The 28th TCTAP 2023

Hot Topics: Bifurcation PCI
2023/5/8 (Mon), 12:02 PM ~ 12:10 PM
Coronary Theater, Walker Hall, Level 1

OCT Guided Bifurcation PCI, Step-by-Step

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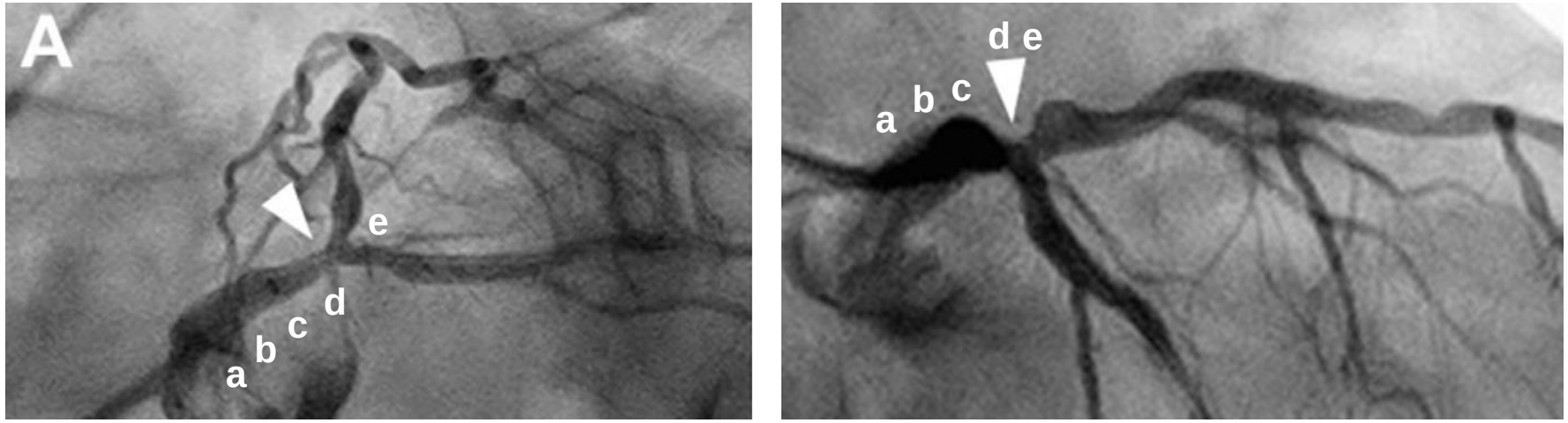
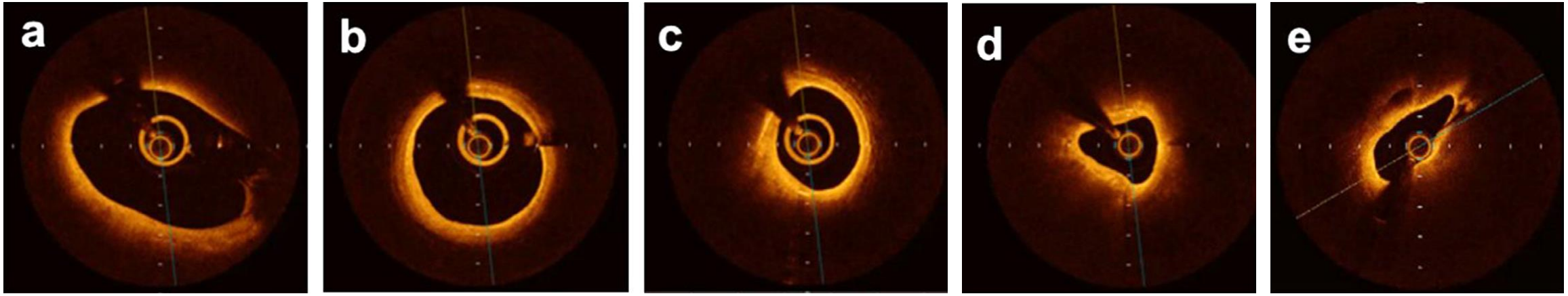
Disclosure statement of financial interest

Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

Affiliation/Financial Relationship	Company
Grant/Research Support	No
Consulting Fees/Honoraria	No
Major Stock Shareholder/Equity	No
Royalty Income	No
Ownership/Founder	No
Intellectual Property Rights	No
Other Financial Benefit	No

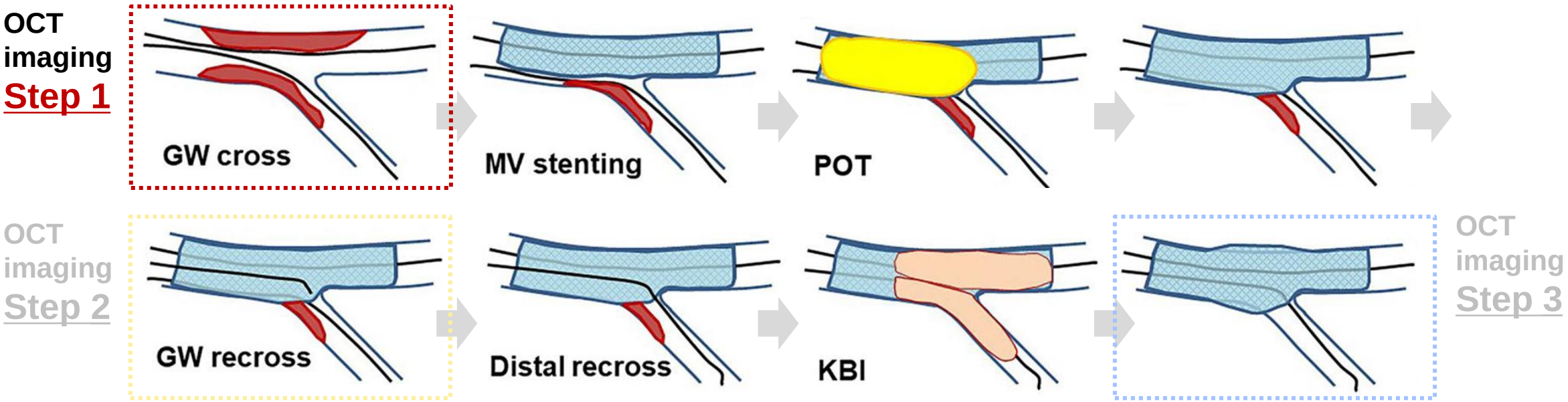
OCT in bifurcation





OCT provides accurate information about lumen and vessel dimensions, plaque characteristics, and bifurcation morphology.

