

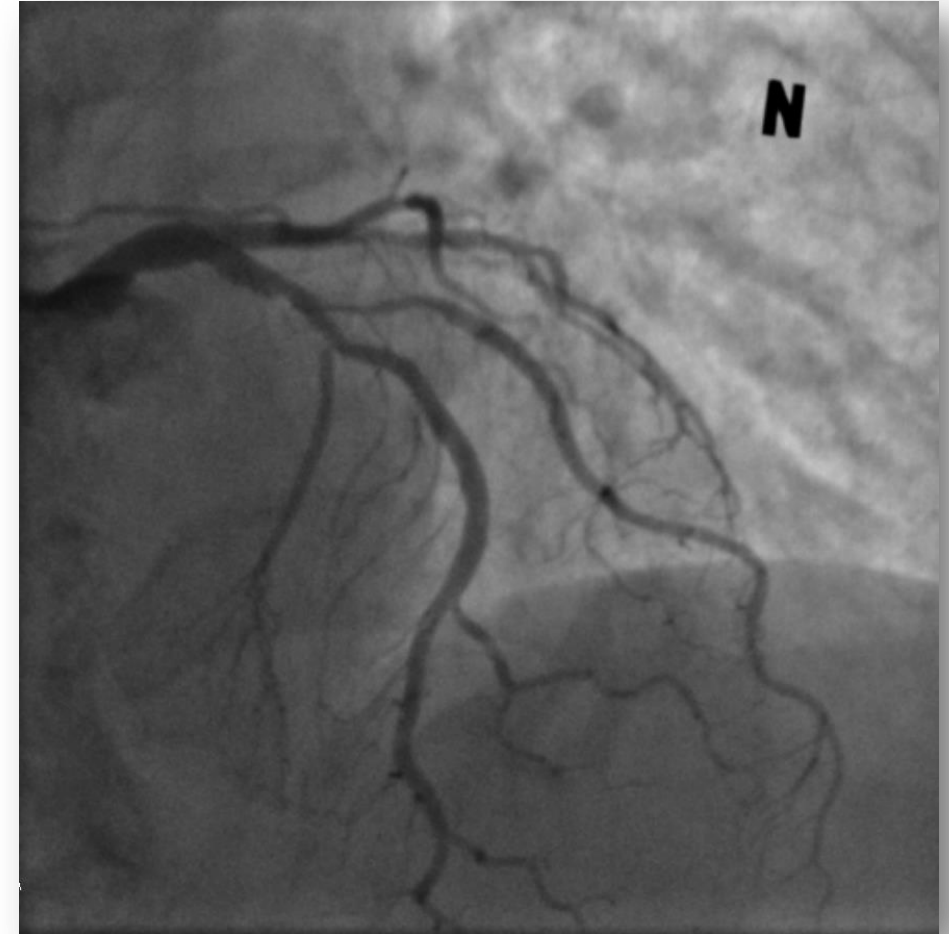
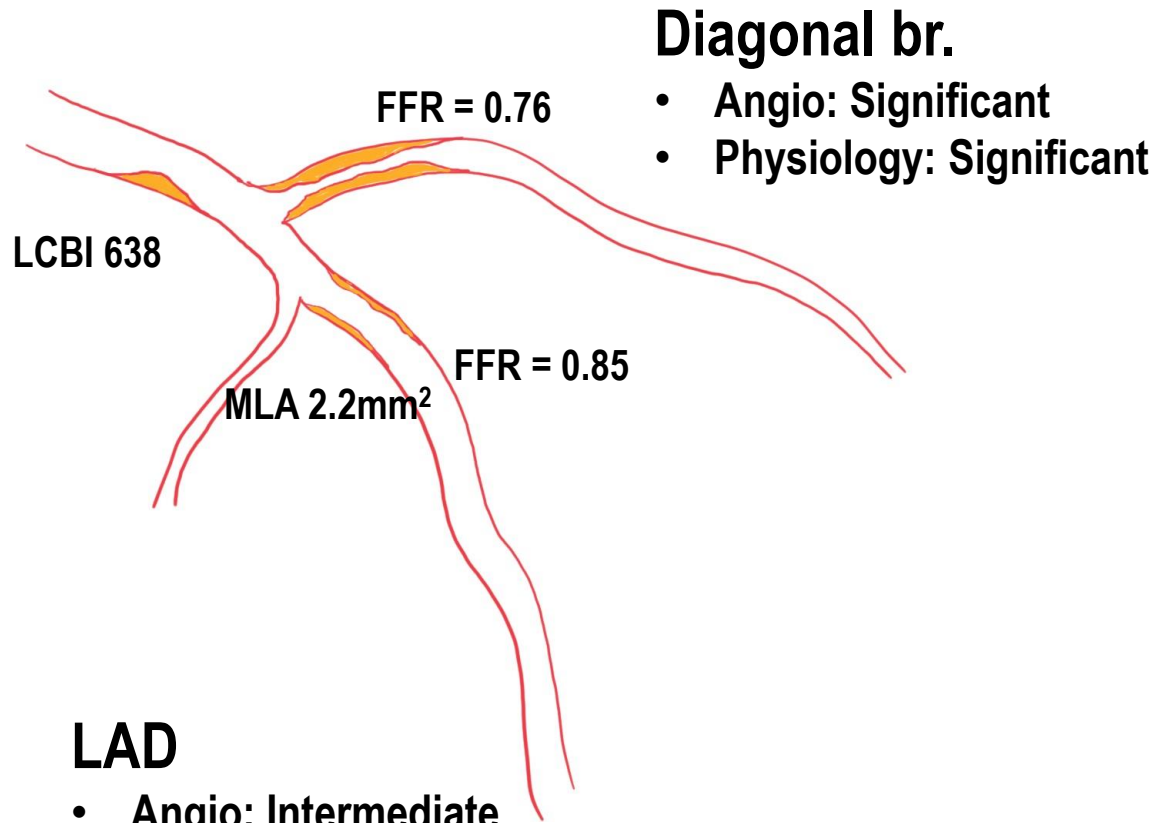
Case-Based Debate for Vulnerability

