3-D OCT Guided Bifurcation PCI

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Conflict of Interest

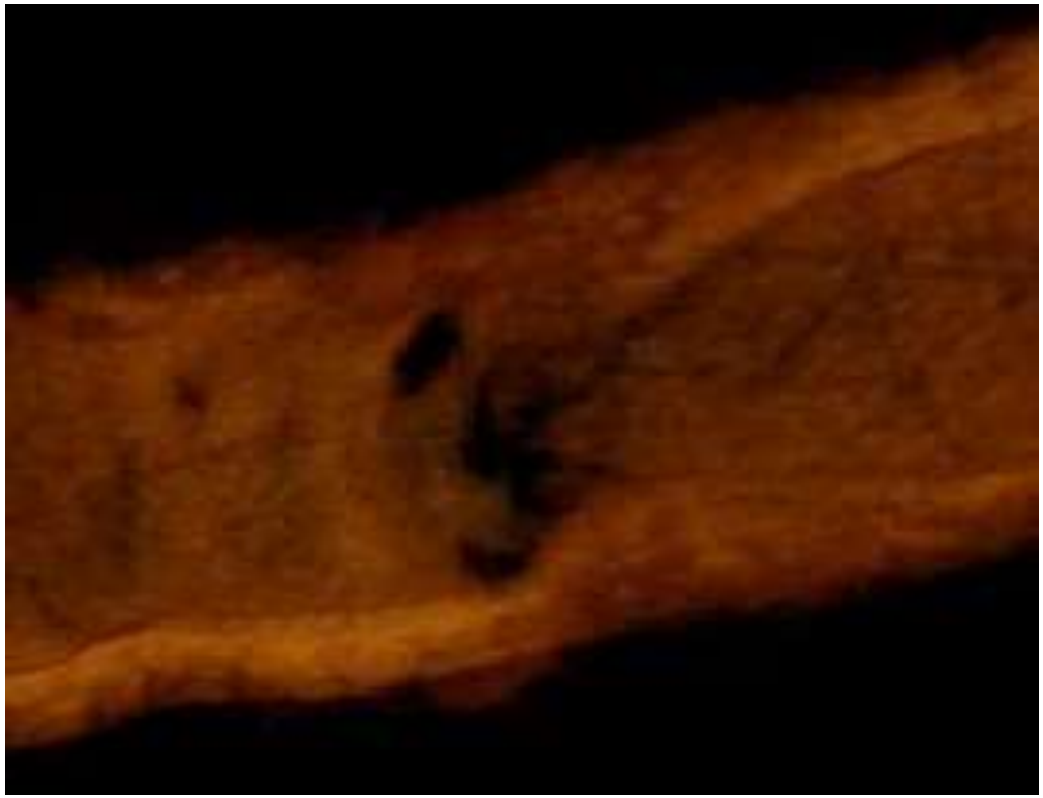
Grant support: St. Jude Medical

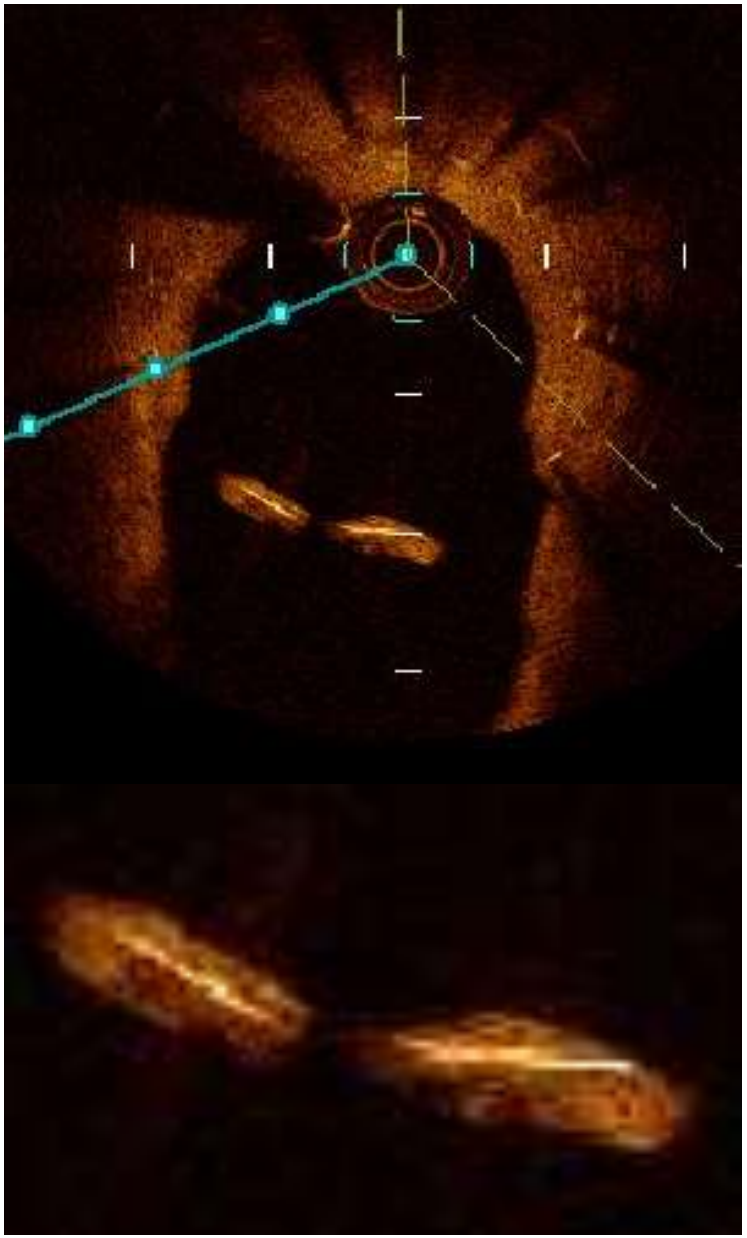
A 3D-OCT Investigation into Coronary Artery Bifurcation Lesion Stent Implantation Technique

3D-OCT Bifurcation Registry

investigators

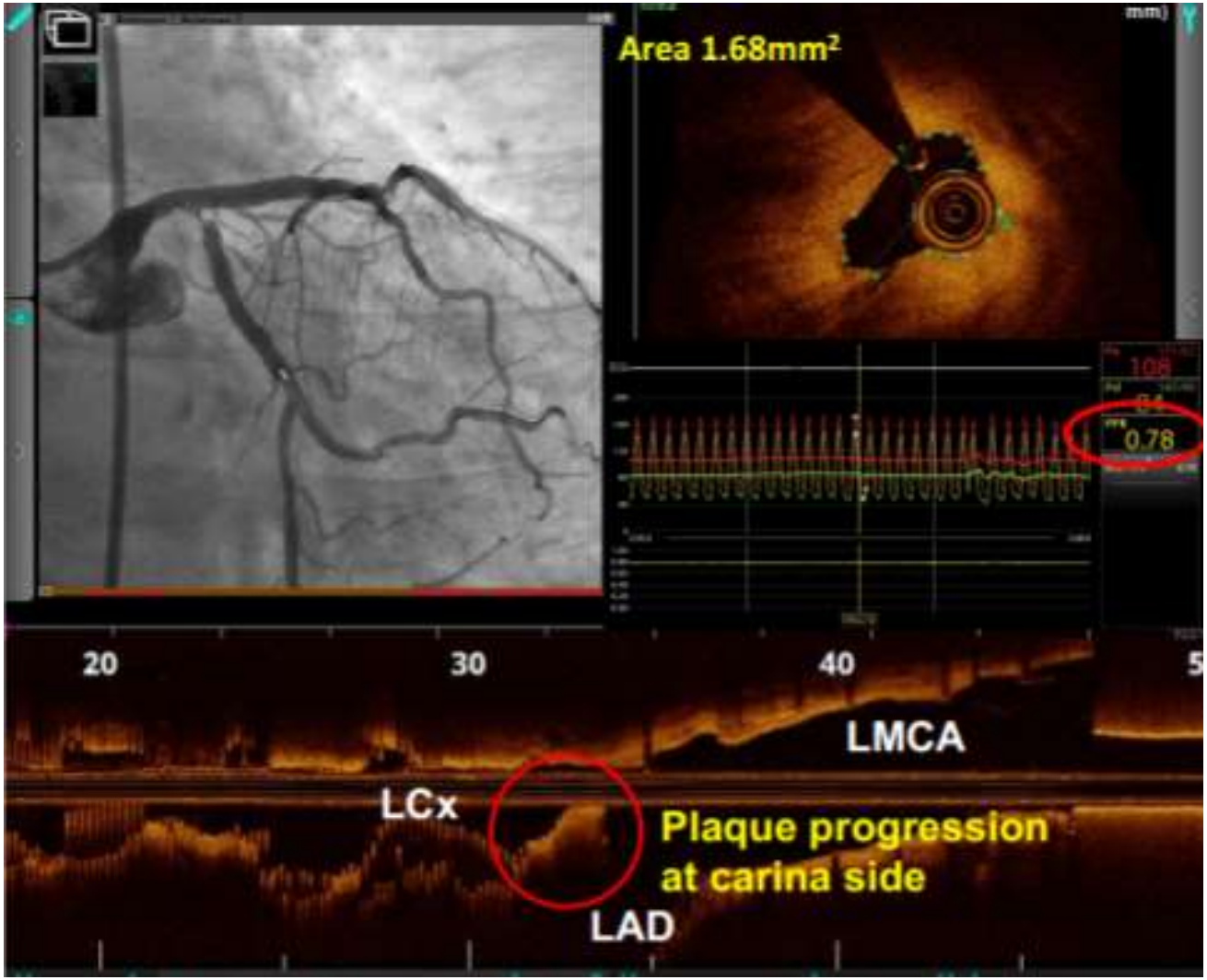
Should we treat SB?
Is remained jailed struts harmful?