Flow of OCT-guided bifurcation stenting



Step 1 (lesion assessment)

- Stent diameter, length, landing zone
- SB ostium length, branching angle
- MV calcification

Step 2 (GW re-cross)

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Step 3 (Optimization)

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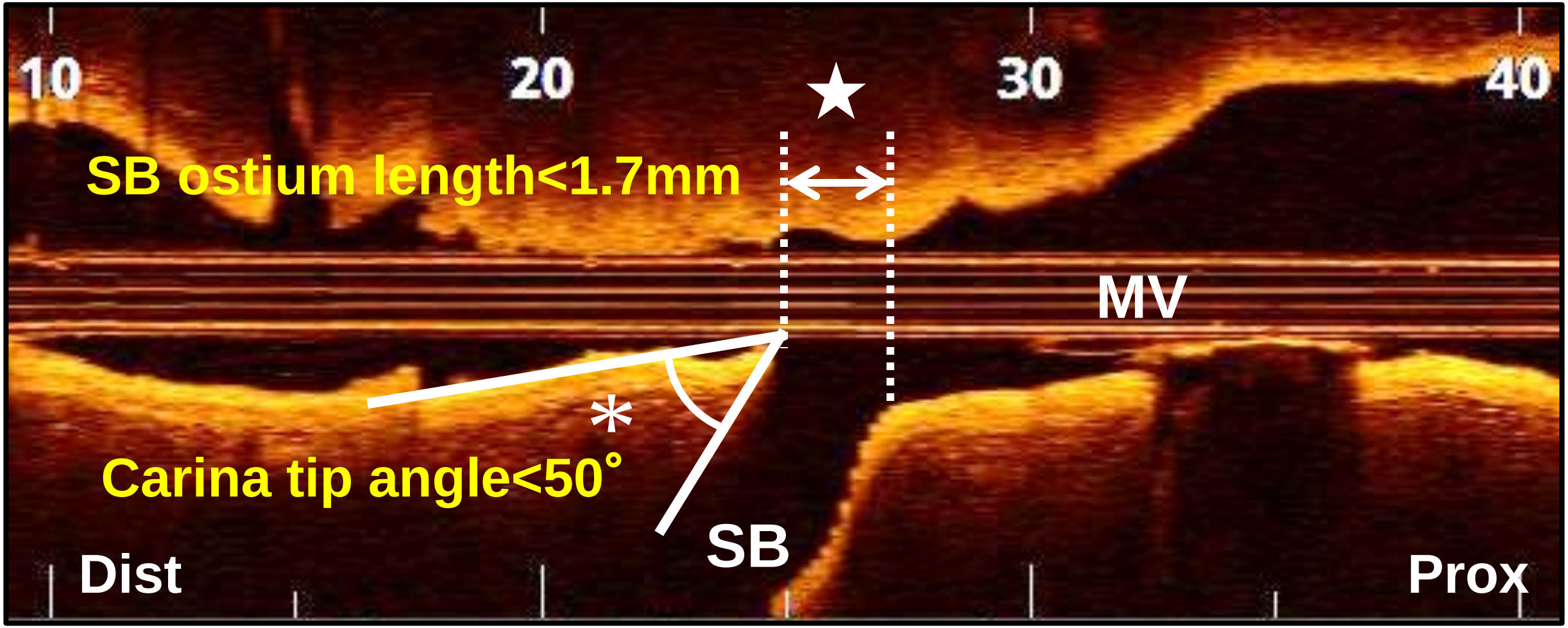
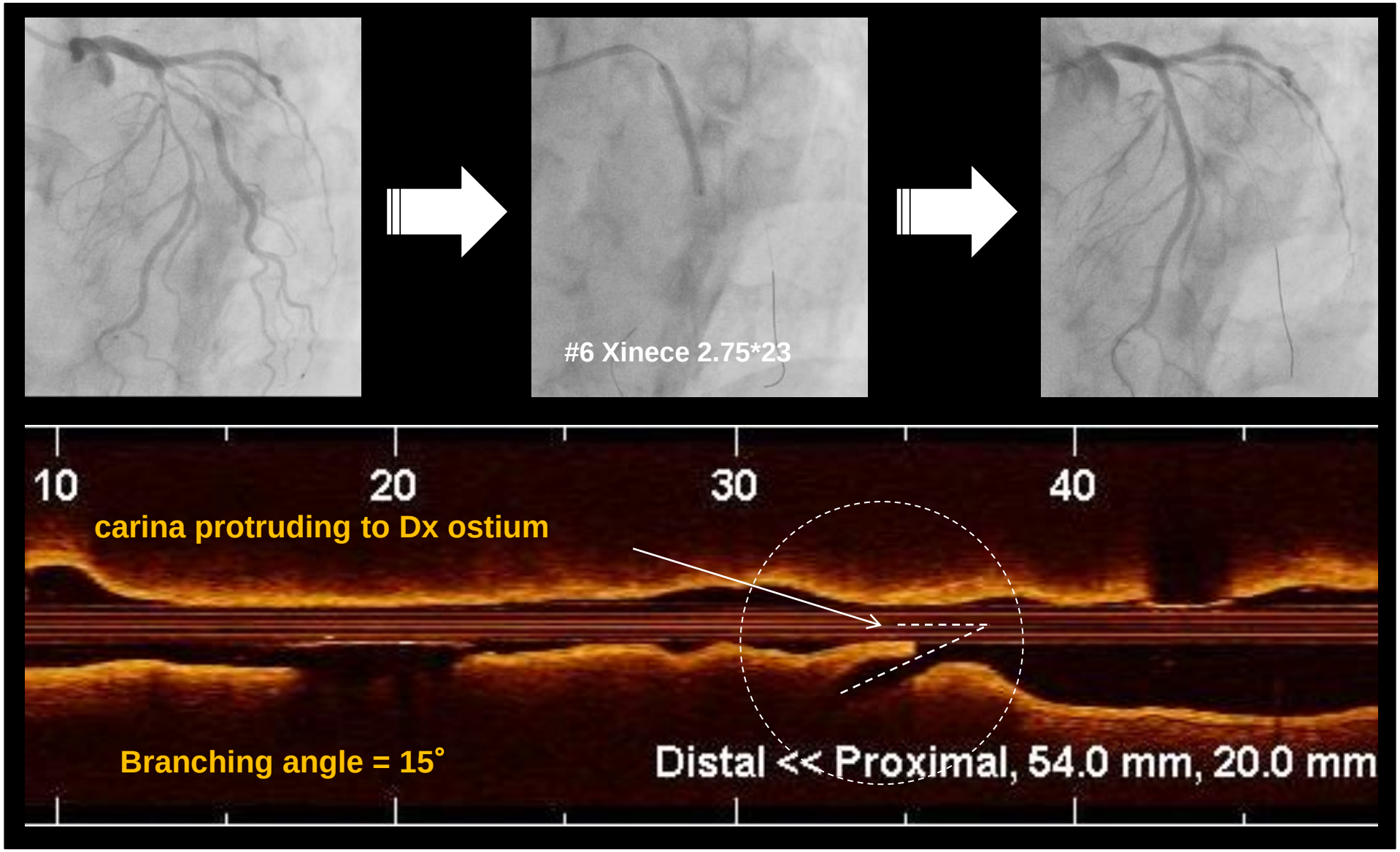
Criteria for predicting side branch occlusion