: Strategy for Bifurcation treatment with this case

KI HYUN JEON
Cardiovascular Center, Mediplex Sejong Hospital

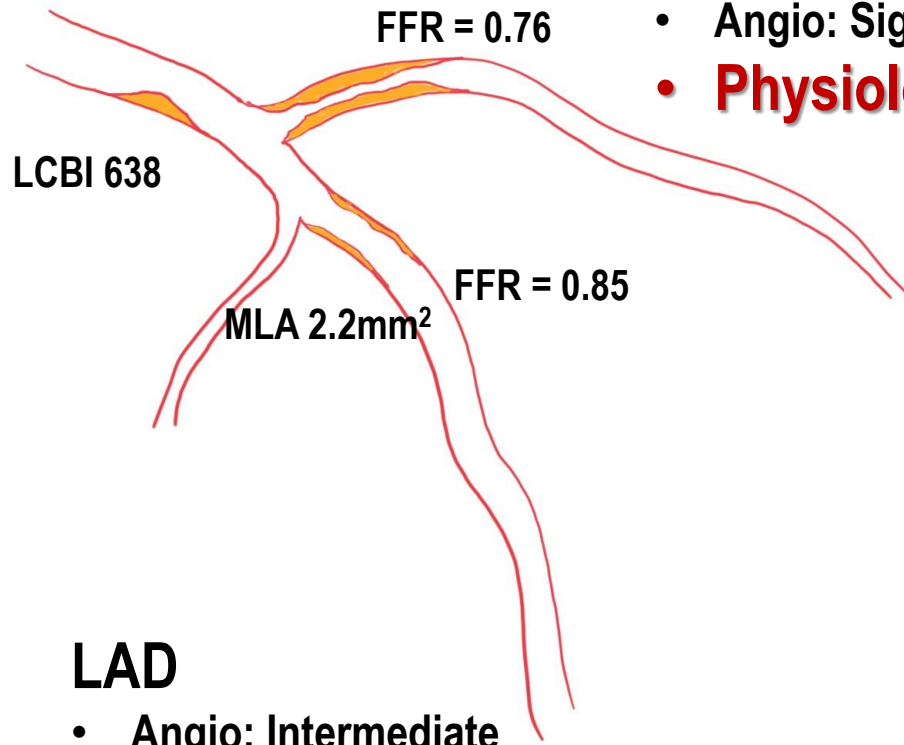


Summary and Treatment strategy



Bifurcation 0,0,1 vs.
Bifurcation 1,0,1 or 1,1,1

Summary and Treatment strategy

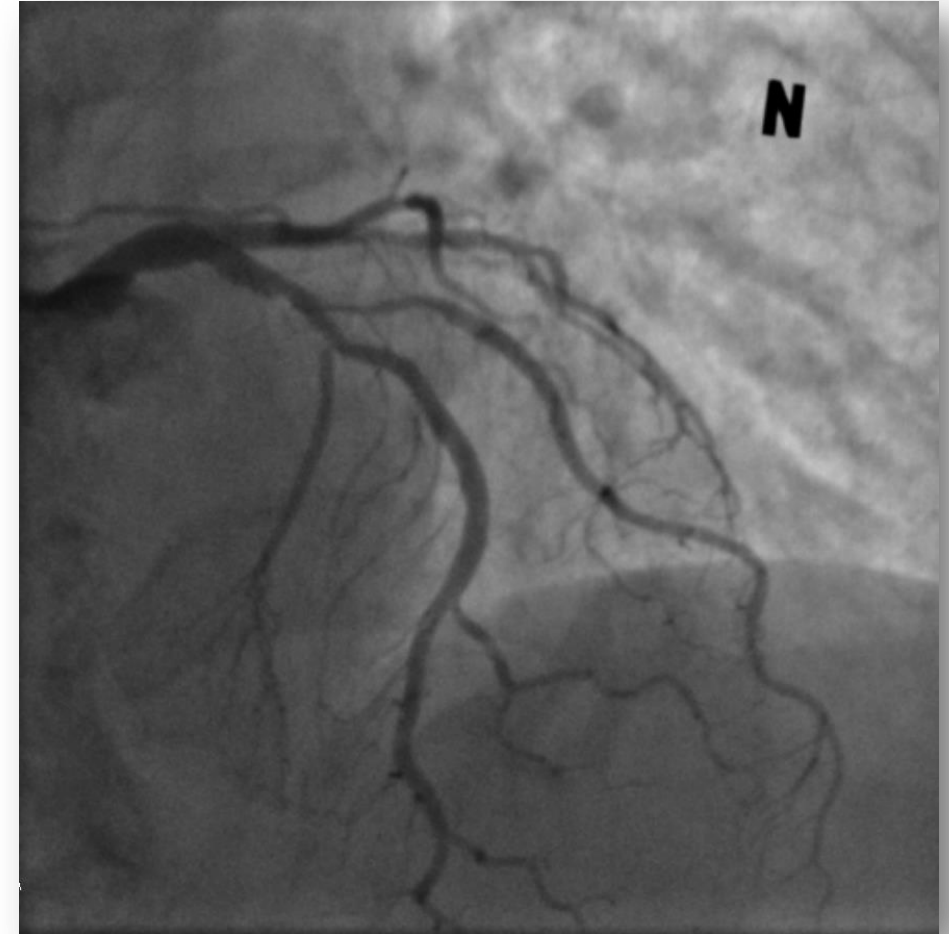


Diagonal br.

- Angio: Significant
- **Physiology: Significant**

LAD

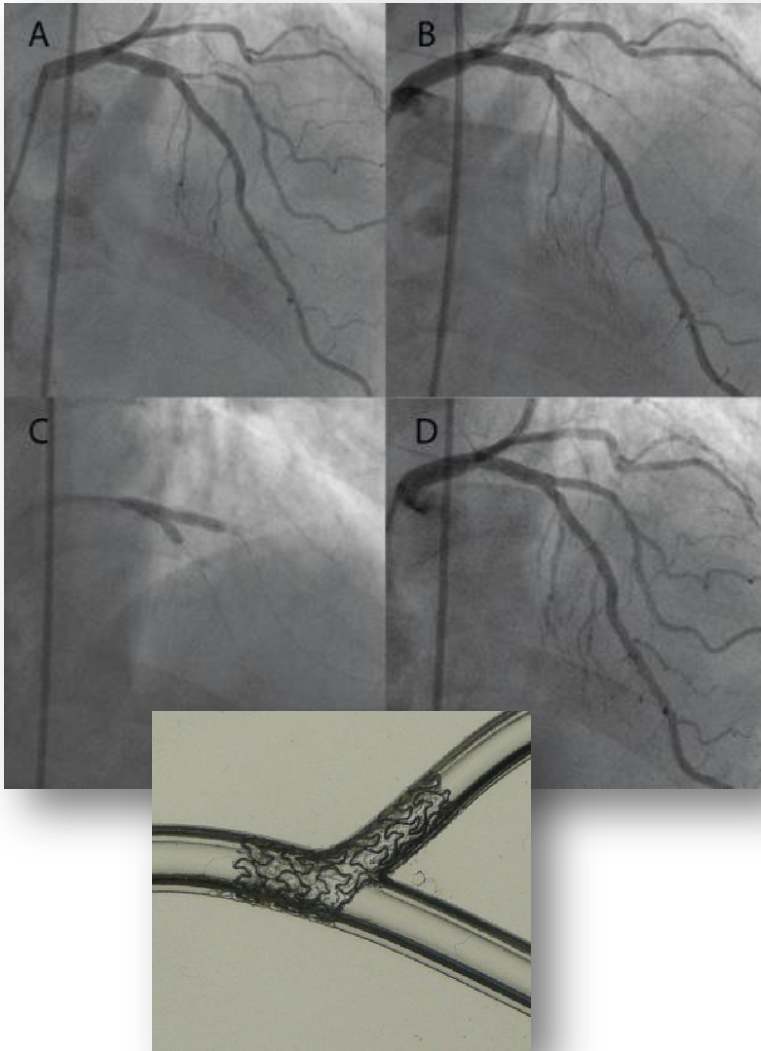
- Angio: Intermediate
- **Physiology: Functionally insignificant**
- IVUS: Significant
- NIRS: Lipid rich plaque, maxLCBI 638



