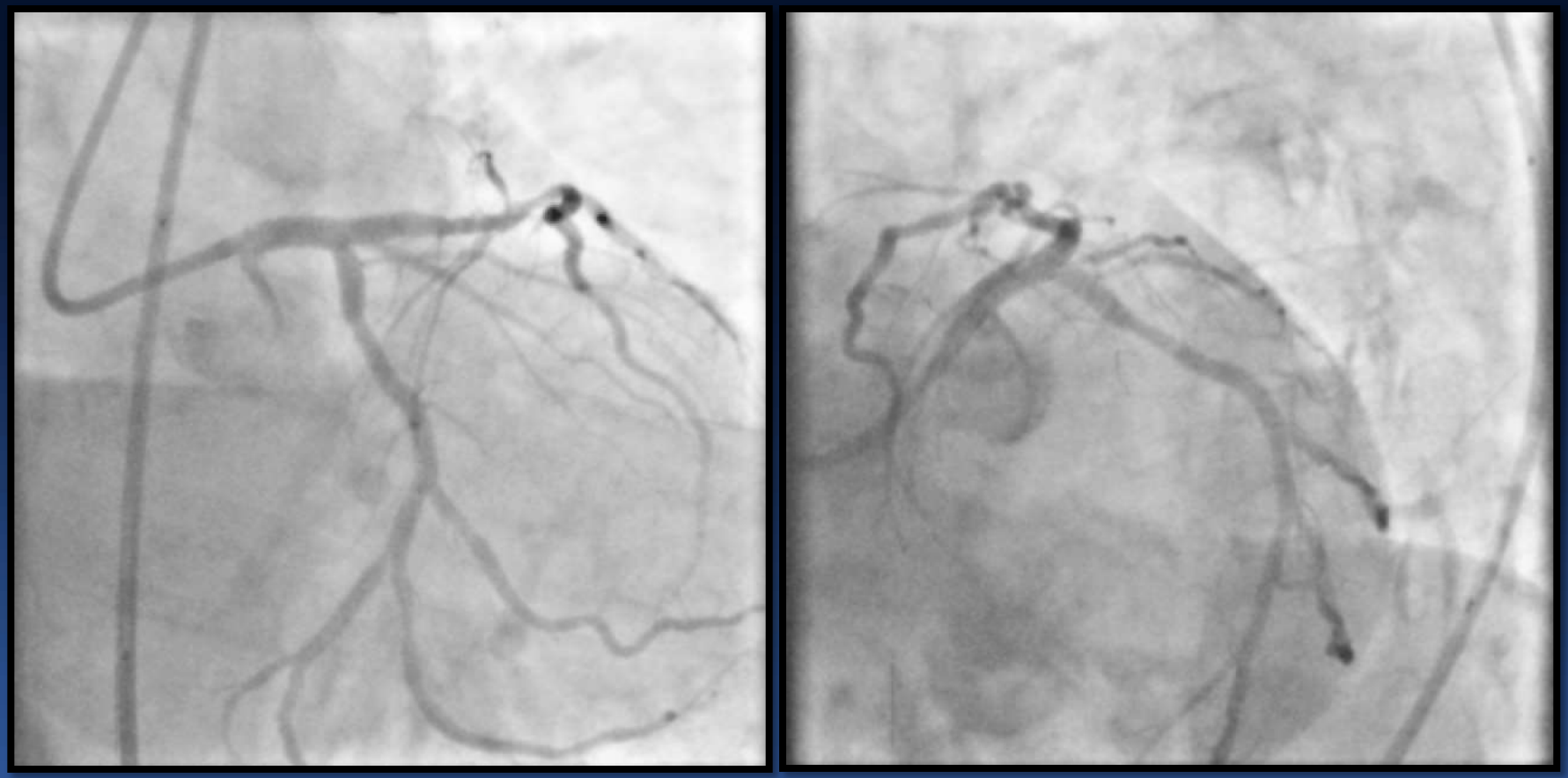


DK crush—Step 5: final kissing

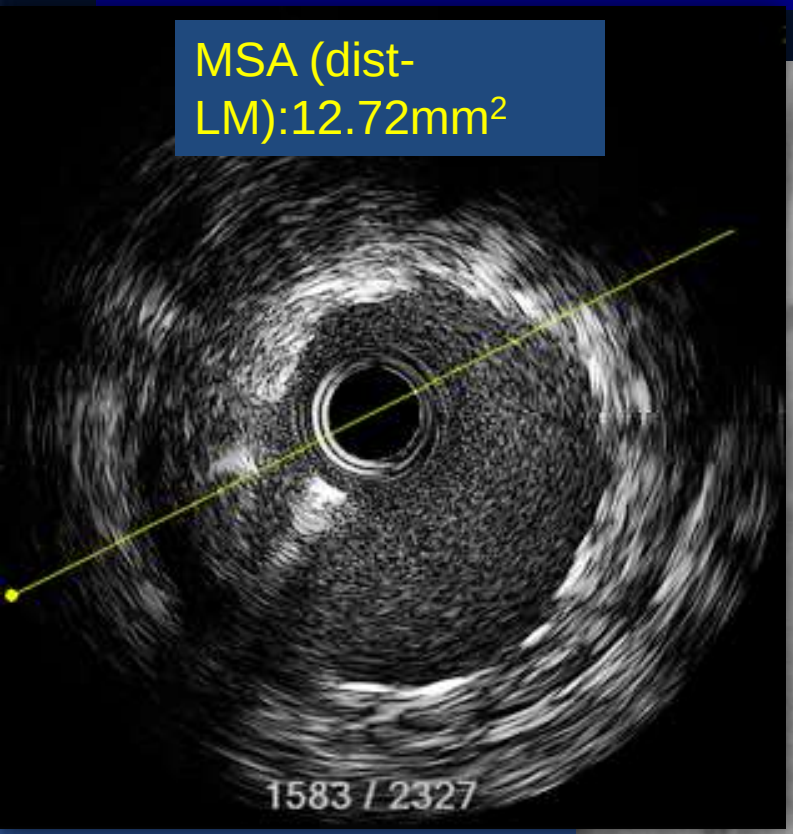


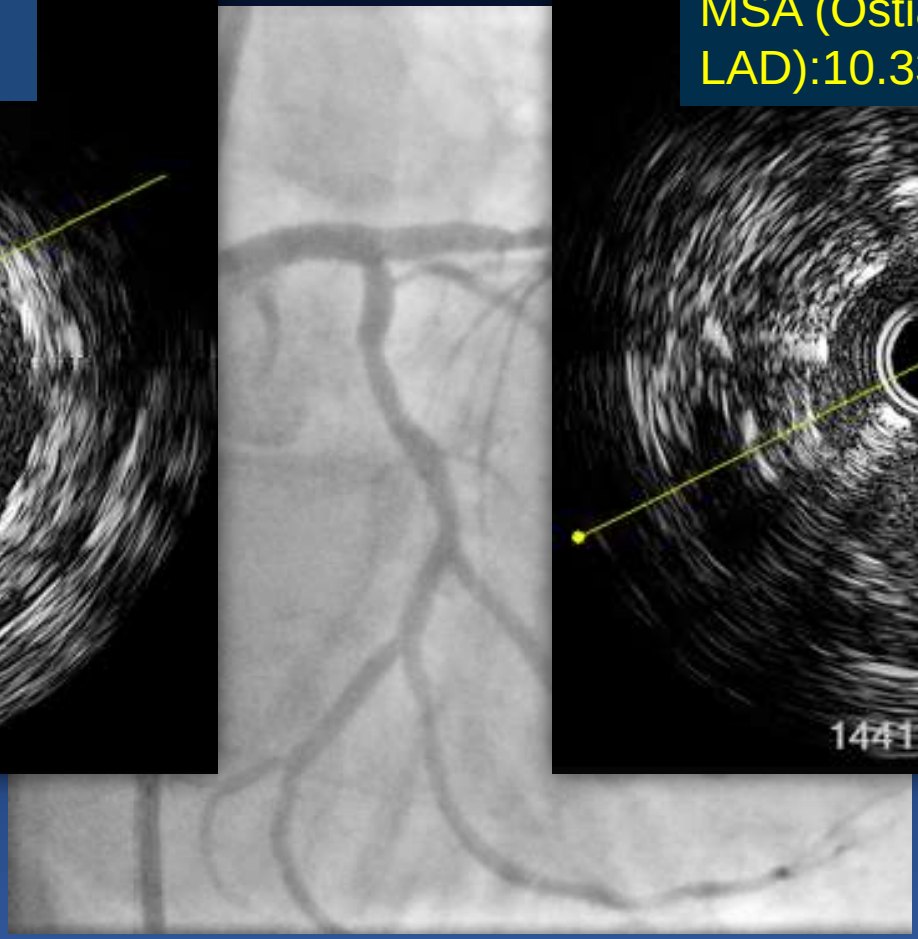
Final POT

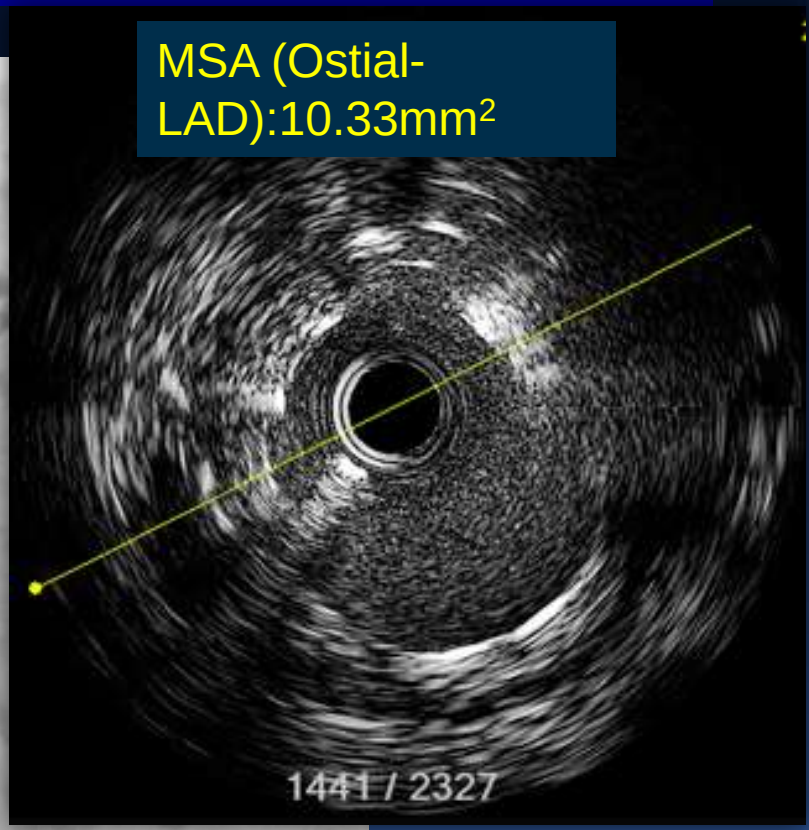
Final result



Post-stenting IVUS







13-month Angio-FU

Take home messages

- Location of SB re-crossing is an important predictor for performance of bifurcation stenting.
- Regardless of type of distal bifurcation angle, DK crush has advantages over classic crush and culotte stenting in terms of reduction of gap formation and stent under-expansion.
- Based on DKCRUSH serial trials, results imply that DK crush stenting was associated with improved clinical results for complex bifurcation lesions.

Thanks for your attention