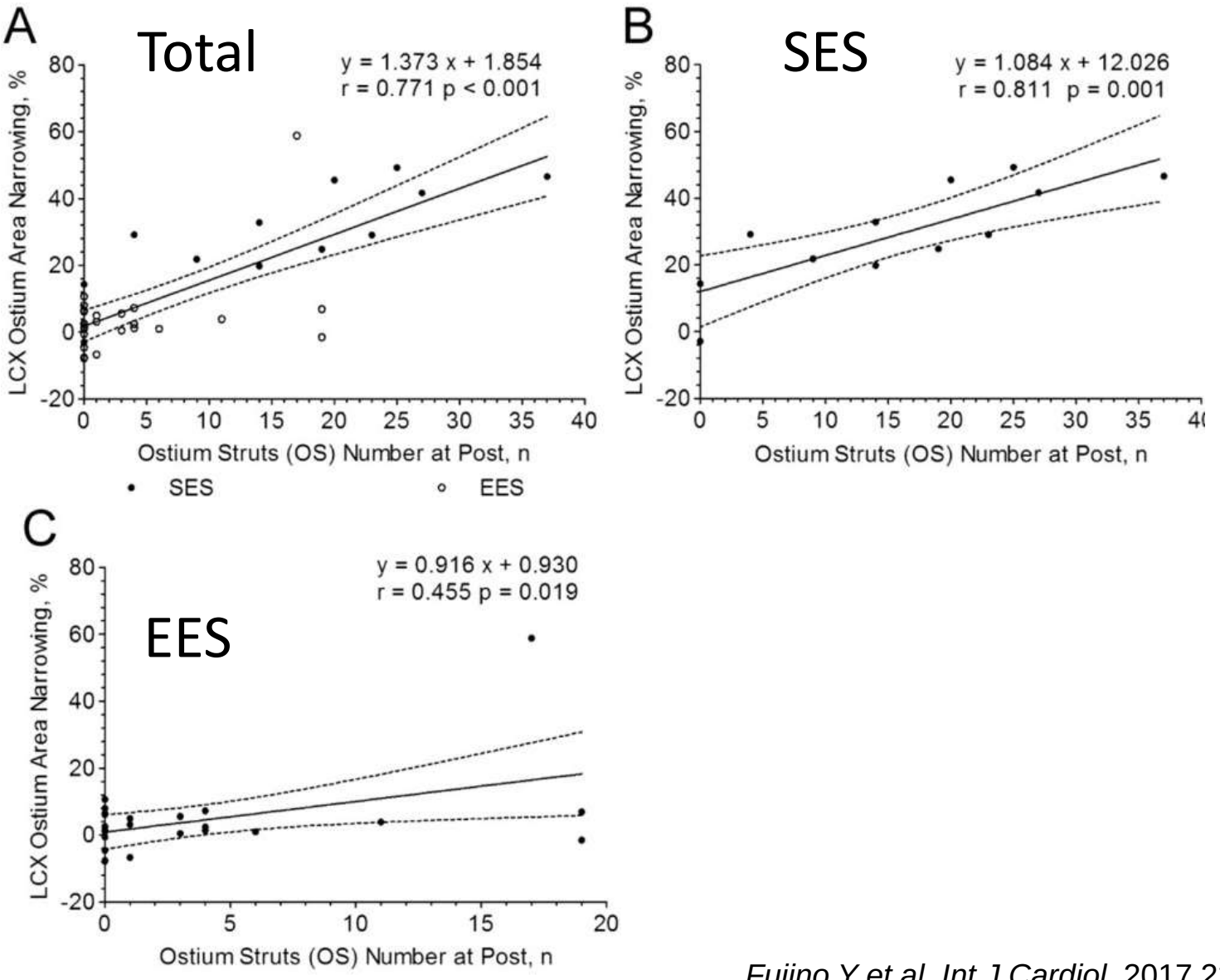
Intimal proliferation on the jailed struts

LCX ostial restenosis after crossover stenting without KBI



Fujino Y et al. Int J Cardiol. 2017 230, 284-292

Correlation between LCX ostium area narrowing and jailed struts number



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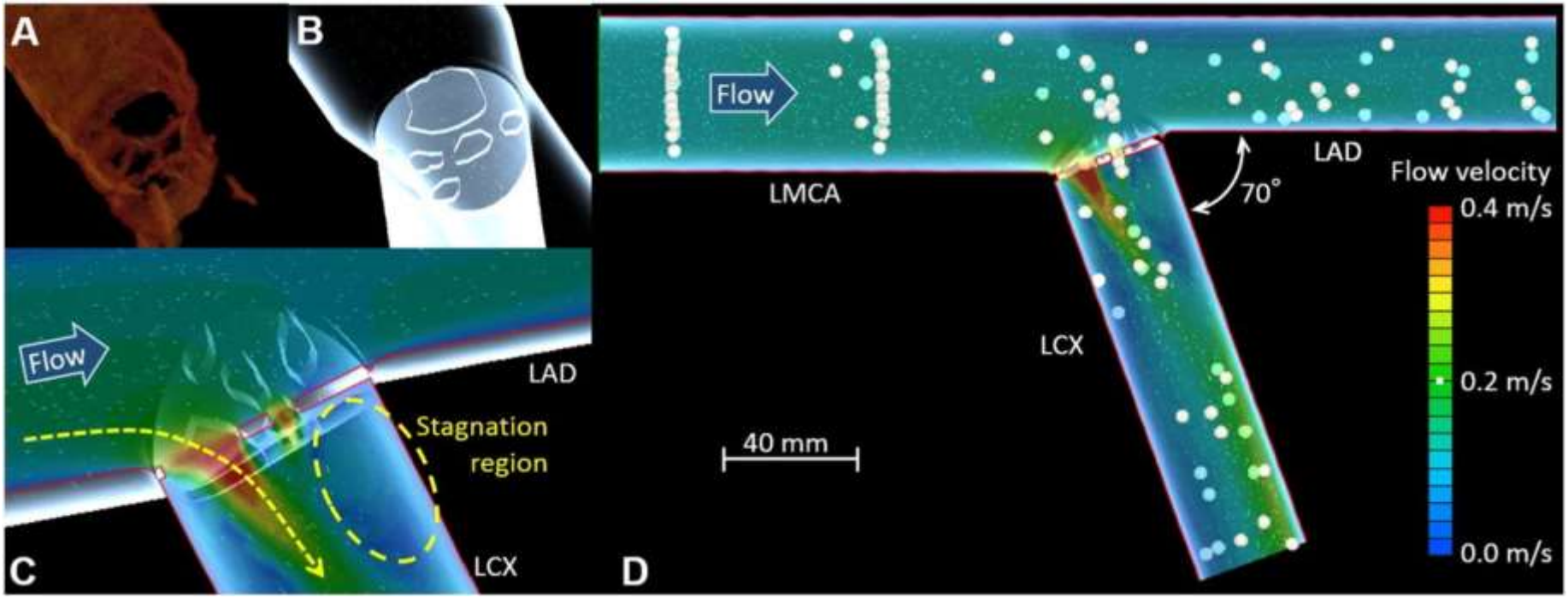
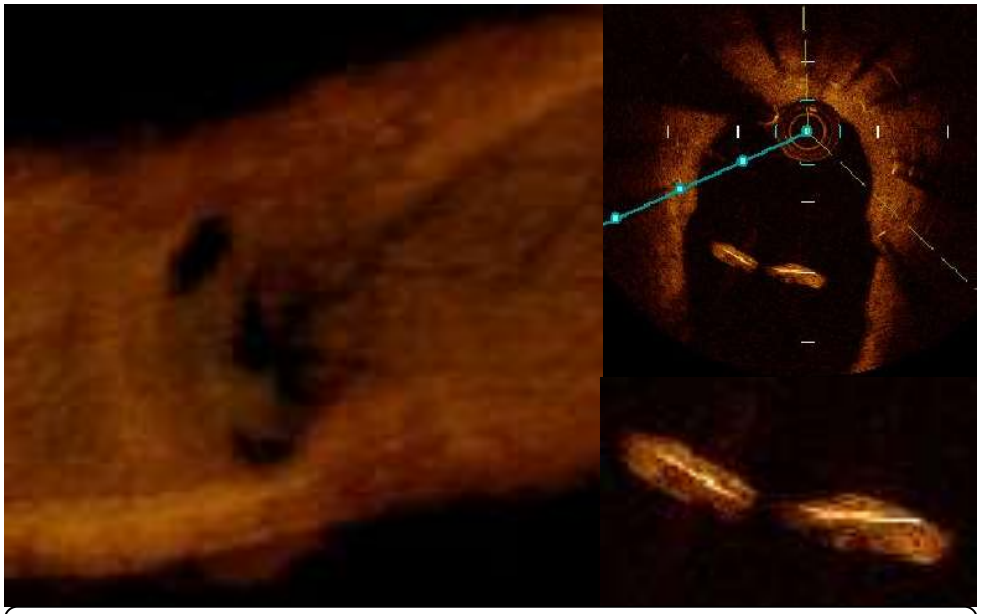
CFD simulation based on 3-D OCT images in 9mo F/U