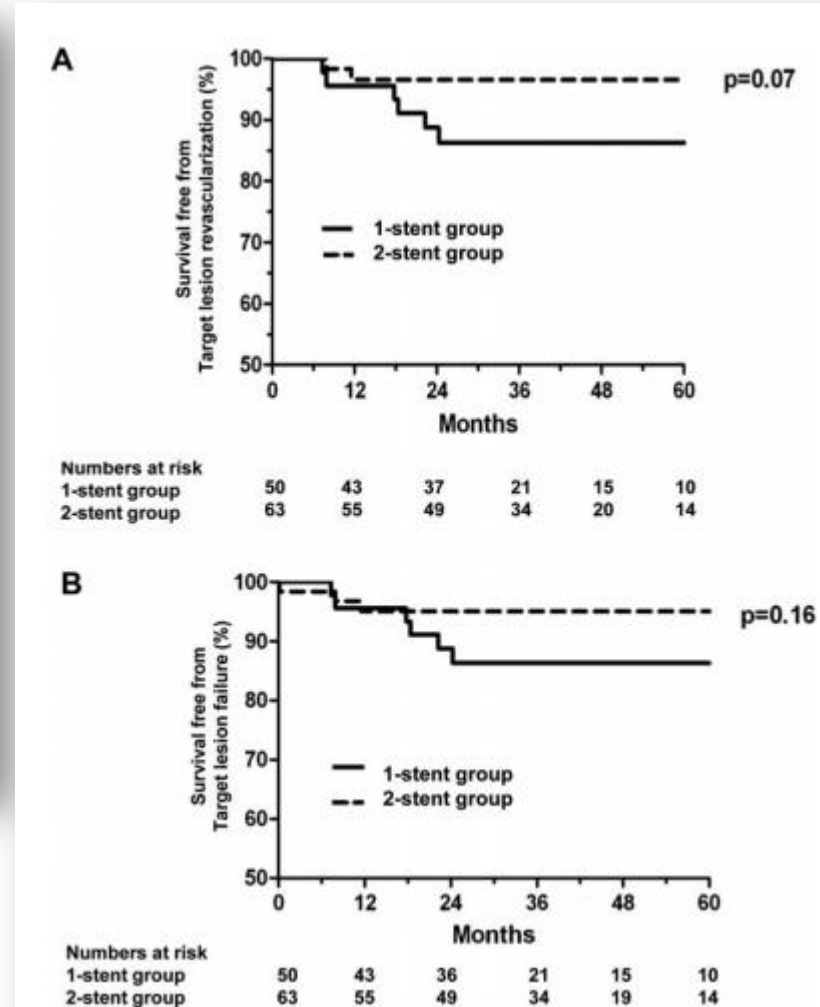
Bifurcation 0,0,1

Treatment of Medina 0,0,1 Bifurcation

Inverted provisional T stenting



Bifurcation 0,0,1 in COBIS II Registry



DEB only for bifurcation lesion

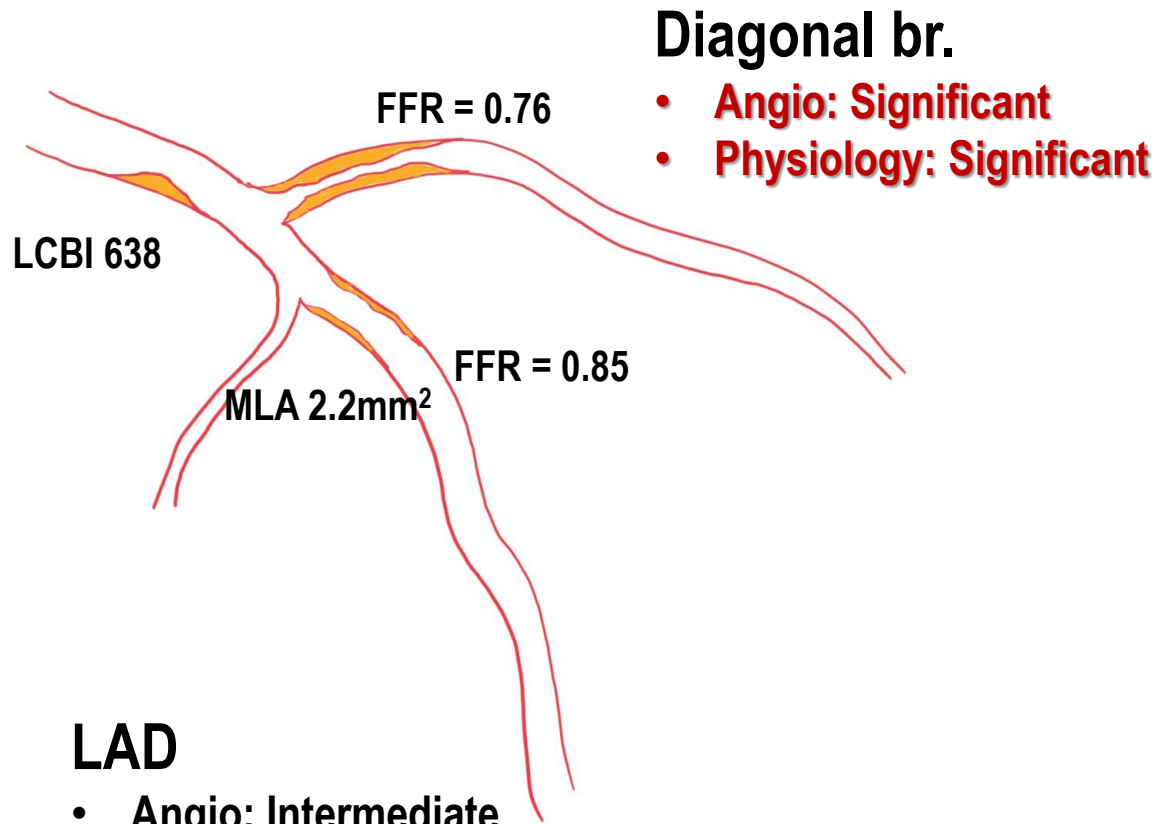
Table 2 Lesion characteristics of 39 different lesions and the associated rate of MACE or restenosis in the subgroups

| Characteristics | Number of lesions (n = 39) | Number of patients with restenosis or MACE (n = 4) |
|--|----------------------------|--|
| Medina classification type, n (%) | | |
| 1.1.1 | 7 (17.9) | 0 (0) |
| 1.1.0 | 4 (10.3) | 0 (0) |
| 1.0.1 | 1 (2.6) | 0 (0) |
| 1.0.0 | 2 (5.1) | 0 (0) |
| 0.1.1 | 7 (17.9) | 1 (25) |
| 0.1.0 | 6 (15.4) | 3 (75) |
| 0.0.1 | 12 (30.8) | 0 (0) |
| Target bifurcations, n (%) | | |
| LM/LAD/LCX | 13 (33.3) | 4 (100) |
| LAD/diagonal | 11 (28.2) | 0 (0) |
| LCX/marginal | 8 (20.5) | 0 (0) |
| RCA/RCA-PL/RCA-PD | 7 (17.9) | 0 (0) |
| Type of DCB used, n (%) | | |
| SeQuent® Please (B. Braun Melsungen, Berlin, Germany) | 28 (60.9) | 2 (50) |
| In.Pact™ Falcon (Medtronic Invatec, Roncadelle, Italy) | 18 (39.1) | 2 (50) |

EuroIntervention 2010;5:814-820

Catheterization and Cardiovascular Intervention 2014;84:E43-50

Summary and Treatment strategy

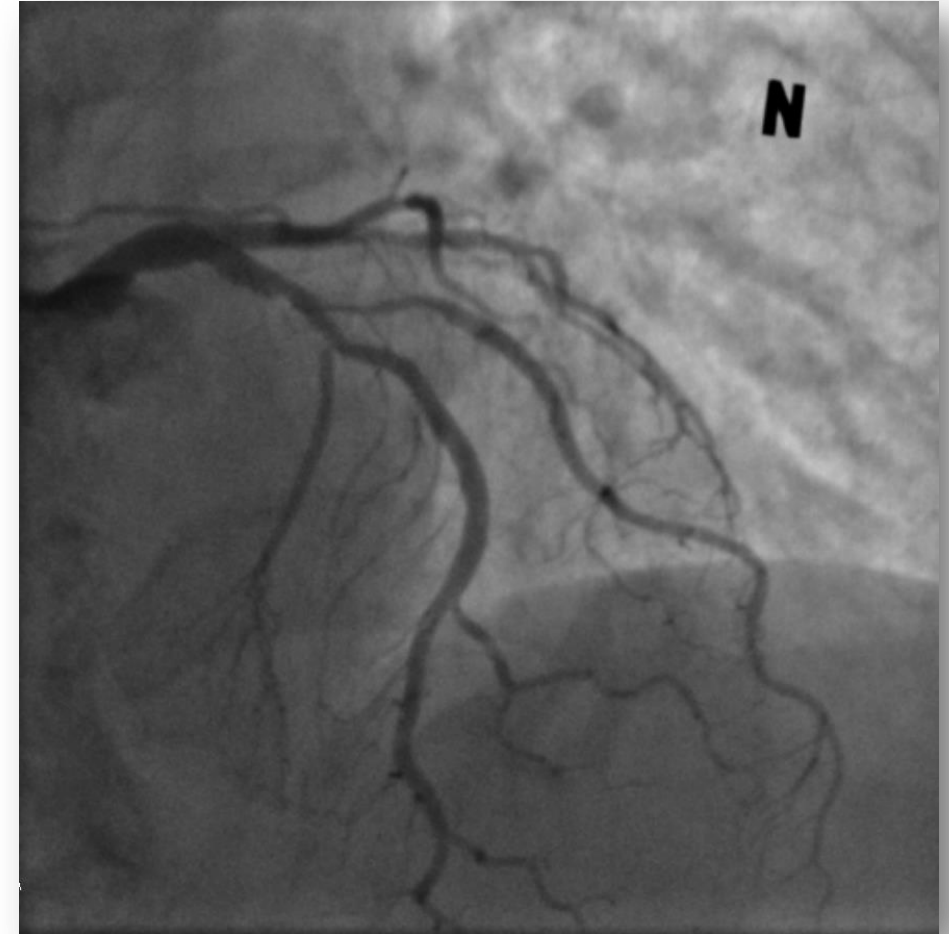


Diagonal br.