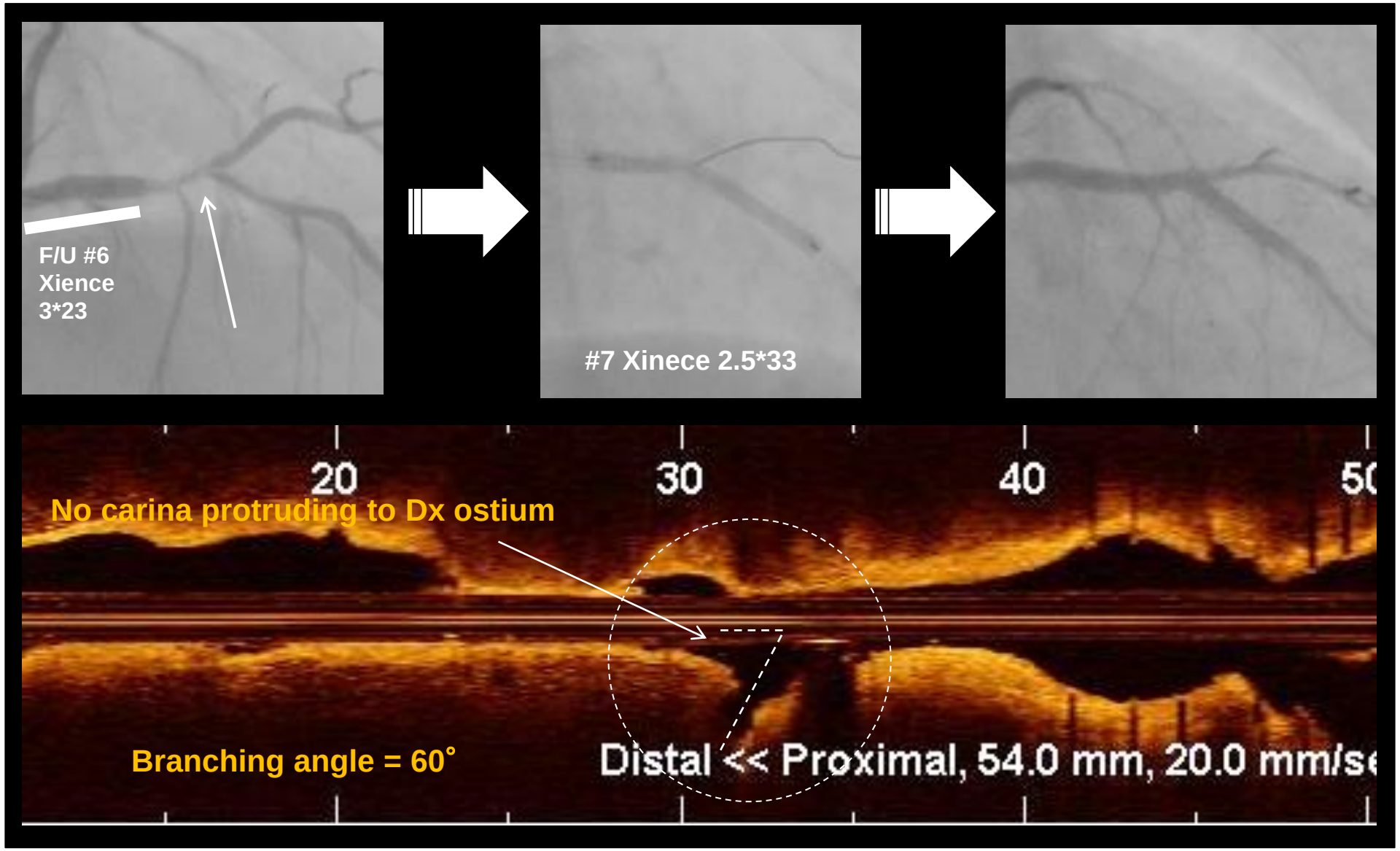


Measurements of carina tip angle (defined as the angle between lumen contour lines of main branch and SB at the carina, asterisk) and length between proximal branching point to carina tip (star) in longitudinal OCT image.