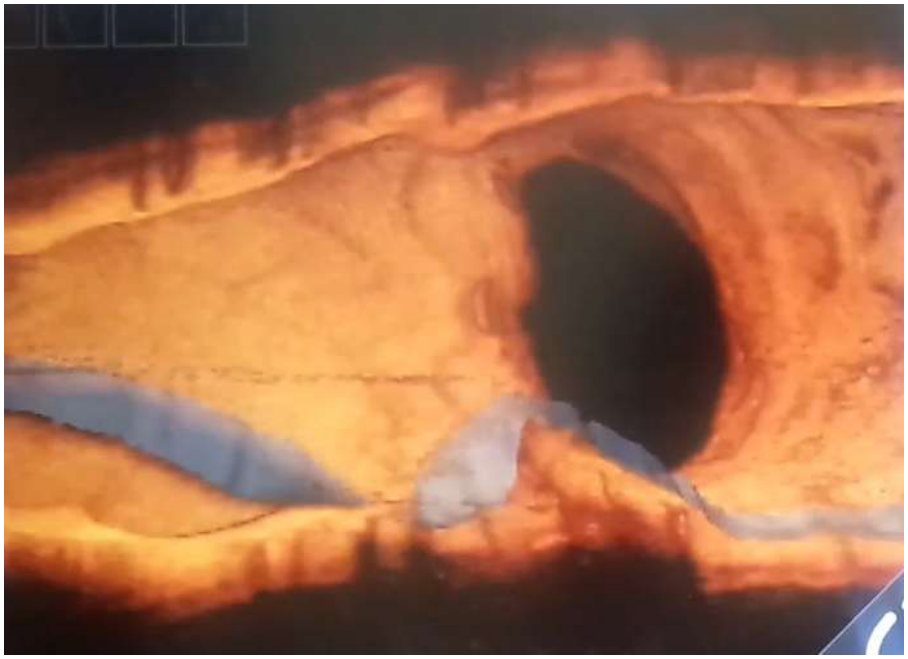
Fujino Y et al. Int J Cardiol. 2017 230, 284-292

SB Dilation or Not?

Complete removal of the jailed struts and optimal dilation in each branch will promote ideal intimal coverage with less restenosis.



Intimal Coverage on the jailed struts



What's new for achieving complete removal of jailed struts without any serious stent deformation?

3D-OCT Bifurcation Registry

3D OCT investigators

Design Multicenter prospective non-randomised observational study from 10 Japanese Centers

Aim To investigate the effect of the detection of guide wire (GW) recrossing point to the SB using 2D/3D OCT on the bifurcation stenting

Objective 168 bifurcation lesions in 167patients who underwent bifurcation stenting under the guidance of OCT

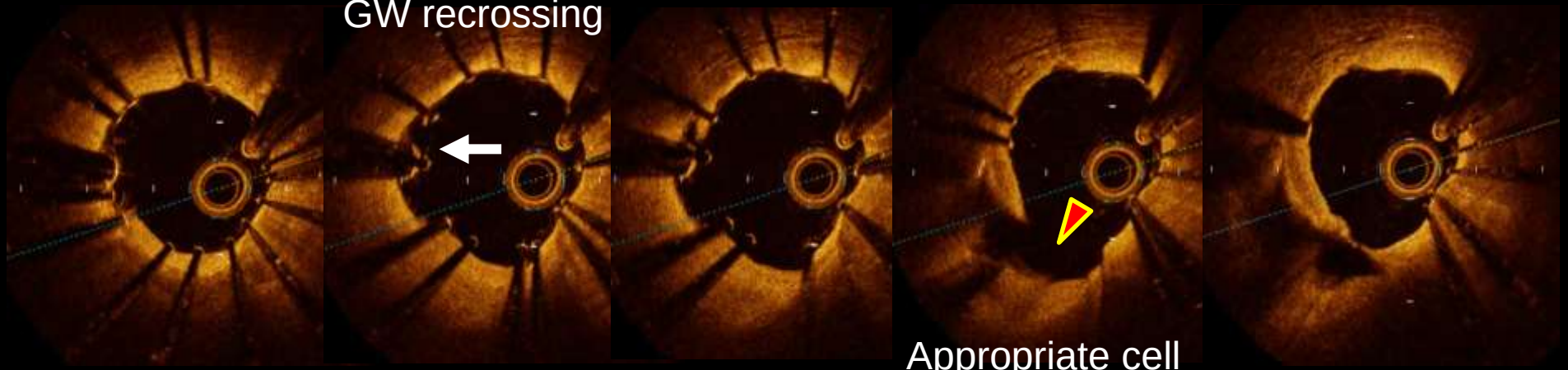
Period 2014/06/01～2015/12/31

P.I. Junya Shite & Takayuki Okamura
(Saiseikai Nakatsu Hp) (Yamaguchi Univ)