- **Angio: Significant**
- **Physiology: Significant**

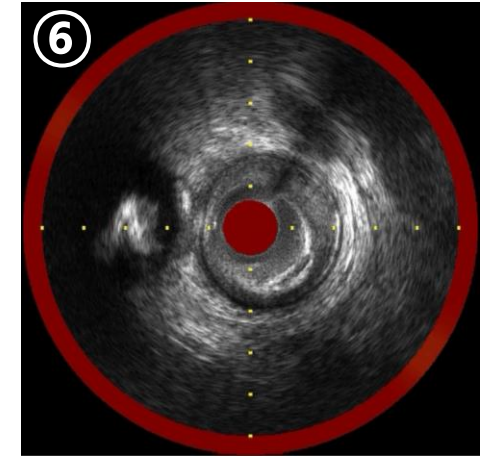
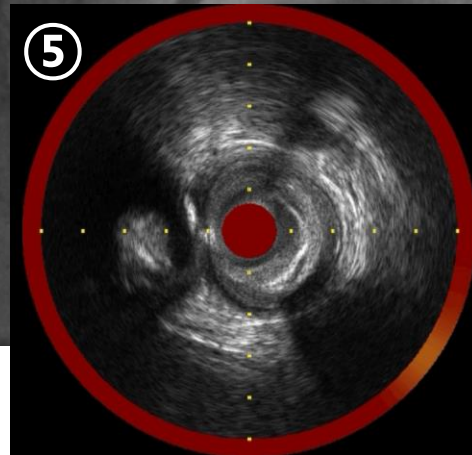
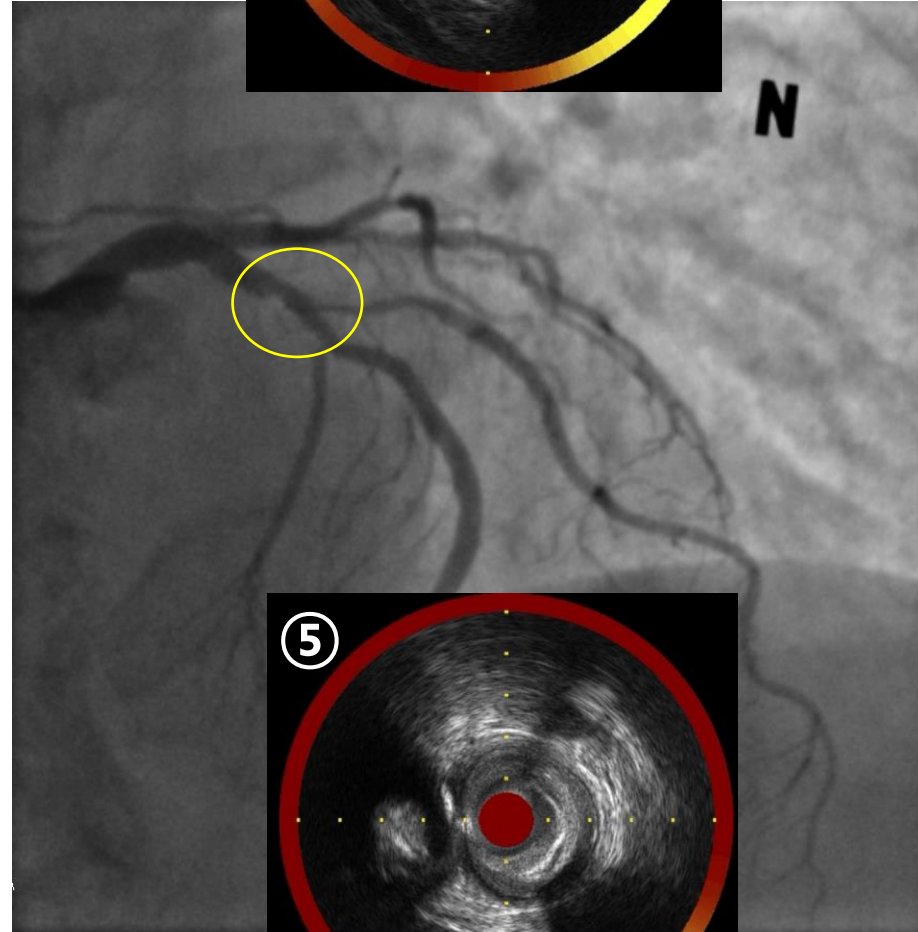
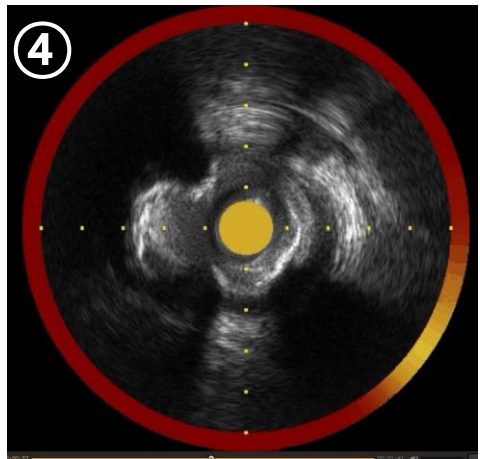
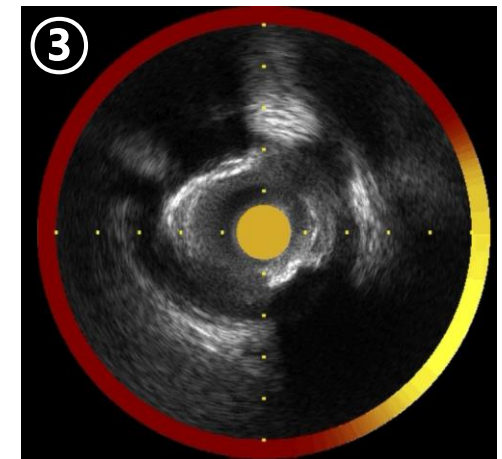
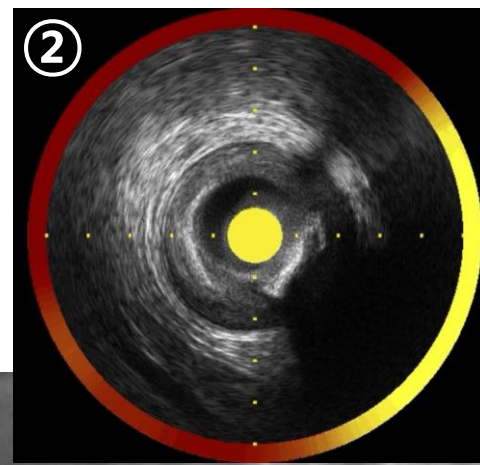
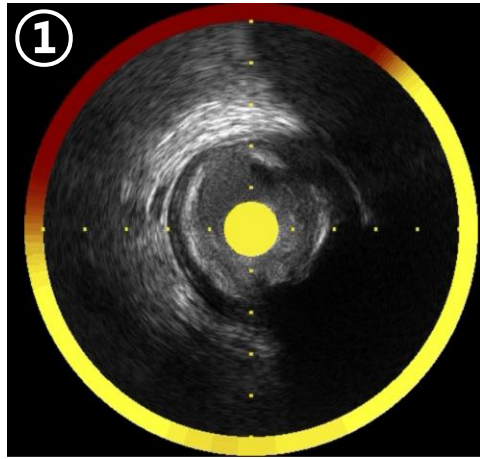
LAD

- **Angio: Intermediate**
- **Physiology: Functionally insignificant**
- **IVUS: Significant**
- **NIRS: Lipid rich plaque, maxLCBI 638**