An example of SB occlusion after MV stenting

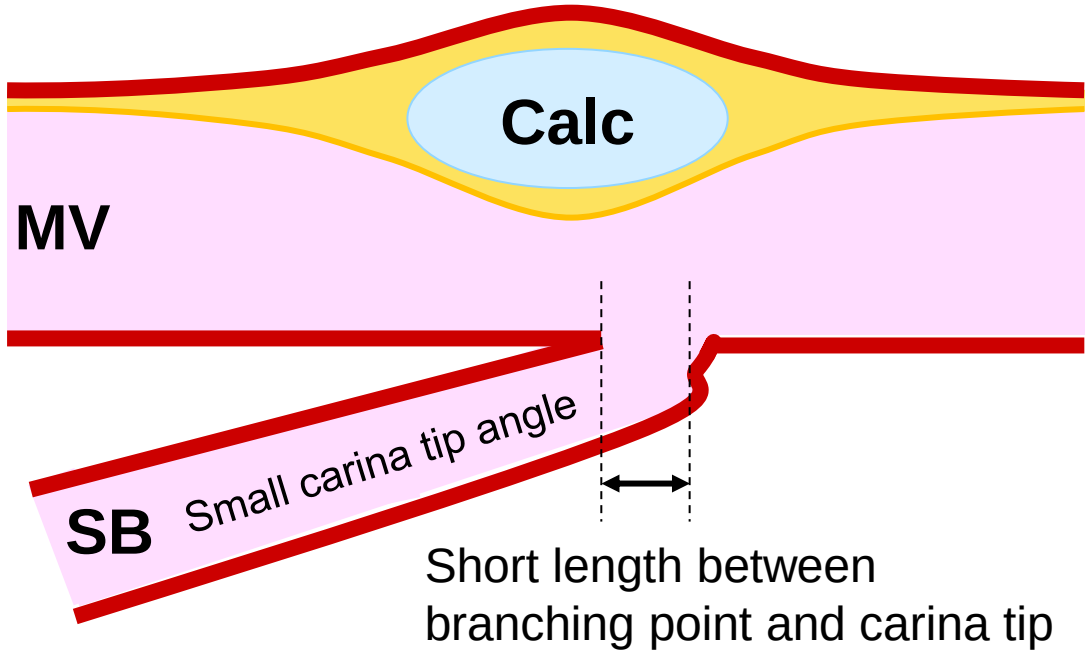


An example of *no* SB occlusion after MV stenting

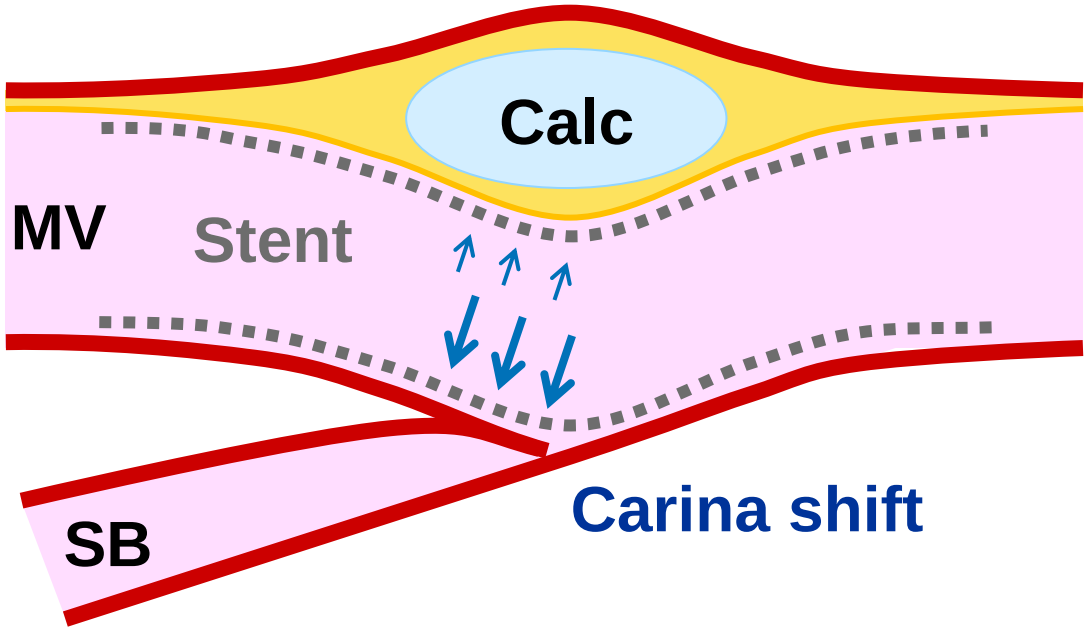


Calcification as a risk for SB complication

Pre-intervention



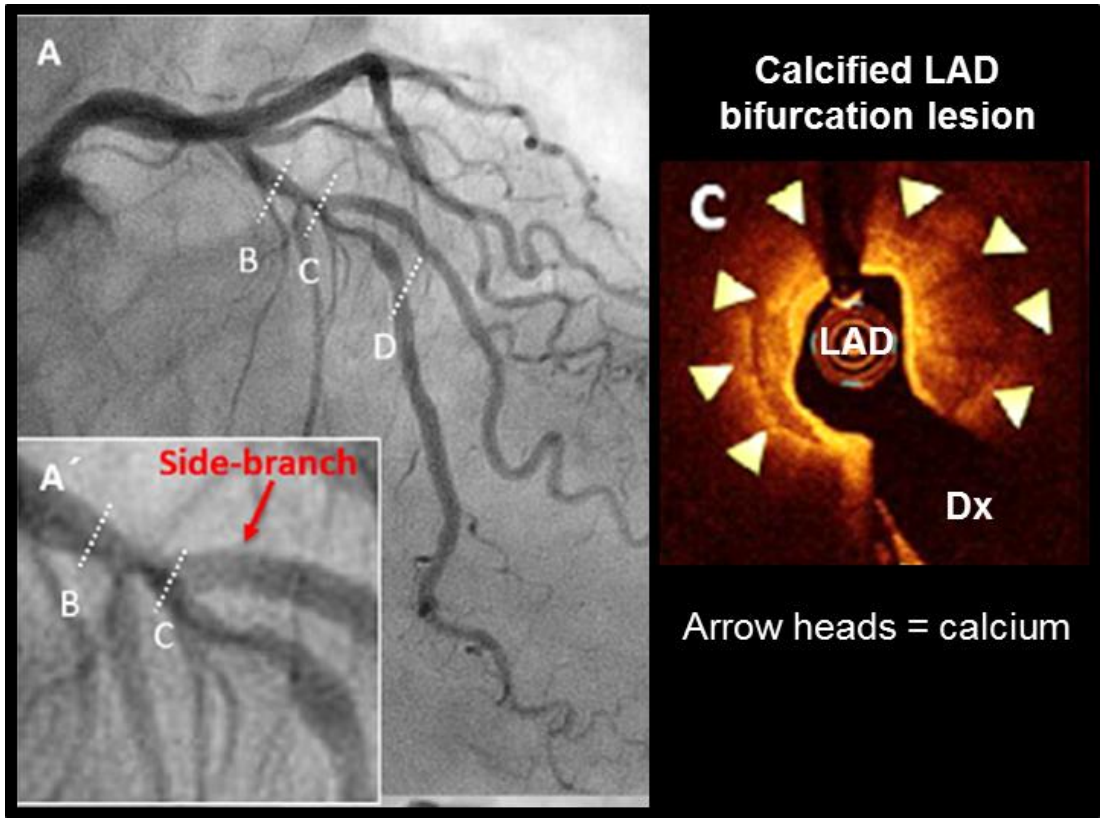
Post stent implantation



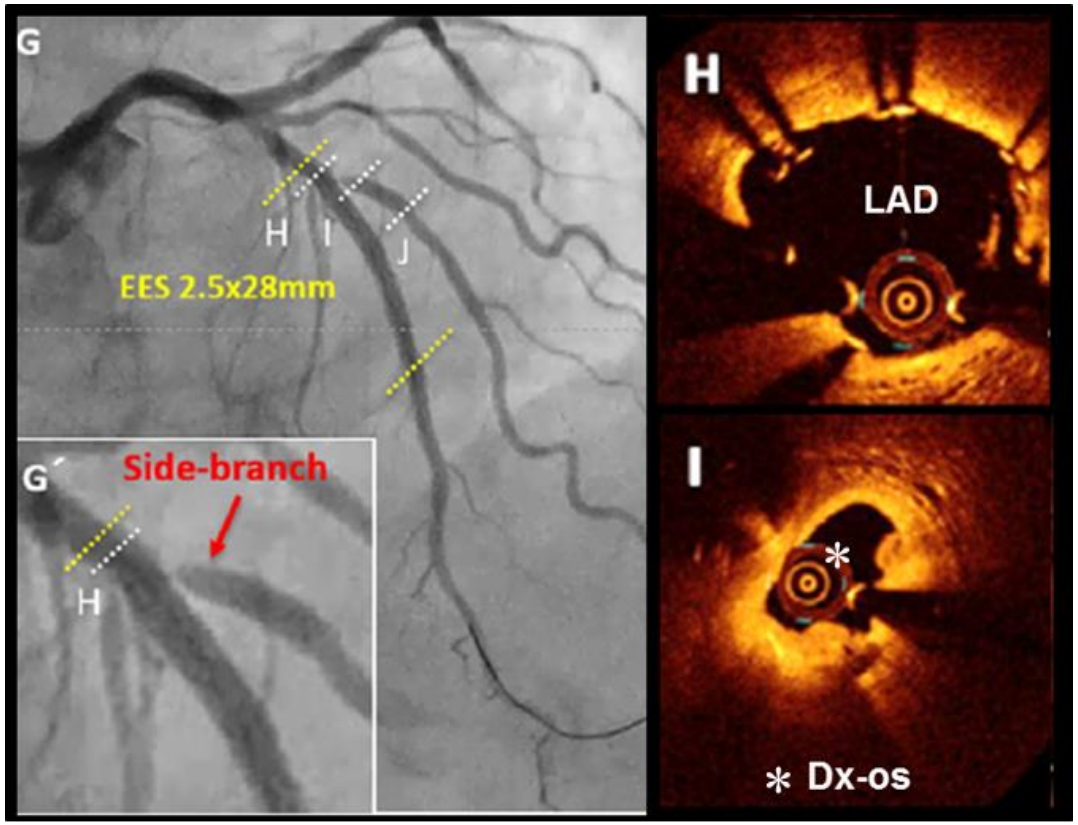
- Carina without atherosclerotic change is thin and easy to shift toward SB ostium, and results in ostial stenosis.
- The existence of a large calcified plaque in the opposite side SB leads to stent expansion toward the SB side because of elastic characteristics of atherosclerotic plaque. This mechanism might also play a role in carina shift.