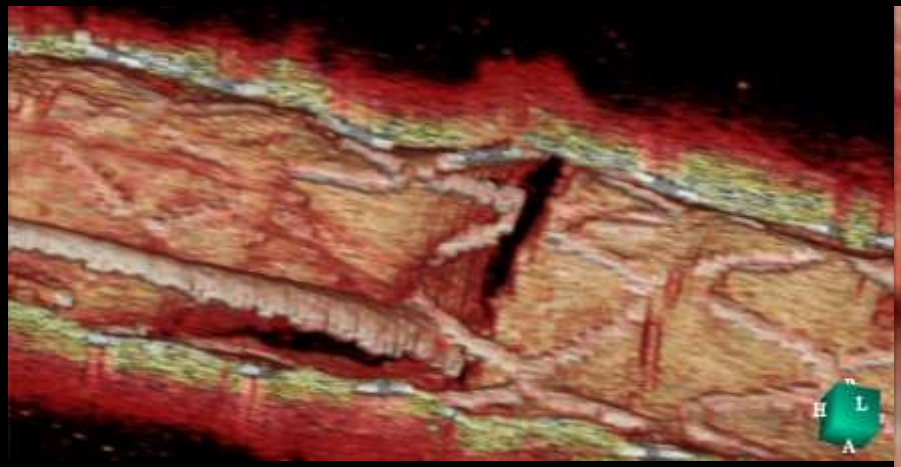
Stent enhanced 3D OCT

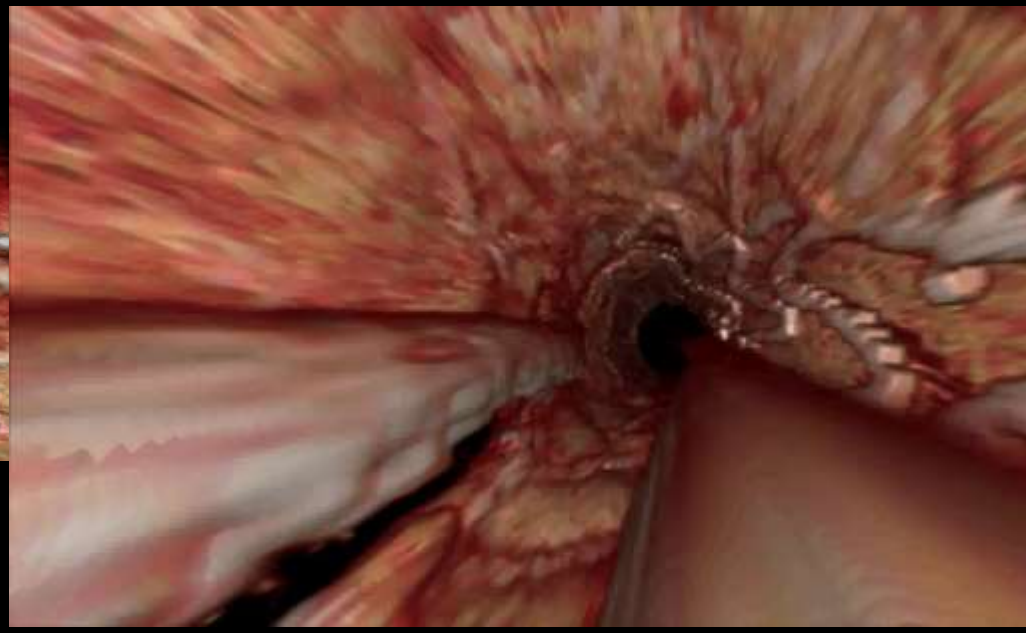
Okamura et.al EuroIntervention 2014

2D OCT on site

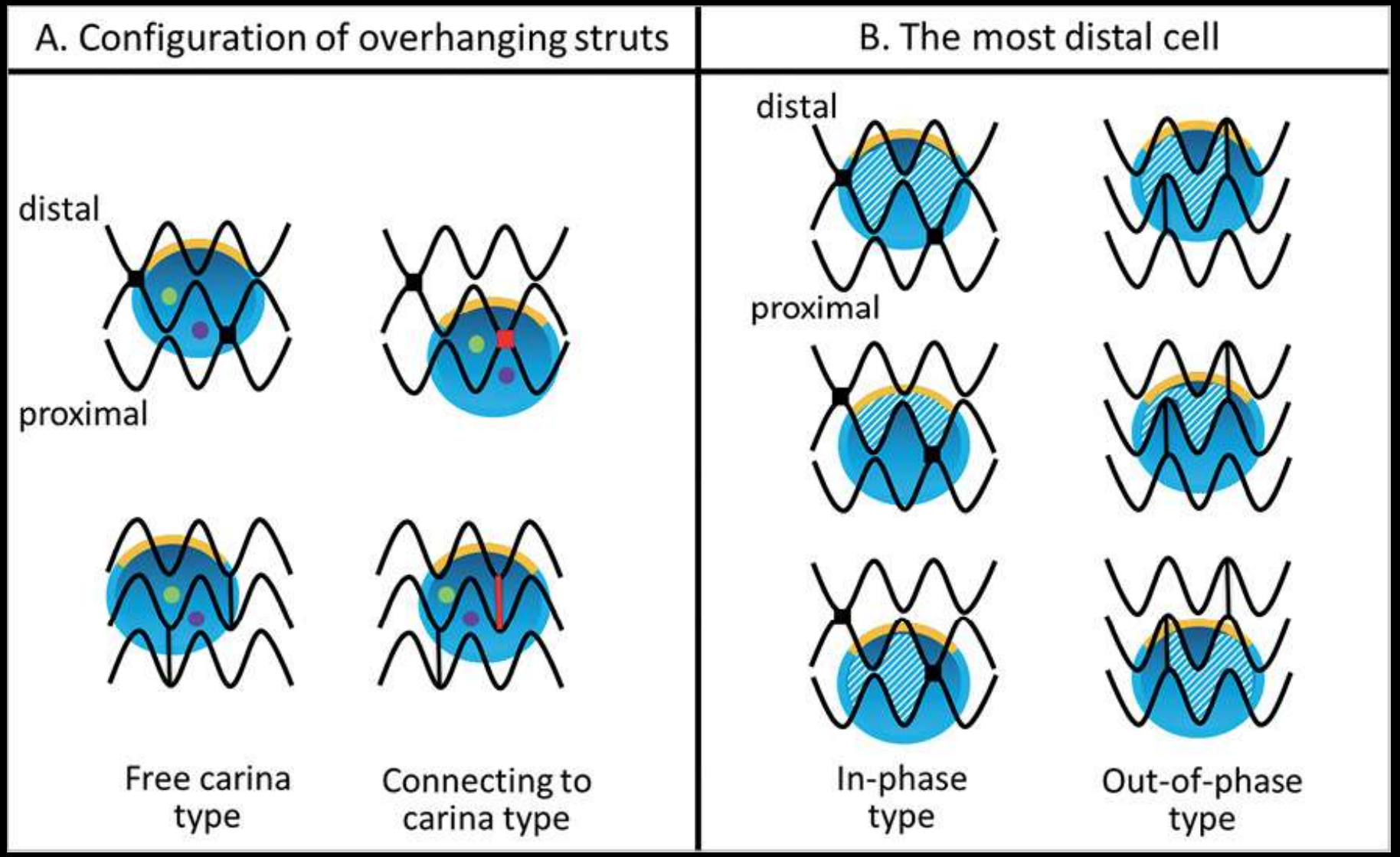


3D OCT reconstructed in core laboratory



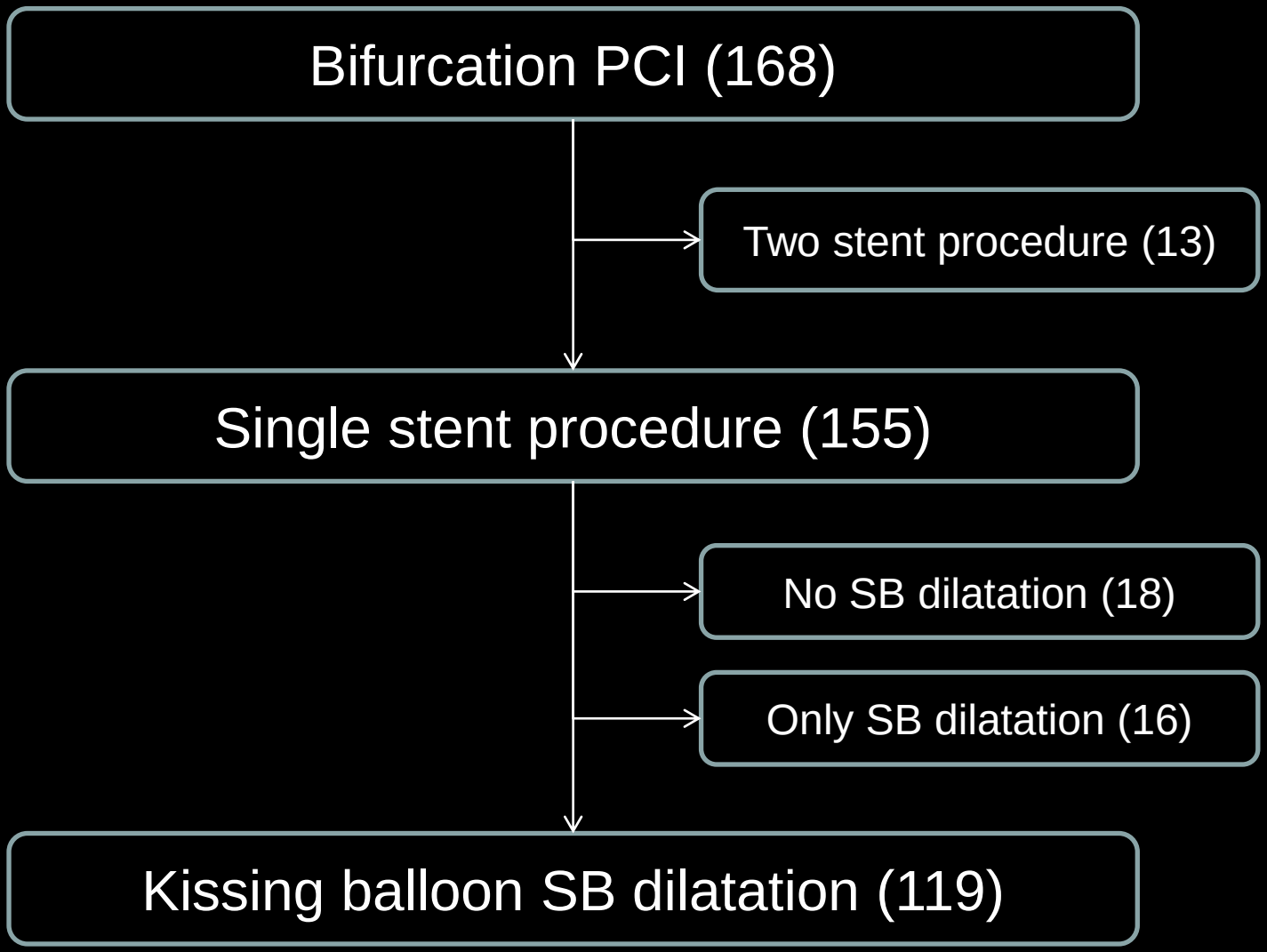


Pattern of link-connection and GW crossing point

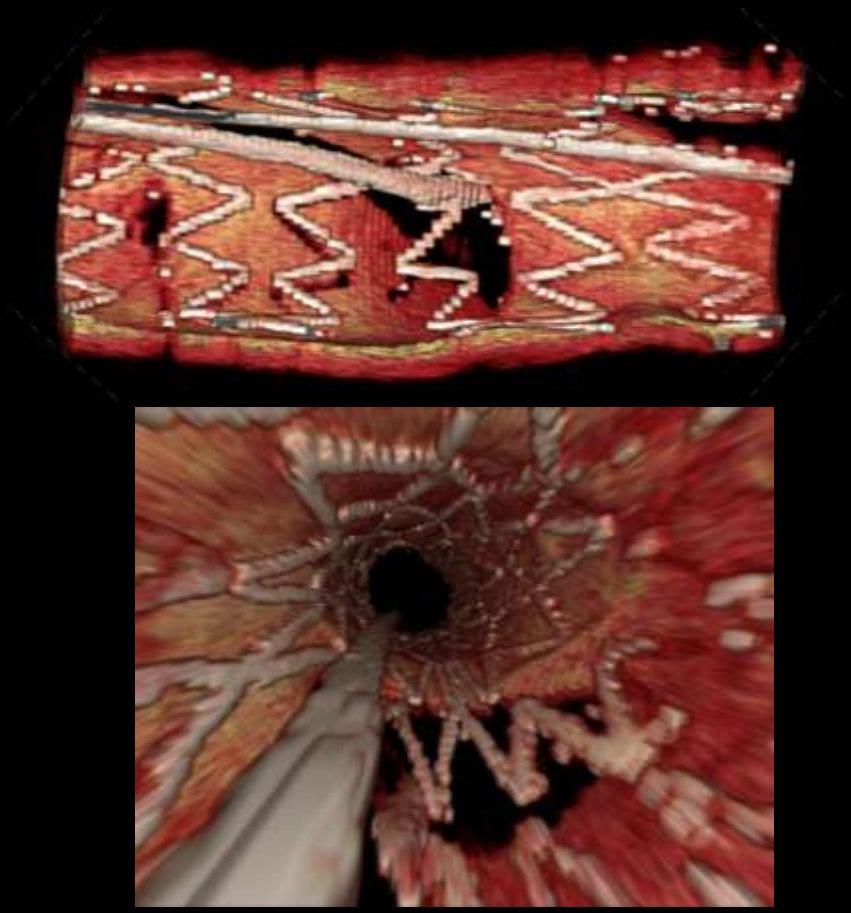