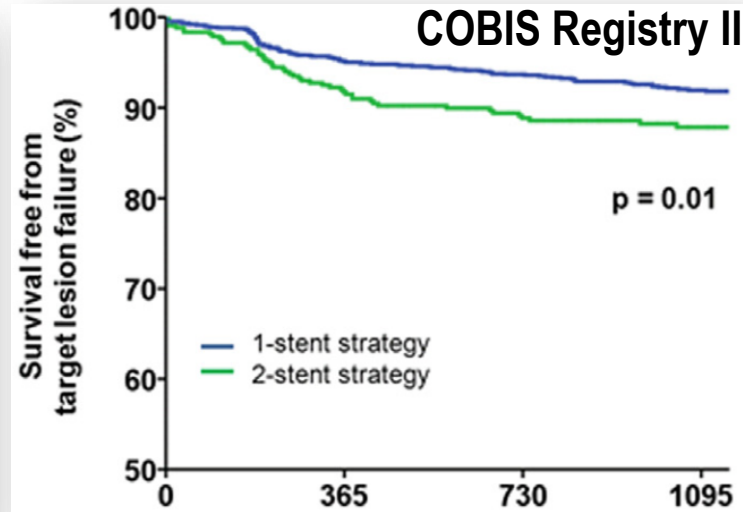
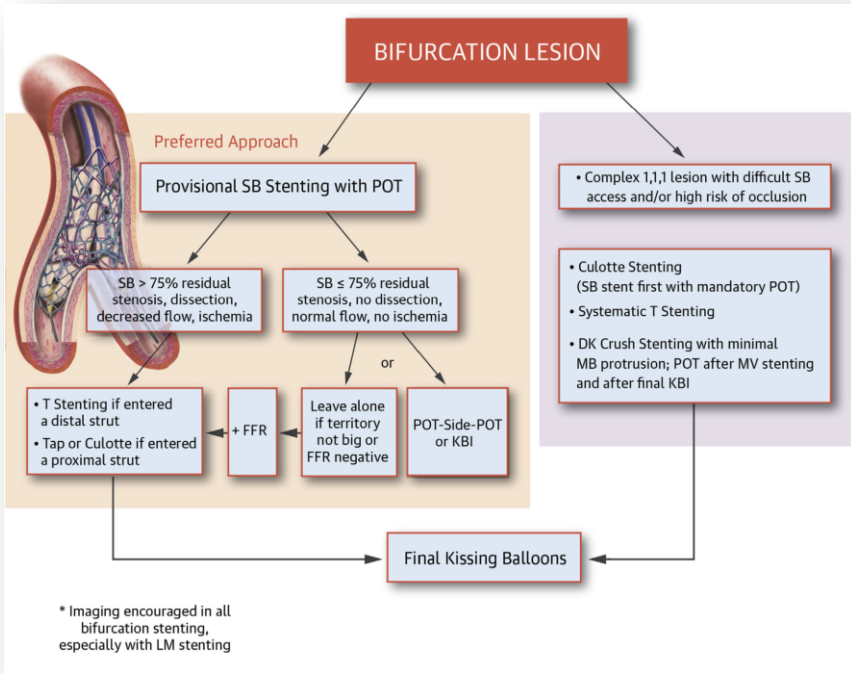


Bifurcation 1,0,1 or 1,1,1

Imaging Evaluation



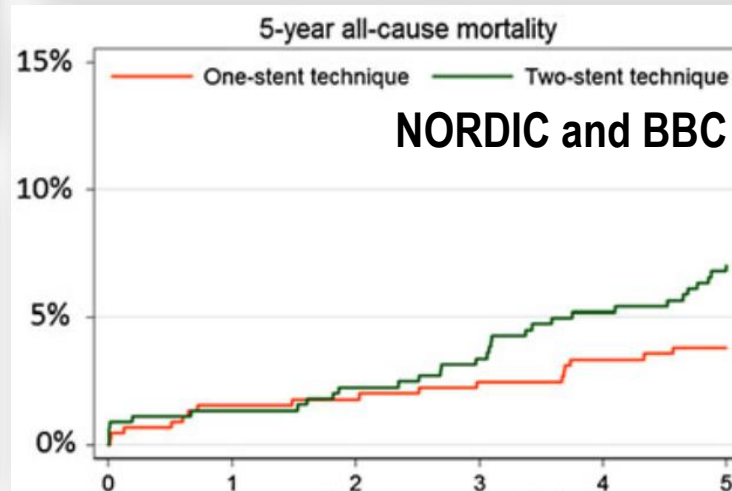
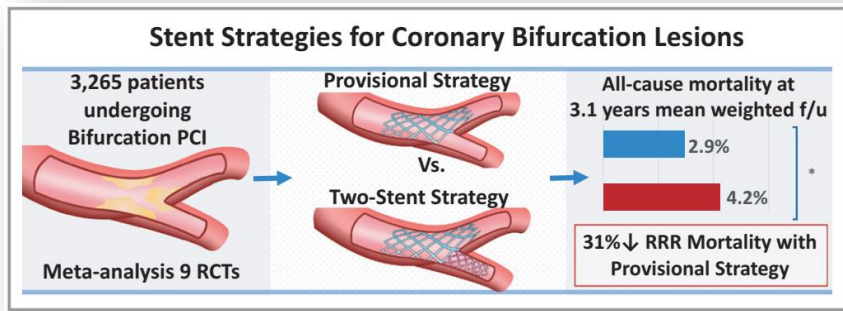
How to Treat ?



1-Stent is better than 2-Stent, but

2-Stent better in...

- ✓ **Long plaque in side branch**
- ✓ **Severe dissection pre-dilatation**
- ✓ **Unfavorable geometry for rewiring**

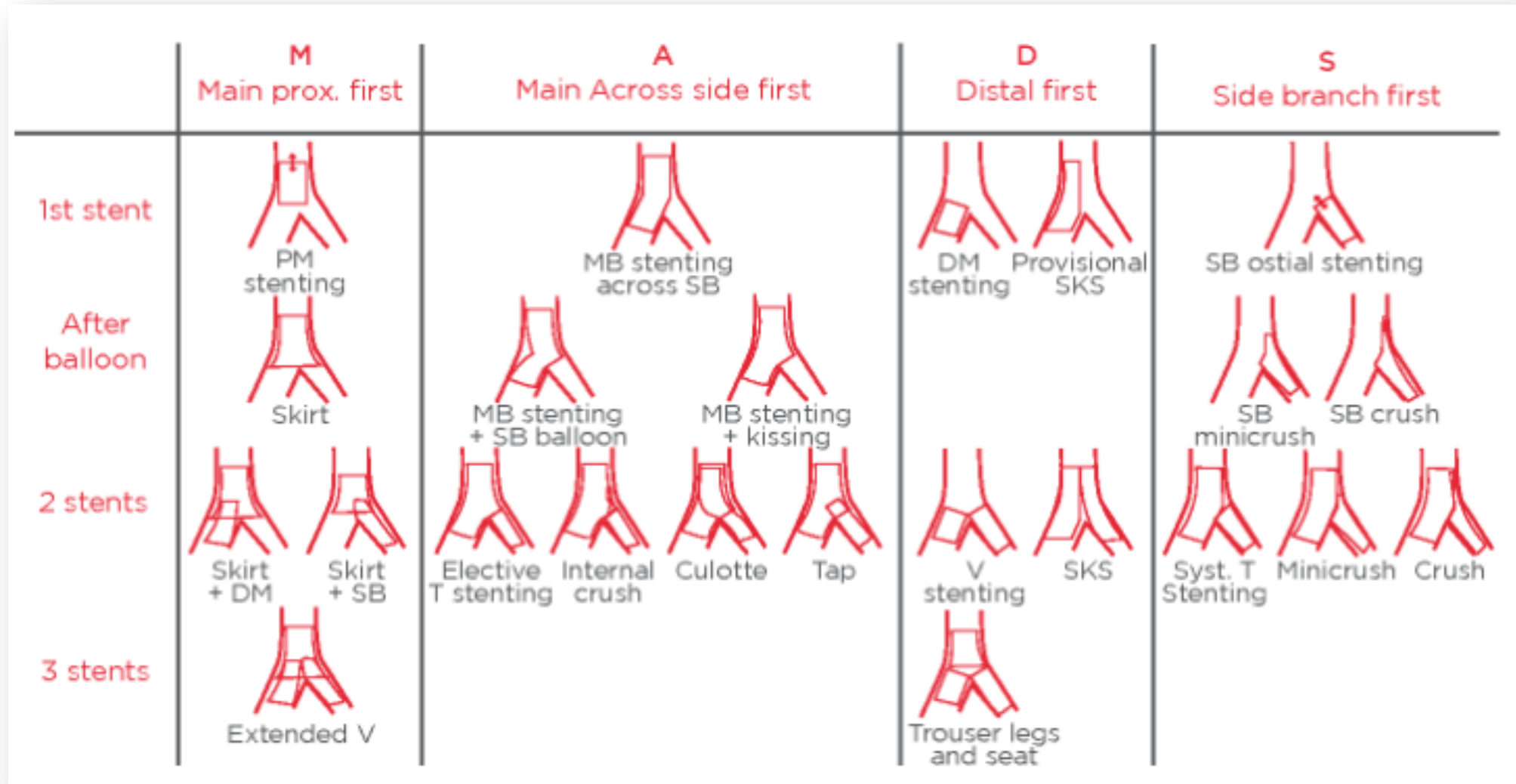


J Am Coll Cardiol Intv 2014;7:255-63

European Heart Journal 2016;37:1923-1928

J Am Heart Assoc. 2018;7:e008730. DOI: 10.1161/JAHA.118008730

Which Technique is better?