An example of calcified plaque at bifurcation

Pre-intervention

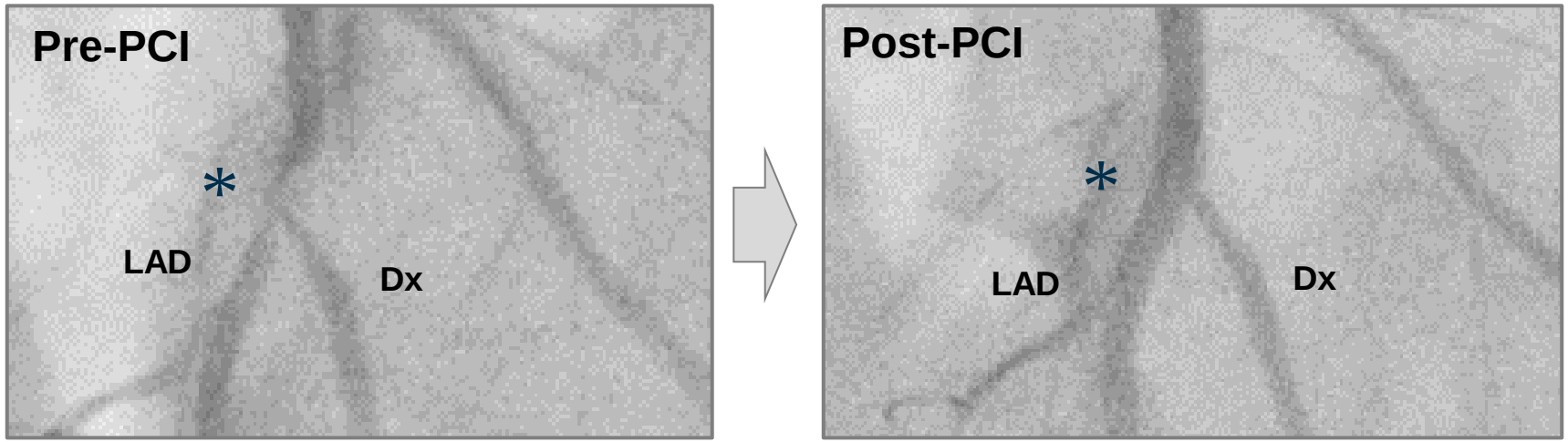


Post stent implantation in LAD

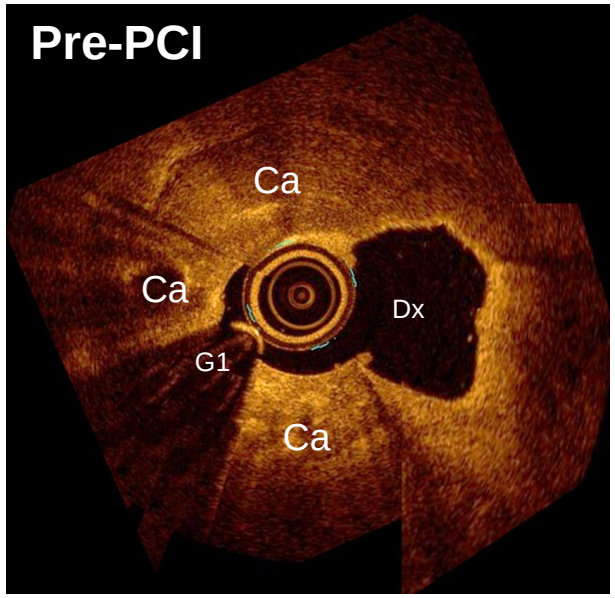


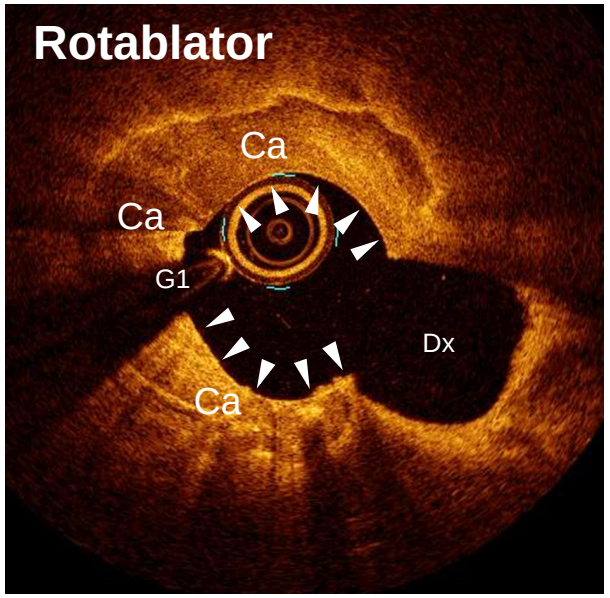
Angiography at pre-stent implantation showed LAD bifurcation lesion. OCT demonstrated severe calcification in the LAD bifurcation lesion (C). After stent implantation in LAD, angiography and OCT disclosed stenosis at side branch ostium.

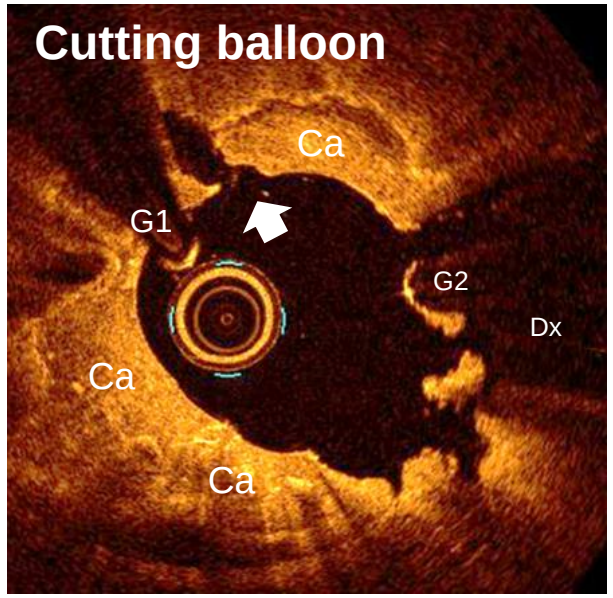
Rotablator + stent in calcified bifurcation lesion

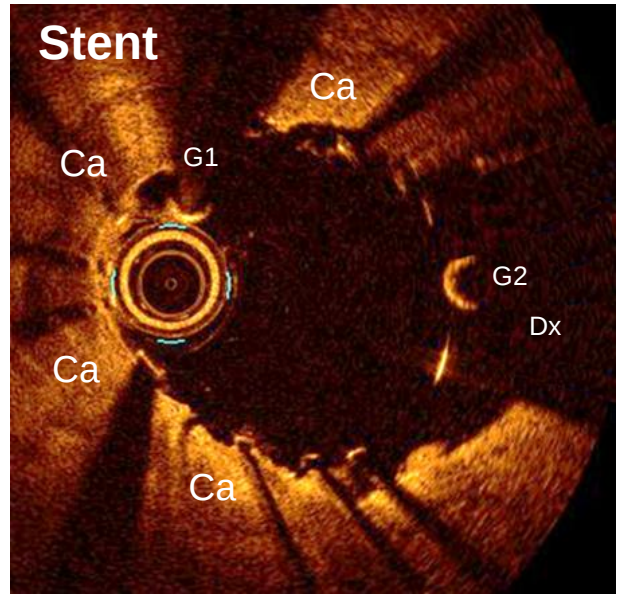


Arrow = calcium fracture
Arrow heads = cutting surface after rotablator atherectomy
Asterisk = target lesion
Ca = calcification
Dx = diagonal branch
G = guidewire
LAD = left anterior descending