Okamura T et al. EuroIntervention, 2014

Study flow


Bifurcation PCI (168)
Two stent procedure (13)
Single stent procedure (155)
No SB dilatation (18)
Only SB dilatation (16)
Kissing balloon SB dilatation (119)

Feasibility of assessment of GW recrossing point in 3D OCT

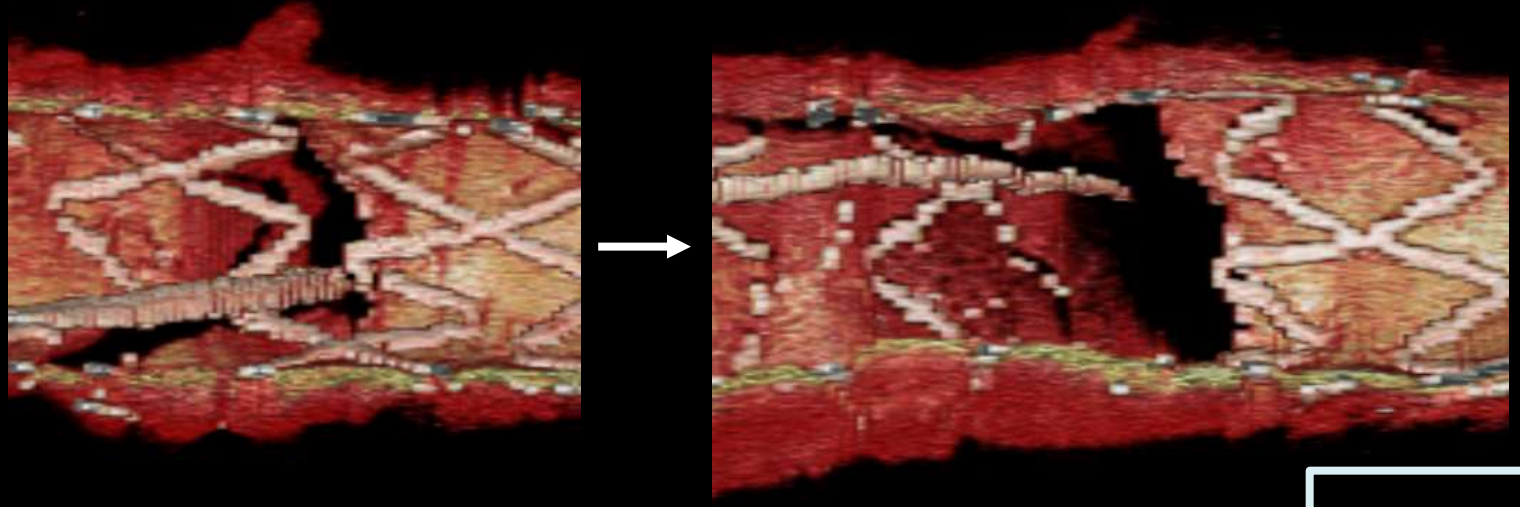


107/119 (89.9%)

GW shadow	9 (7.6%)
NURD	3 (2.5%)