In Vitro Experiments using micro CT

In-vitro coronary bifurcation model

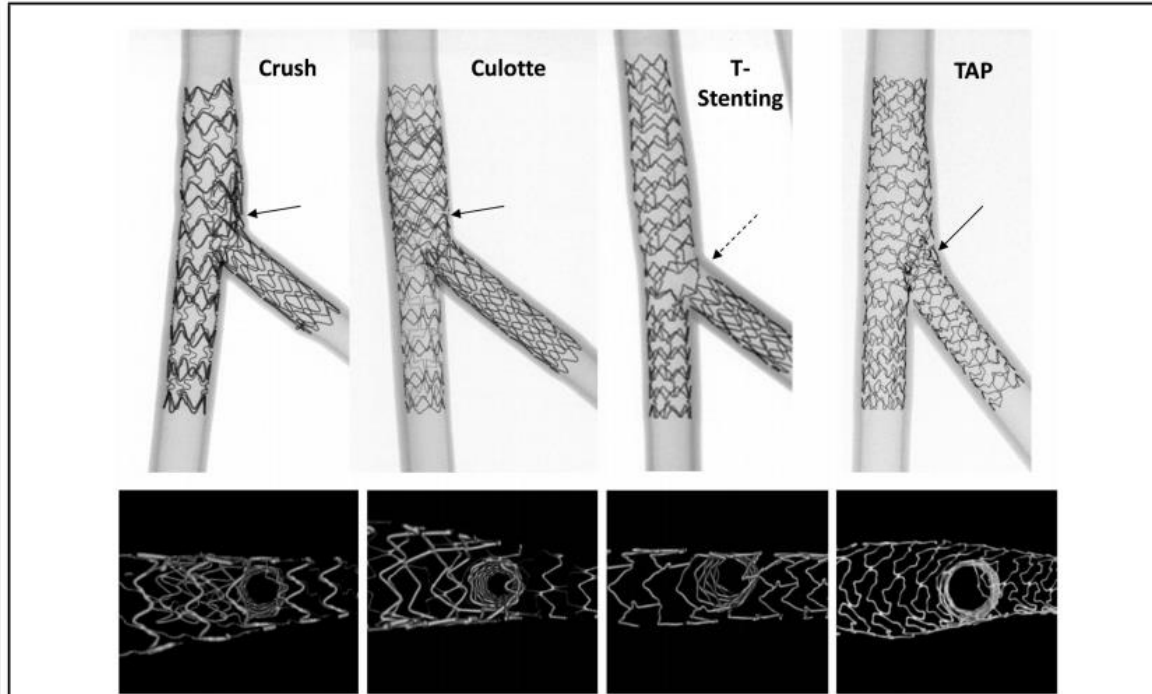


Figure 1. Planar projection and 3D view of the side branch (SB) ostium showing a comparison of 4 different bifurcation techniques: Crush, Culotte, T-stenting and T and Protrusion (TAP). Overlapping layers of struts proximal to the SB in the Crush and Culotte techniques (arrow) increase the metallic presence and the rate of malapposition proximal to the SB. T-stenting technique can leave a gap in stent scaffolding between the main vessel stent and the SB stent (dashed arrow), whereas TAP provides scaffolding of the ostium with minimal strut overlap and malapposition in the proximal vessel.

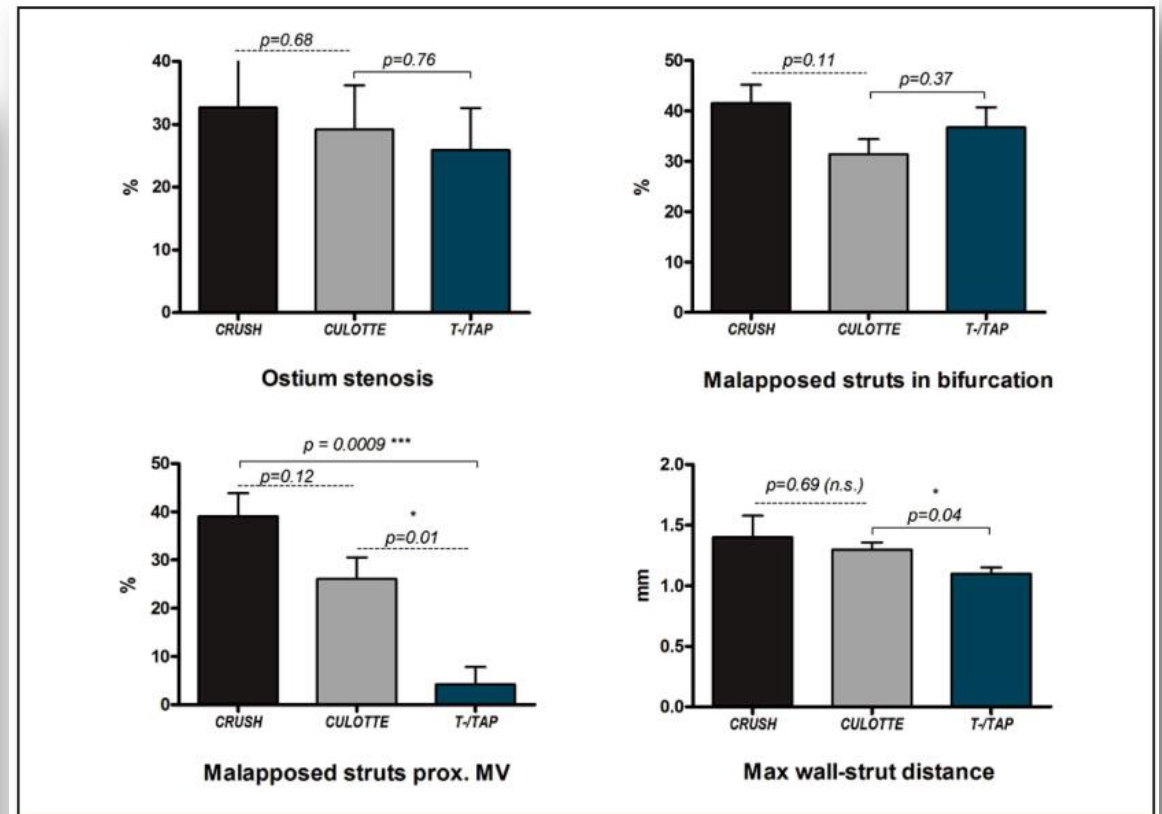
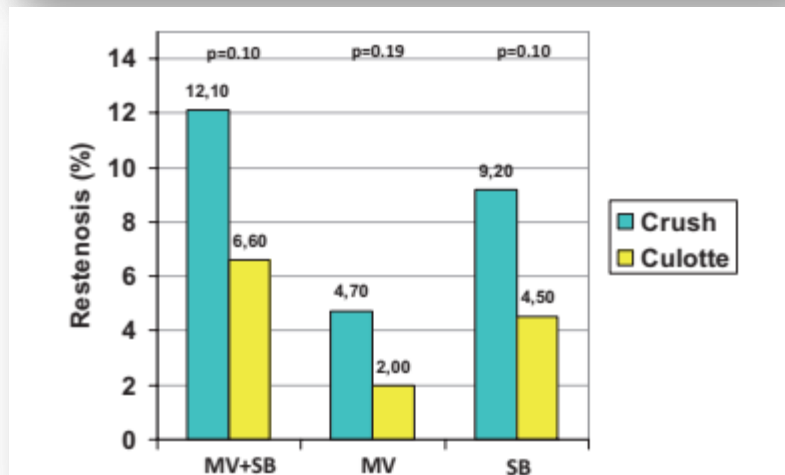
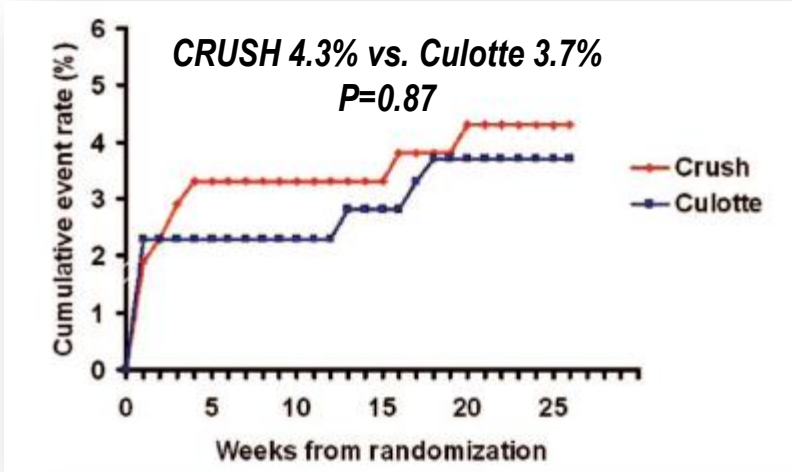


Figure 3. Rate of ostial stenosis and strut malapposition assessed by micro-computed tomography (CT) with different 2-stent techniques. 2-stent conventional stenting techniques using commercially available drug-eluting stents (Crush, n=5; Culotte, n=3 and T-T-stenting with Protrusion (TAP), n=4) were compared. After kissing balloon post-dilatation using the same balloon sizes and inflation pressure, the percentage of malapposed struts was quantified from micro-CT scanning at different locations in the bifurcation. A trend was observed with Culotte and TAP techniques having lower rates of malapposition than the Crush technique. Note that measures are the results of in-vitro bench experimentations with optimal crossing and FKI post-dilatation. Results presented are representative of idealized deployment conditions and cannot predict the performance of each technique in patients with advanced diseases; therefore, data must be carefully interpreted.