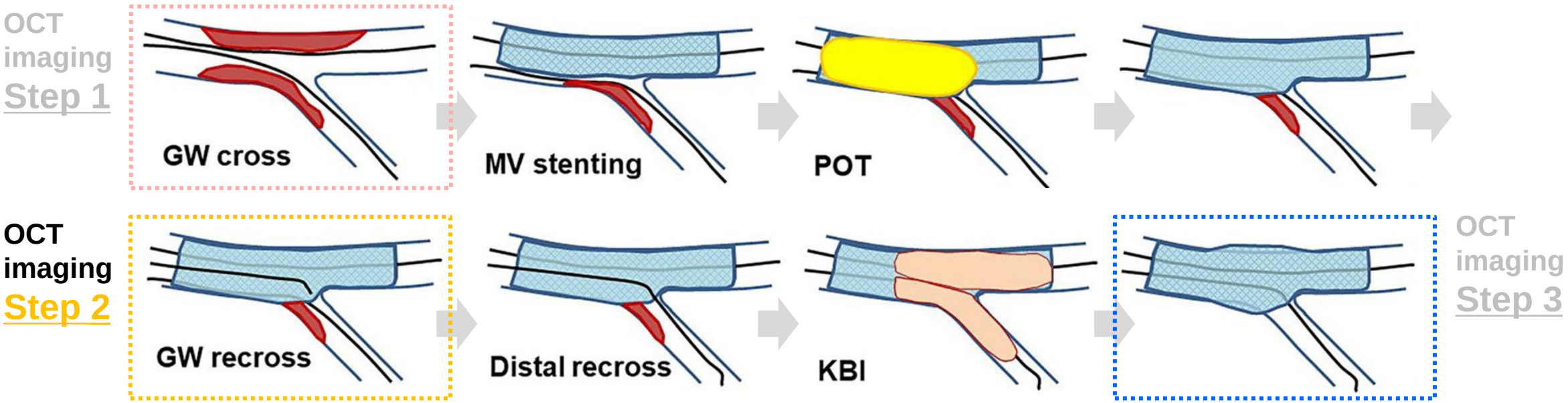








Flow of OCT-guided bifurcation stenting



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3D-OCT image after MV stenting

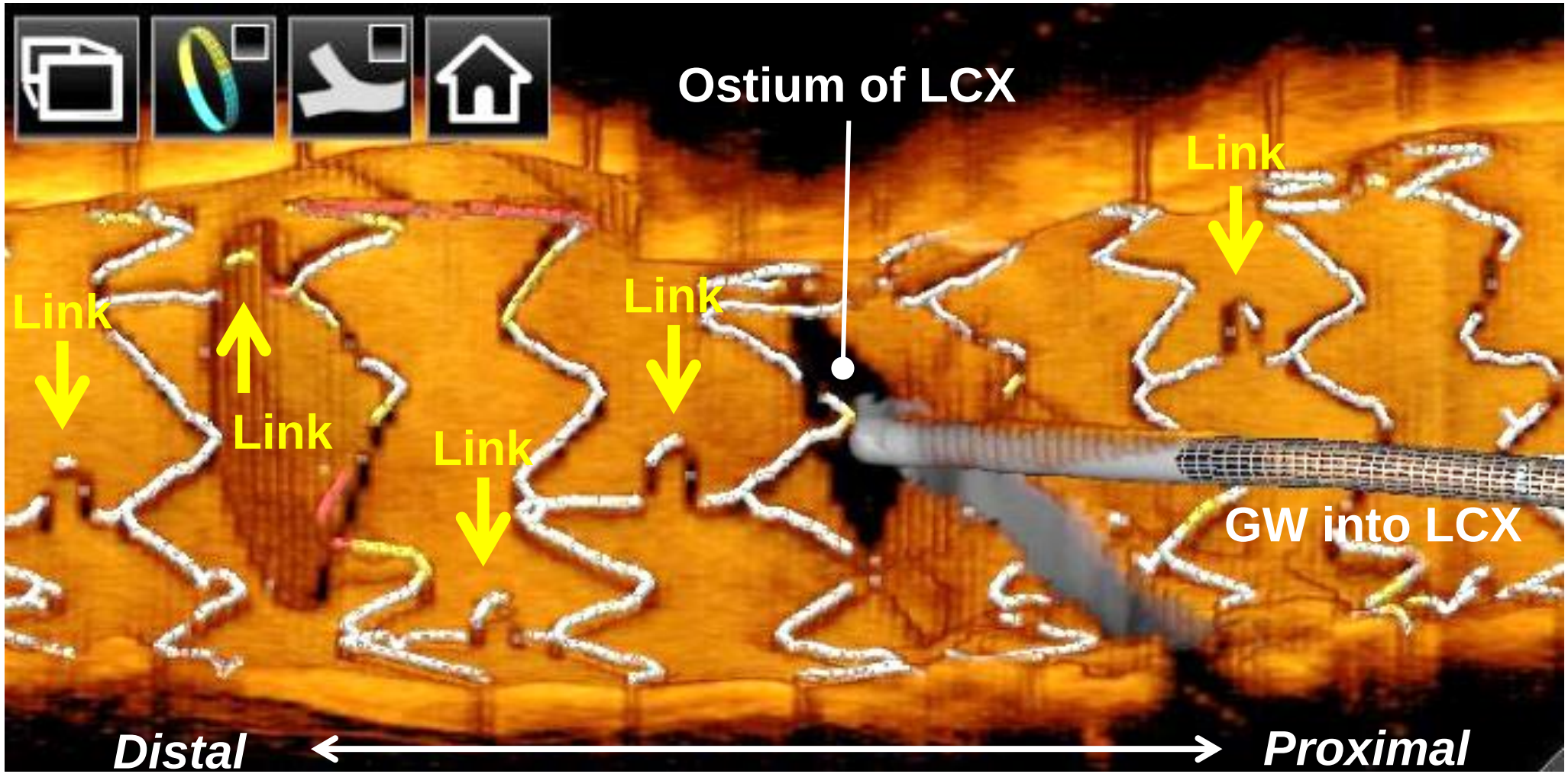
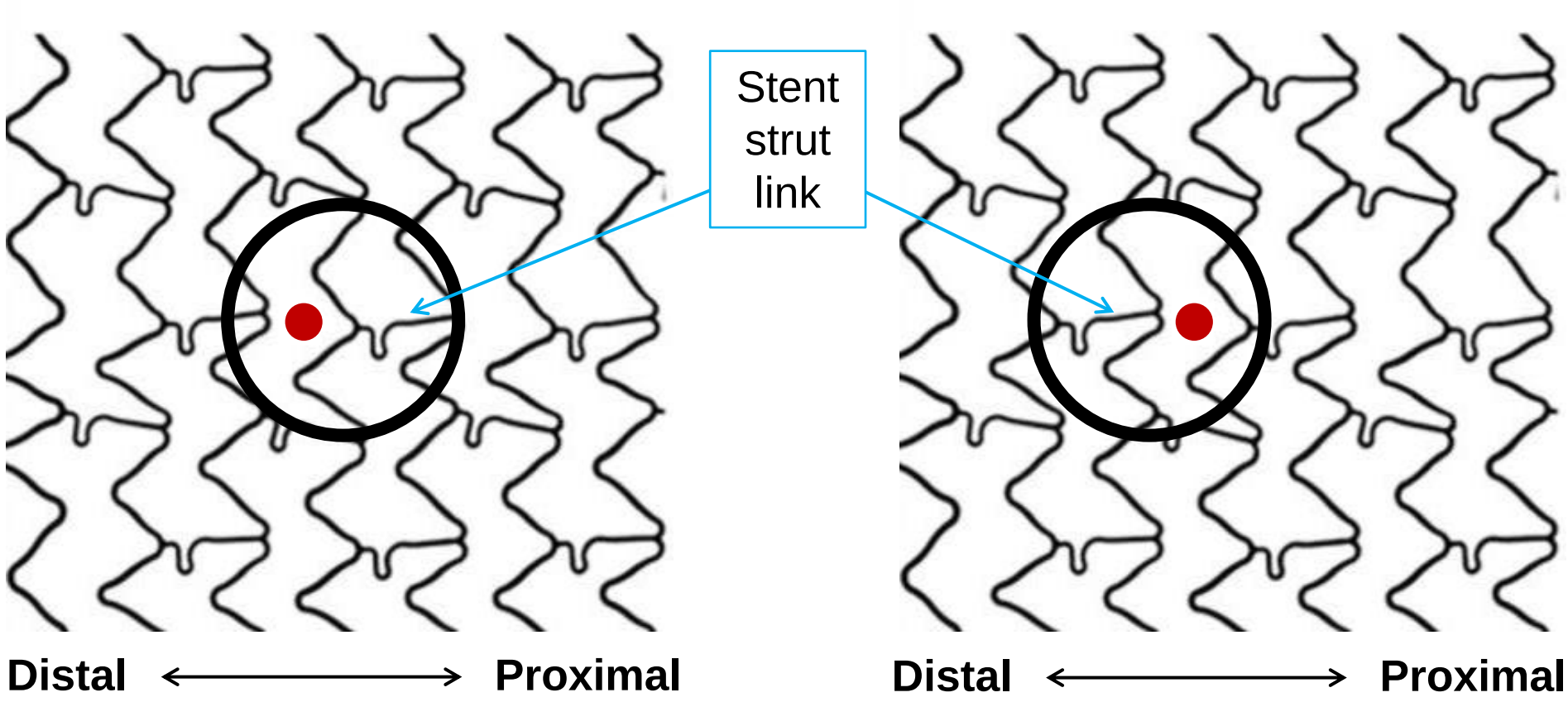