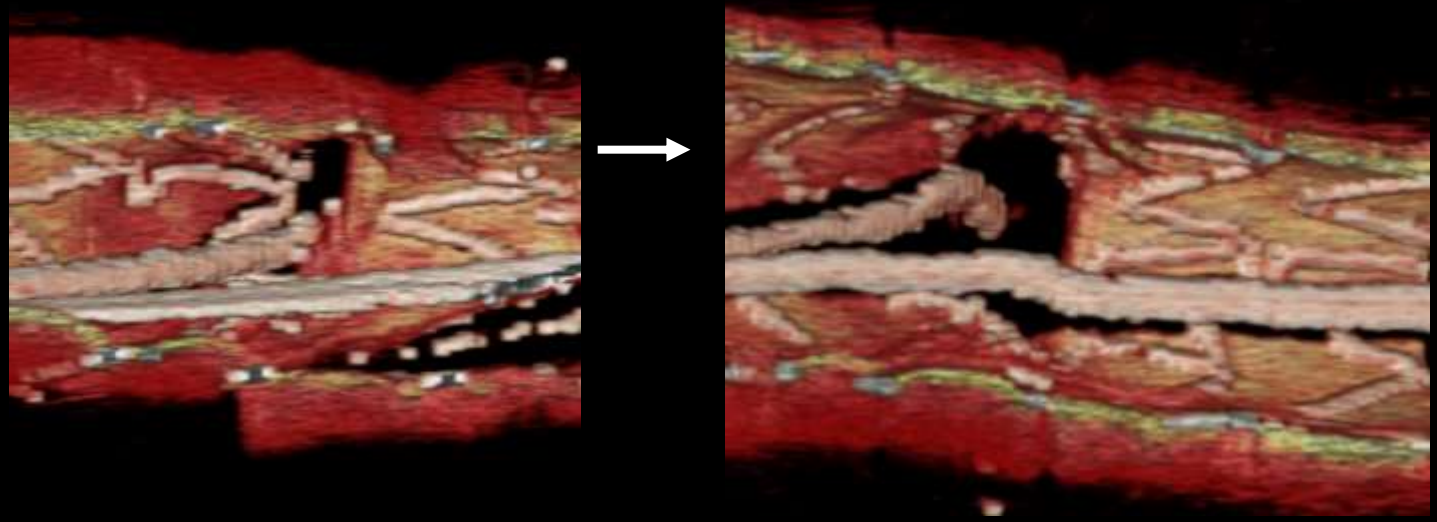
NURD: non-uniform rotational distortion

Free Carina type

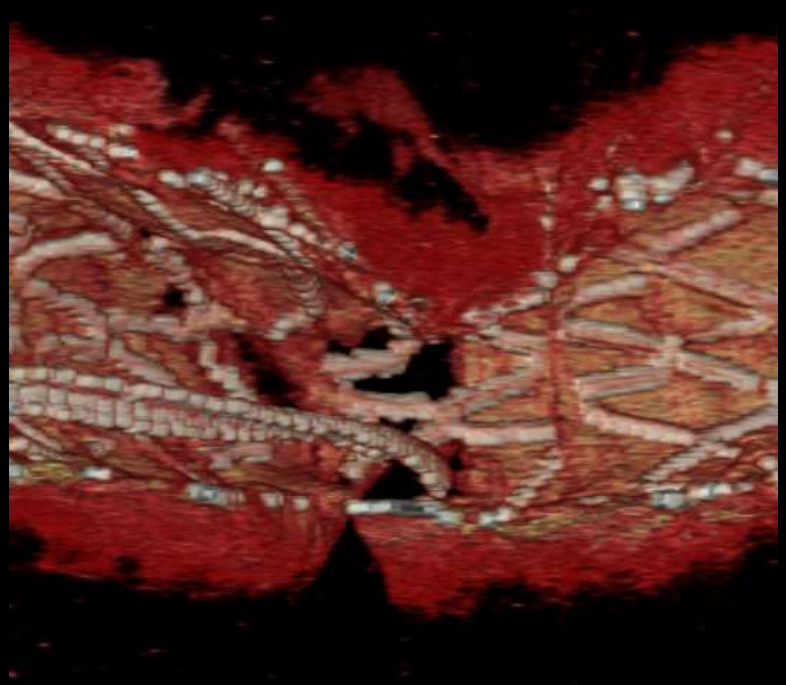


GW recrossing in the optimal distal cell of the free carina type leads to wide opening of the SB without remained jailed struts.

Optimal



Connecting to carina type



Suboptimal

Once the link-connection locates closed to carina,
it is difficult to remove the jailed struts by KBI.

Distribution of GW recrossing pattern

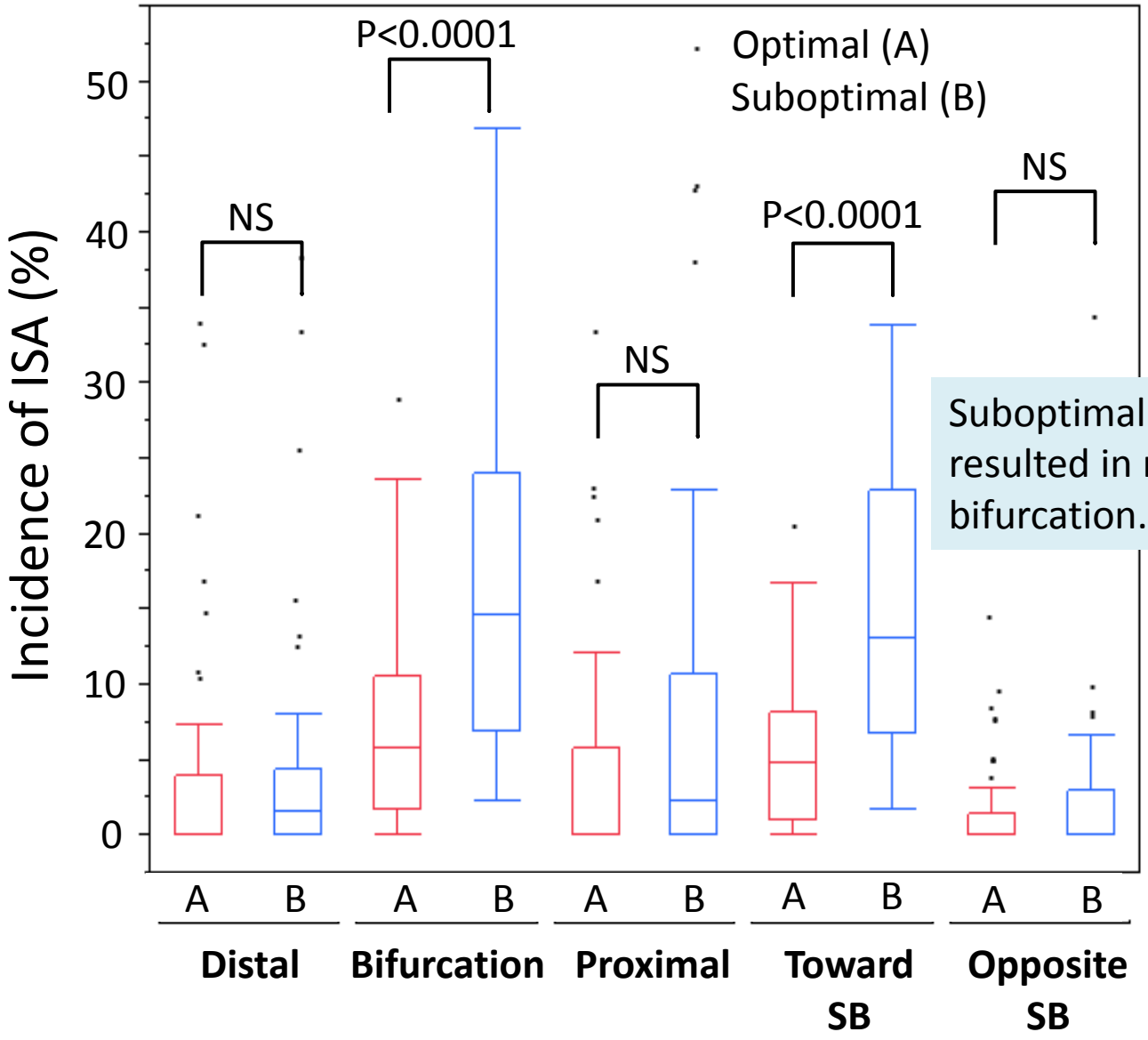
		Link connection in SB ostium		
		All	Link (-)	Link(+)
Distal Rewiring	All		58 (56%)	46 (44%)
	Yes	88 (85%)	55 (53%)	33 (32%)
	No	16 (15%)	3 (3%)	13 (12%)

Optimal (A) :

Suboptimal (B) :

Okamura T, Murasato Y, Shite J et al. submitting

ISA in the bifurcation after KBI



Suboptimal GW recrossing resulted in more ISA in the bifurcation.