Culotte, Crush, and TAP

The Nordic Stent Technique Study

- Total 424 patients, RCT
- Results: **Culotte = Crush**



BBK II angiographic trial

- Total 300 patients, RCT
- Result: **Culotte ≥ TAP**

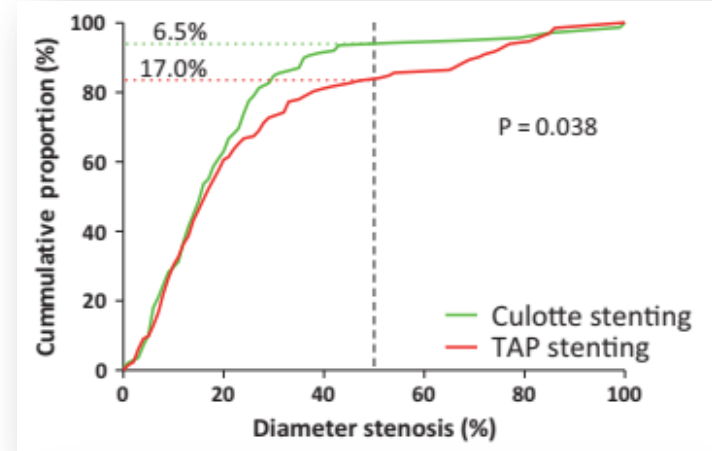


Table 3 One-year clinical outcomes

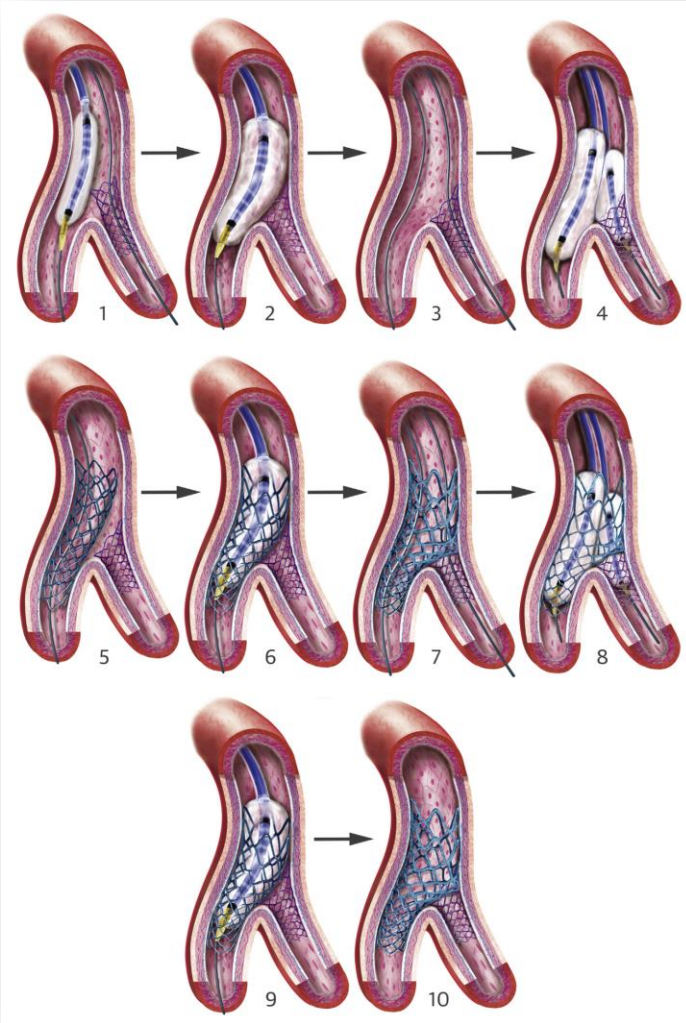
| | Culotte stenting n = 150 | TAP stenting n = 150 | P |
|---|-----------------------------|-------------------------|-------|
| Target lesion revascularization n, (%) | 9 (6.0) | 18 (12.0) | 0.069 |
| TLR only in side branch n, (%) | 7 (4.7) | 13 (8.7) | 0.16 |
| Target lesion failure n, (%) | 10 (6.7) | 18 (12.0) | 0.11 |
| Death, any cause n, (%) | 3 (2.0) | 4 (2.7) | 0.70 |
| Cardiac n, (%) | 1 (0.7) | 1 (0.7) | 1.0 |
| Non-cardiac n, (%) | 2 (1.3) | 3 (2.0) | 0.65 |
| Target vessel myocardial infarction n, (%) | 2 (1.3) | 1 (0.7) | 0.56 |
| ARC definite/probable Stent thrombosis n, (%) | 1 (0.7) | 0 (0) | 0.32 |

Circ Cardiovasc Intervent. 2009;2:2

European Heart Journal 2016;37:3399-3405

DKCRUSH III DK Crush vs. Culotte

Double Kissing Crush Technique



DKCRUSH III Trial

- RCT
- N=419 with UPLMCA
- Results: **DK Crush >> Culotte**

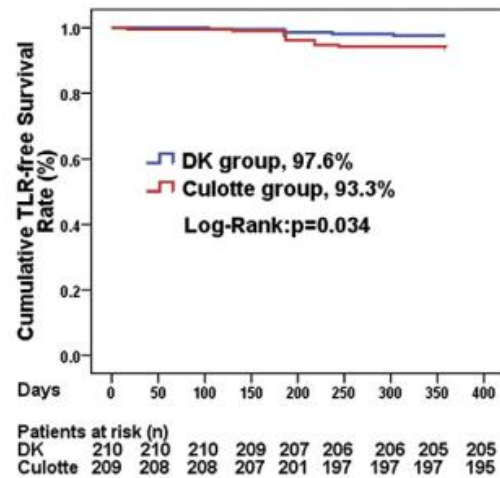


Figure 3 TLR-Free Survival Rate at 12 Months

Rate was 93.3% in the Culotte group, and 97.6% in the double kissing (DK) group ($p = 0.034$). TLR = target lesion revascularization.

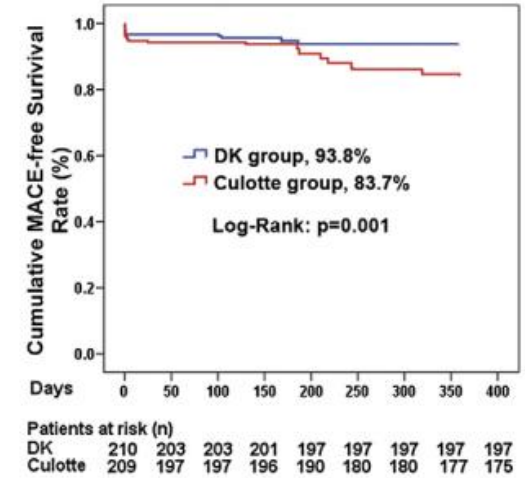
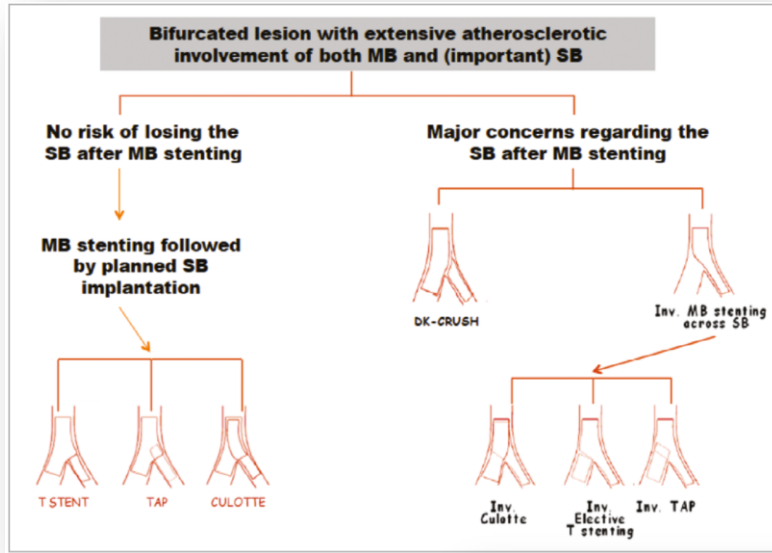