Fig 1. The side branch guidewire crossed through the center of the cell of the main branch stent over the ostium of the side branch.

Optimal stent cell rewiring for KBT

Distal crossing is optimal

Proximal crossing is optimal



Distal wire crossing (●) is optimal if stent strut link is located at proximal site of side branch ostium (○), whereas proximal wire crossing (●) is optimal if stent strut link is located at distal site of side branch ostium (○).

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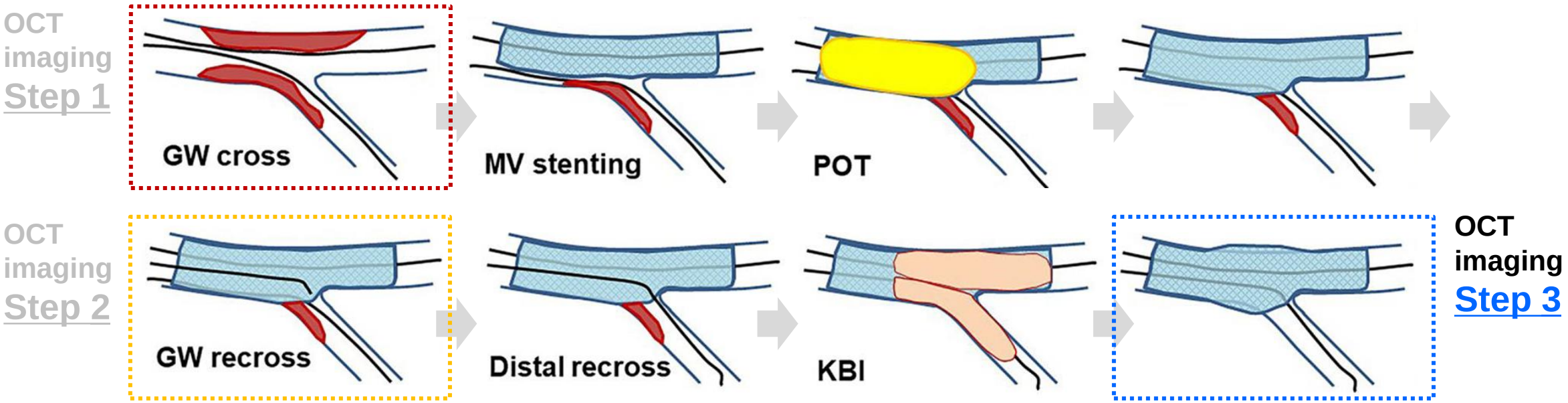

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3D-OCT image after kissing balloon angioplasty