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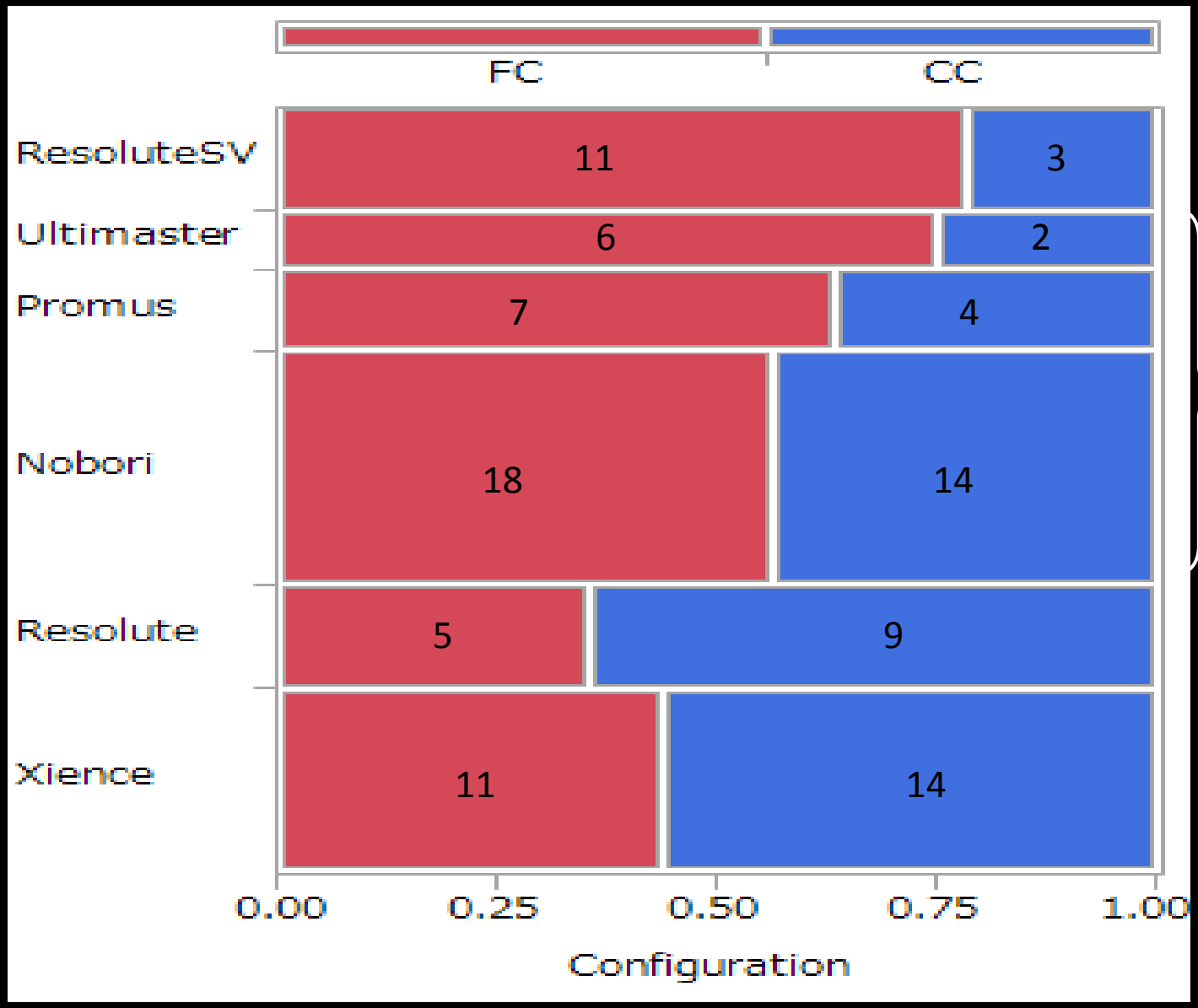
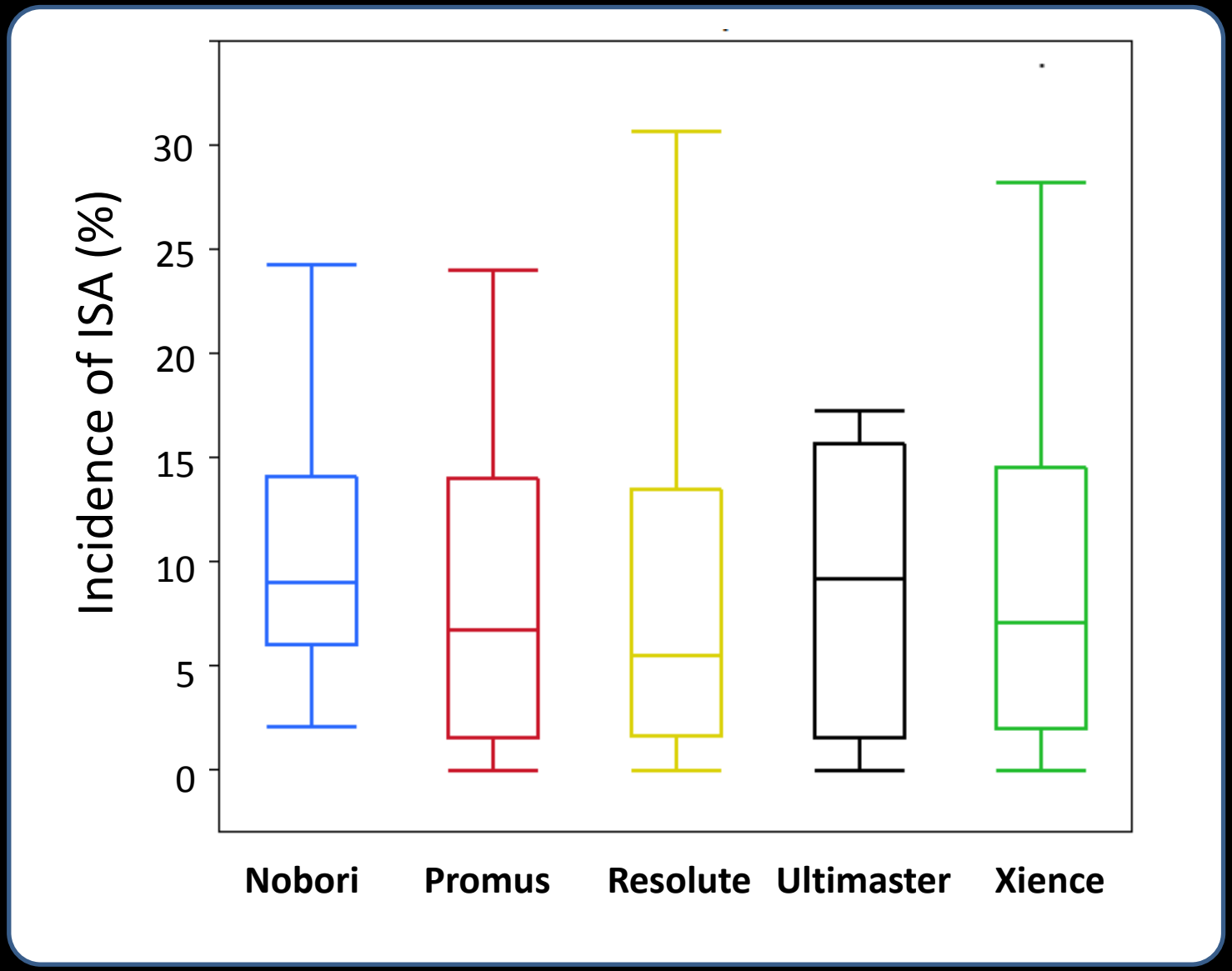
Frequency of connecting carina type in each stent

More link number resulted in more frequent connecting to carina type.



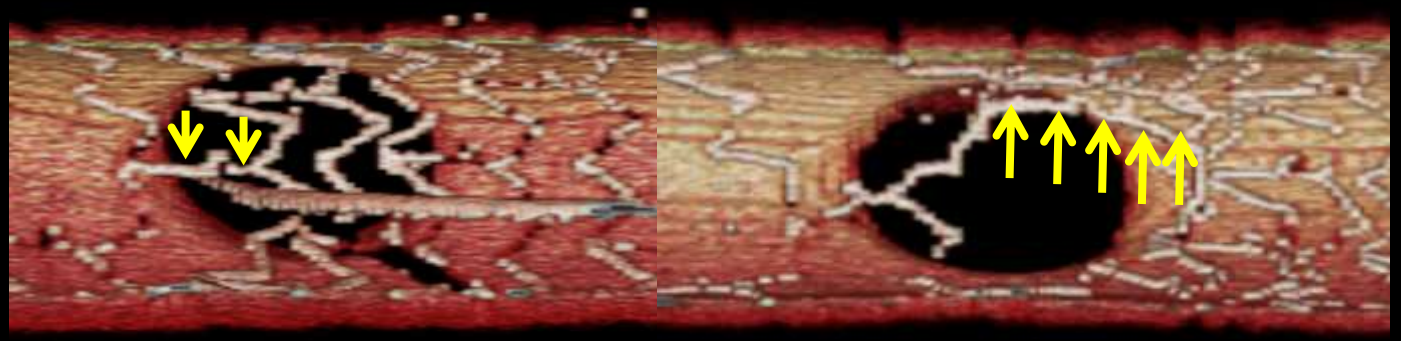
Incidence of ISA in the SB ostium

There were no differences in the ISA regardless of frequency of connecting to carina type.