Figure 5 MACE-Free Survival Rate at 12 Months

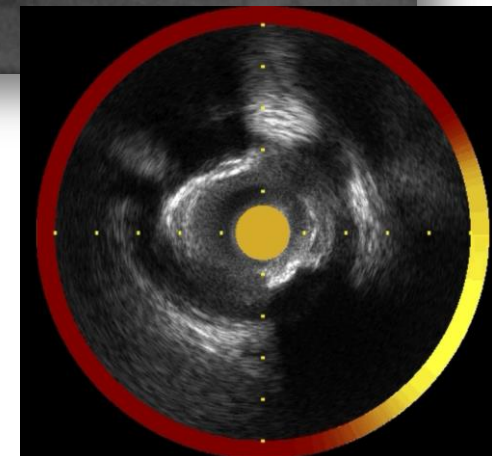
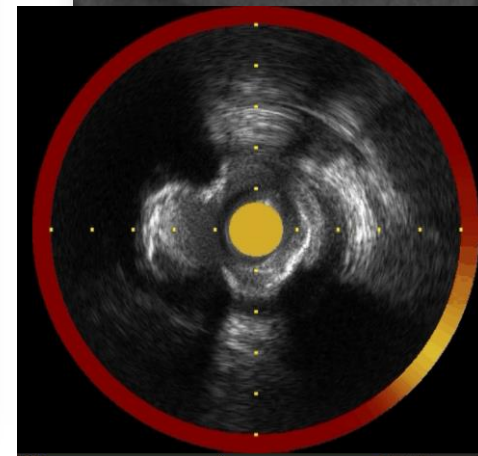
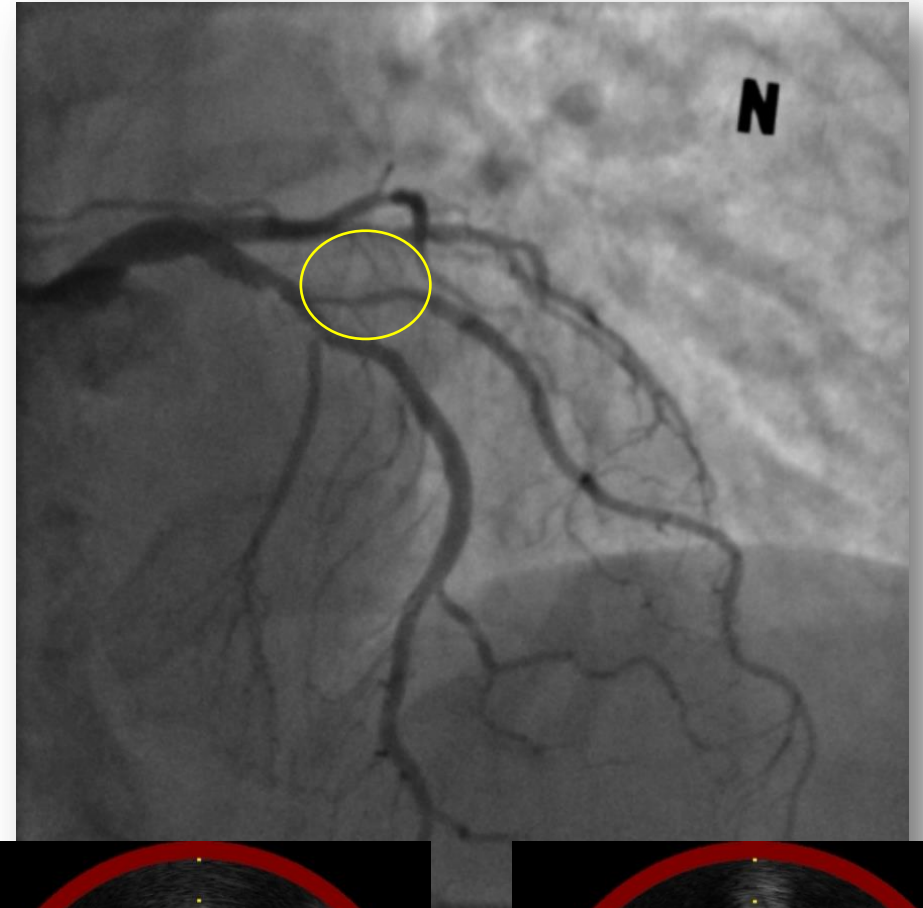
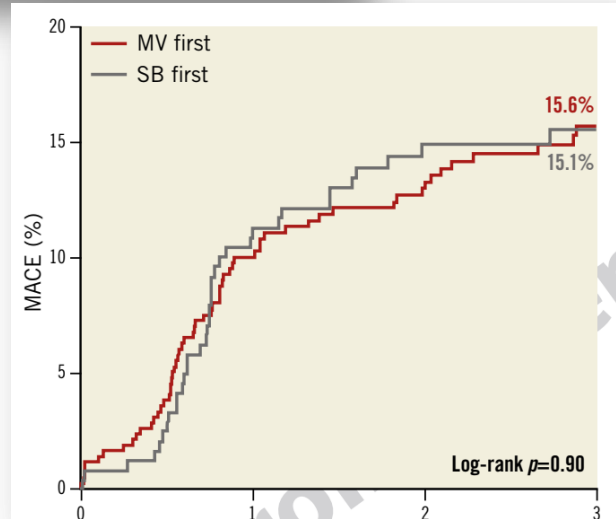
Rate was 83.7% in the Culotte group, and it was 93.8% in the double kissing (DK) group ($p = 0.001$). MACE = major adverse cardiac event.

Which vessel first?

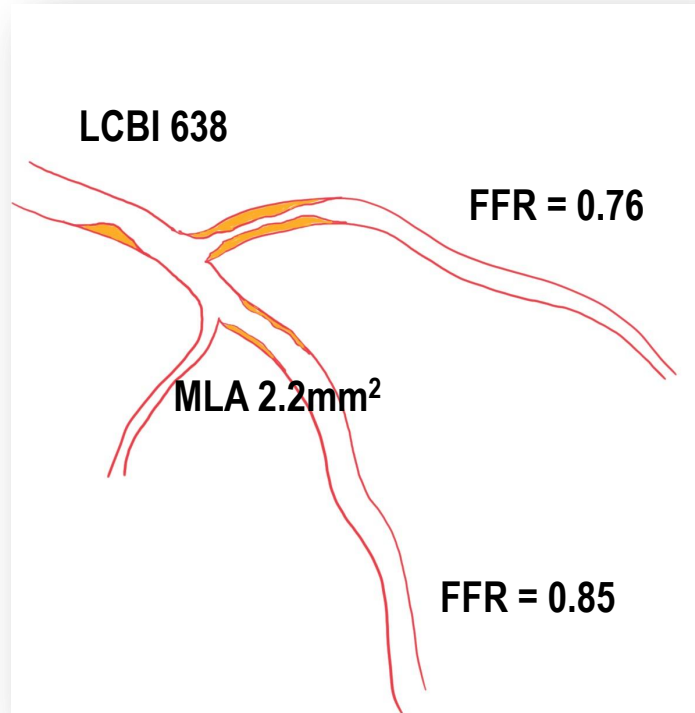
SB loss after MV stenting?



COBIS II registry
 Main vessel first vs. side branch first
 Propensity score matching
 “More Severe Lesion First”



Summary



- **I think the best 2-stent technique is the technique you are most familiar with.** Maybe the optimal result especially in term of stent expansion is much more important than the selection of a specific 2-stent technique.



THANK YOU FOR ATTENTION

Ki Hyun Jeon

Mediplex Sejong Hospital

If you have any question, don't hesitate to e-mail me.

imcardio@gmail.com