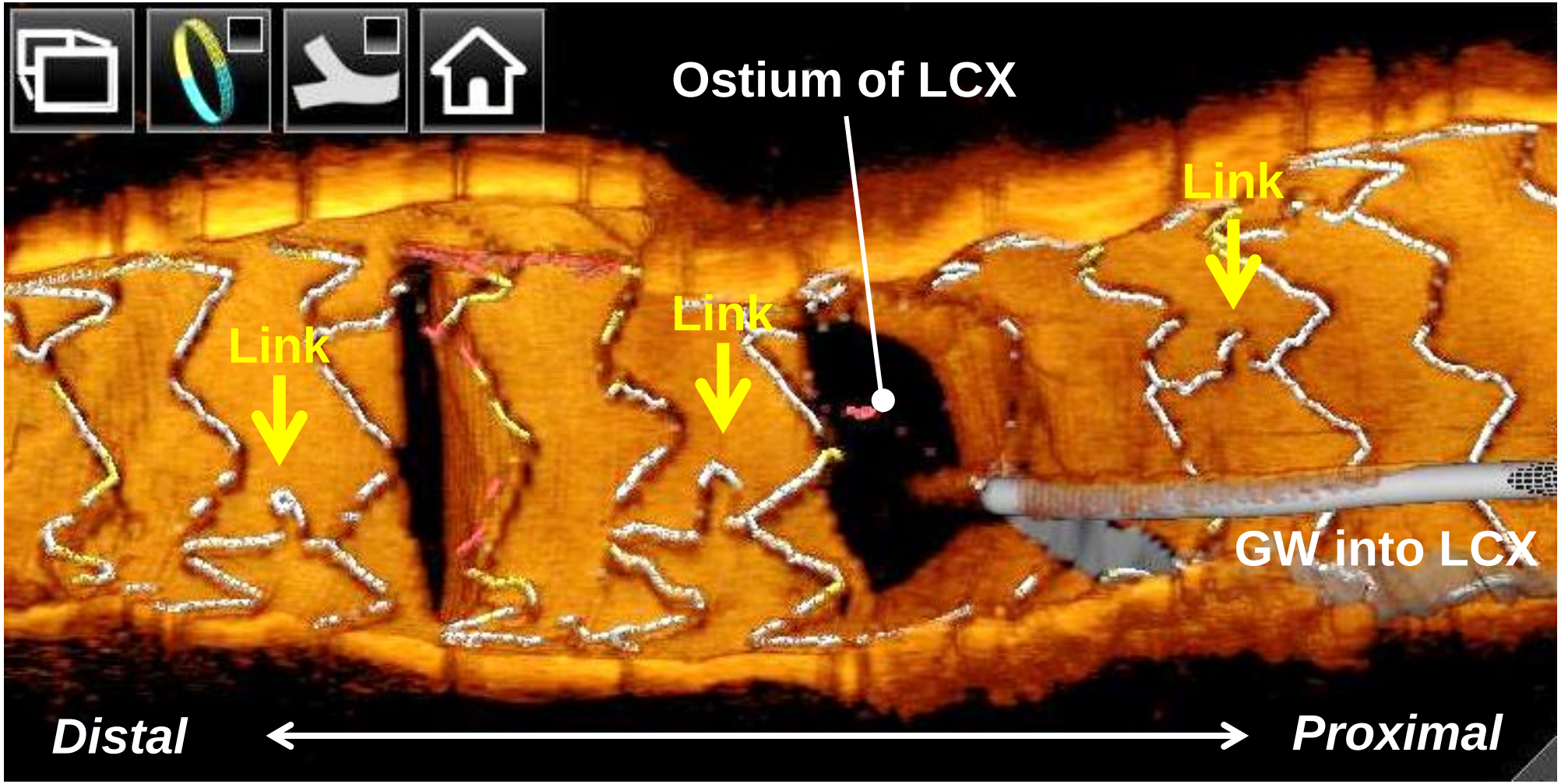
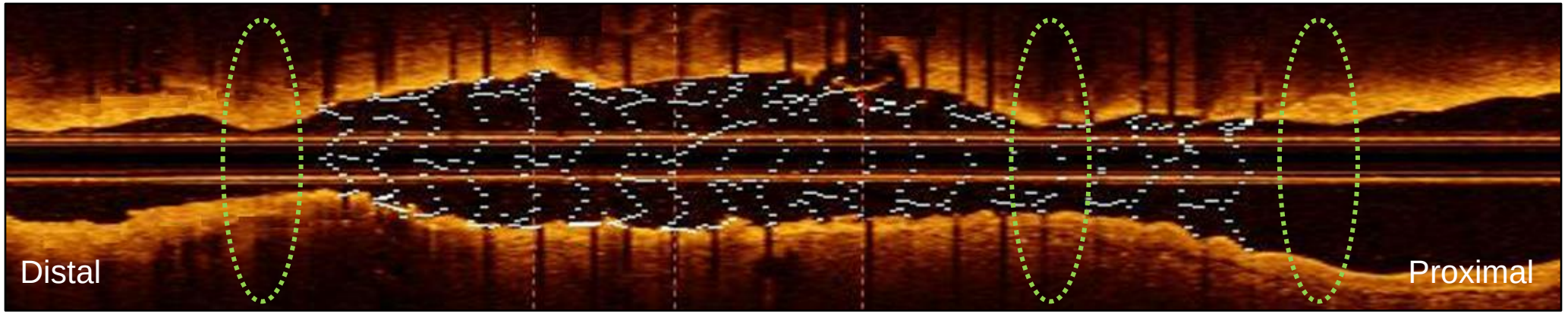
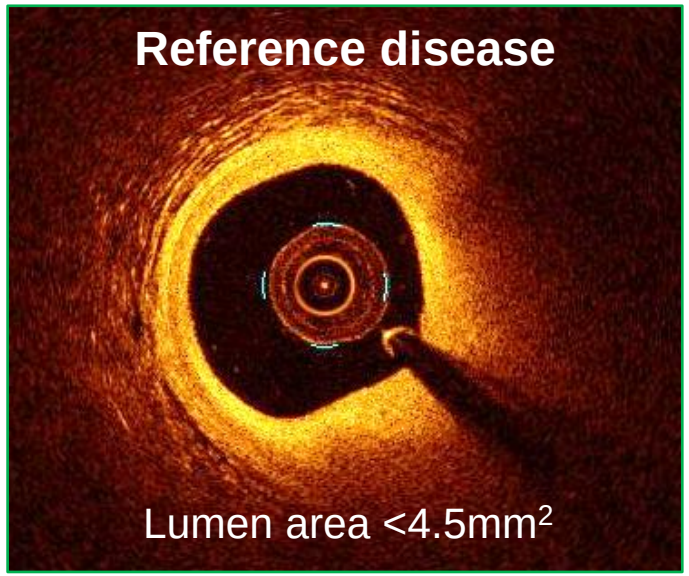
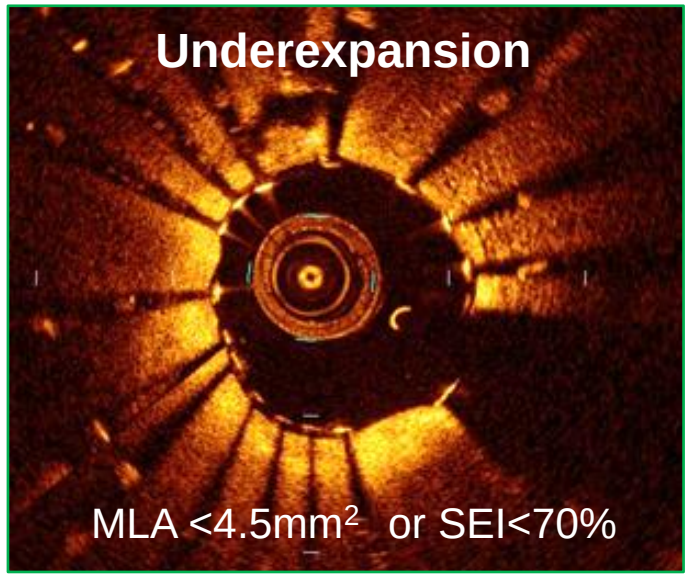


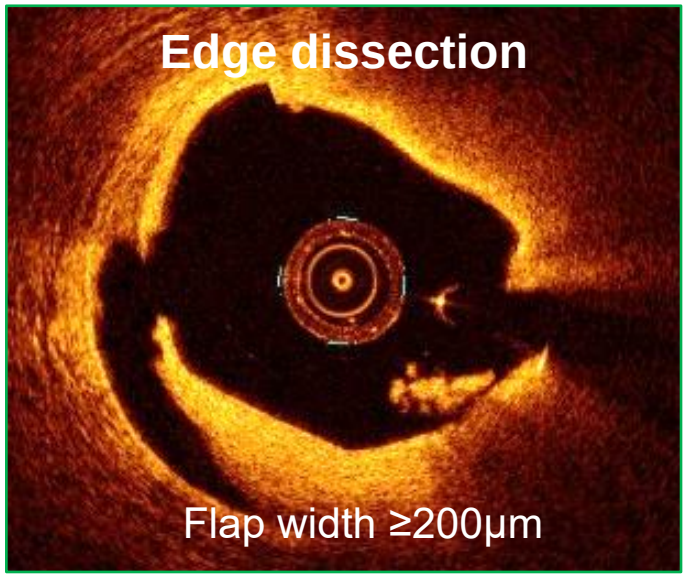
Fig 2. Stent struts over the ostium of the side branch were removed after kissing balloon angioplasty, and those struts had good scaffolding of the ostium of the side branch.

OCT criteria of suboptimal stent implantation









In-stent MLA <4.5mm^2, reference lumen narrowing with lumen area <4.5mm^2, stent edge dissection with a width ≥200μm were associated with worse long-term (7.5 years) PCI outcomes. *(Prati F, et al Euroint 2022)*

Conclusion

During bifurcation PCI, the use of OCT should be considered for pre-procedure lesion assessment, procedure guidance, and stent optimization.