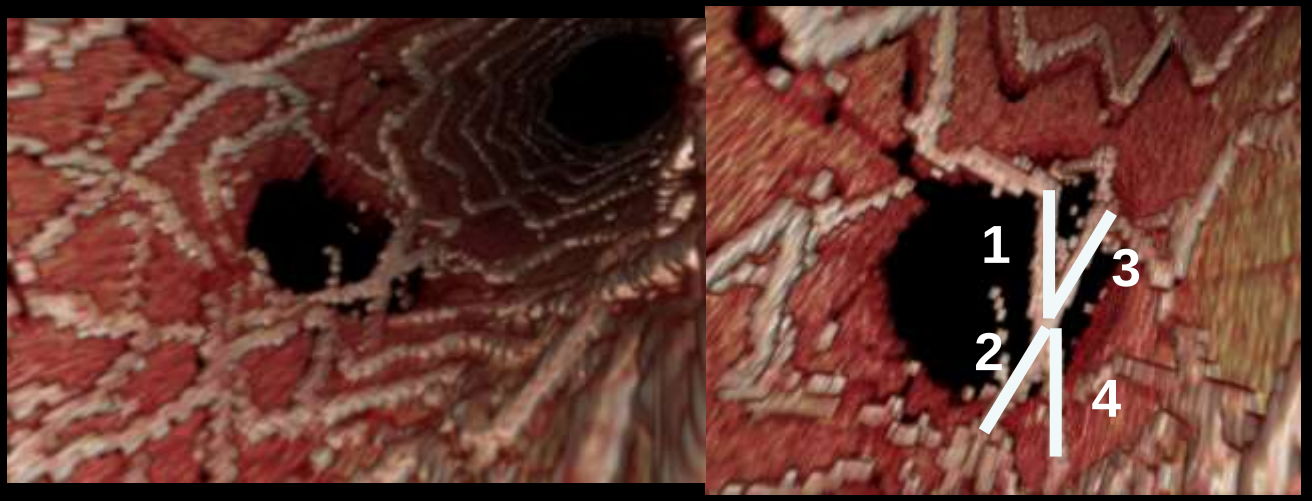
Link connection in SB ostium: 3-link vs. 2-link stent

3-link Xience



Link with single strut is easy to be expanded.

2-link Ultimaster



Link with tough connection of 4 struts is hard to be removed from SBOS.

2D vs. 3D OCT

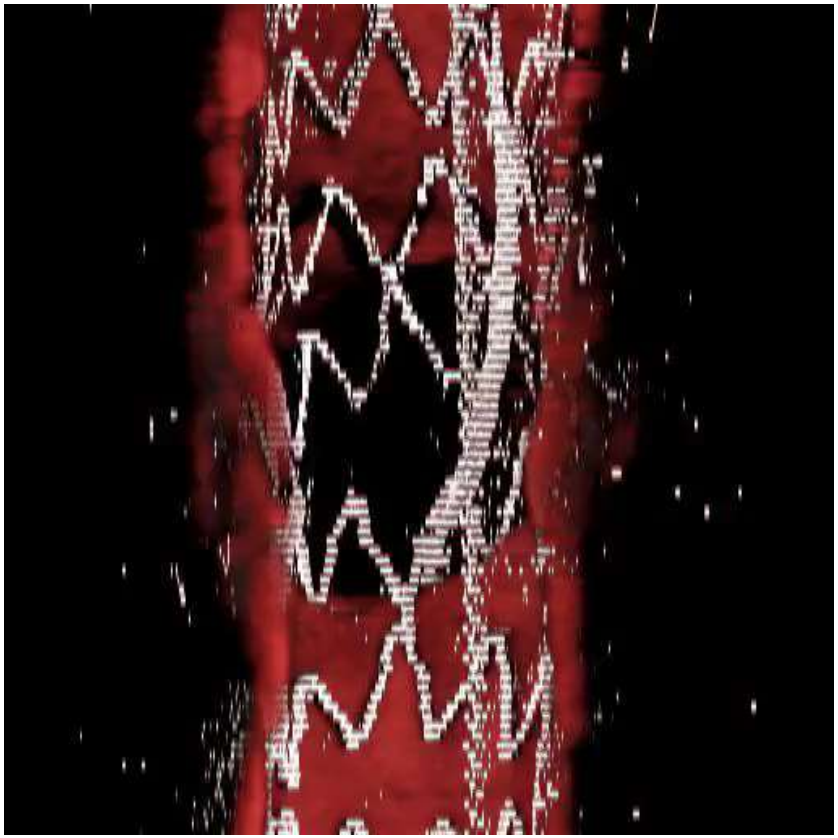
Nagoshi R, Okamura T, Murasato Y, Shite J et al. submitting

	All (n = 106)	3D (n = 56)	2D (n = 50)	P value
Optimal recrossing (%)	54/106	32/56 (57)	23/50 (46)	P = 0.25
Free carina type	54/58	32/32 (100)	22/26 (85)	P=0.024
Distal recrossing (%)	89/106 (84)	51/56 (91)	38/50 (76)	P = 0.035
Average recross times (min-max times)	1.33±0.60 (1-3)	1.55±0.69 (1-3)	1.08±0.34 (1-3)	P < 0.001
≥2 recross (%)	28/106 (26)	25/56 (45%)	3/50 (6%)	P < 0.001
Contrast volume (ml)	158±51.1	146±45.2	171±54.5	P = 0.013
Radiation time (min)	34.3±16.6	37.3±17.1	31.1±15.7	P = 0.059
Operation time (min)	100±36.2	110±36.4	87.6±32.2	P = 0.0032

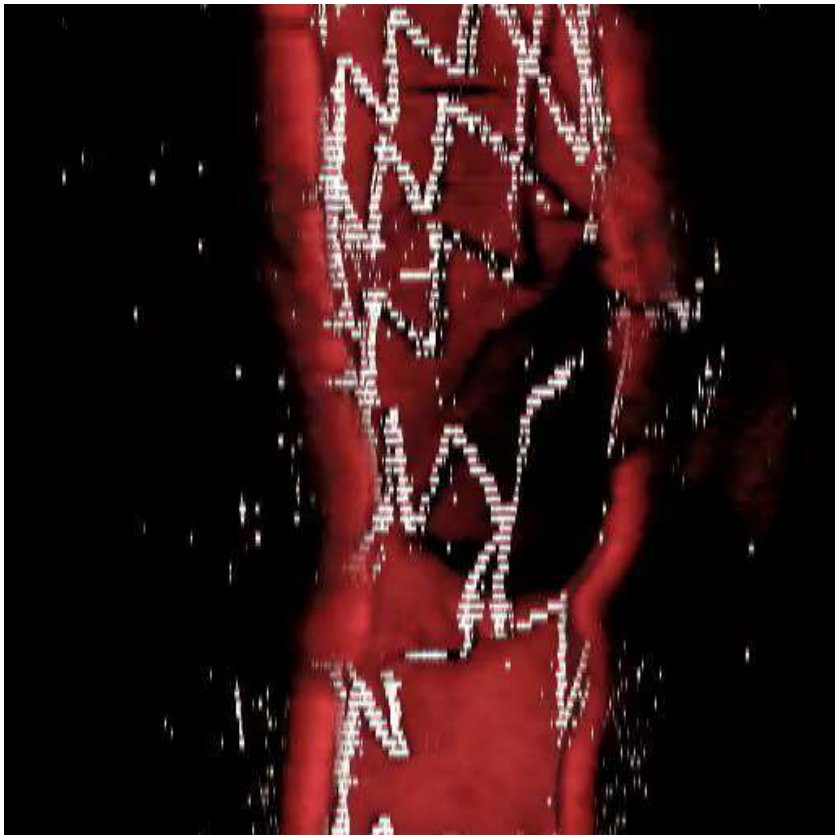
Far distal cell recrossing

GW recross in far distal cell leads to distortion of the stent.

GW recross



After FKB

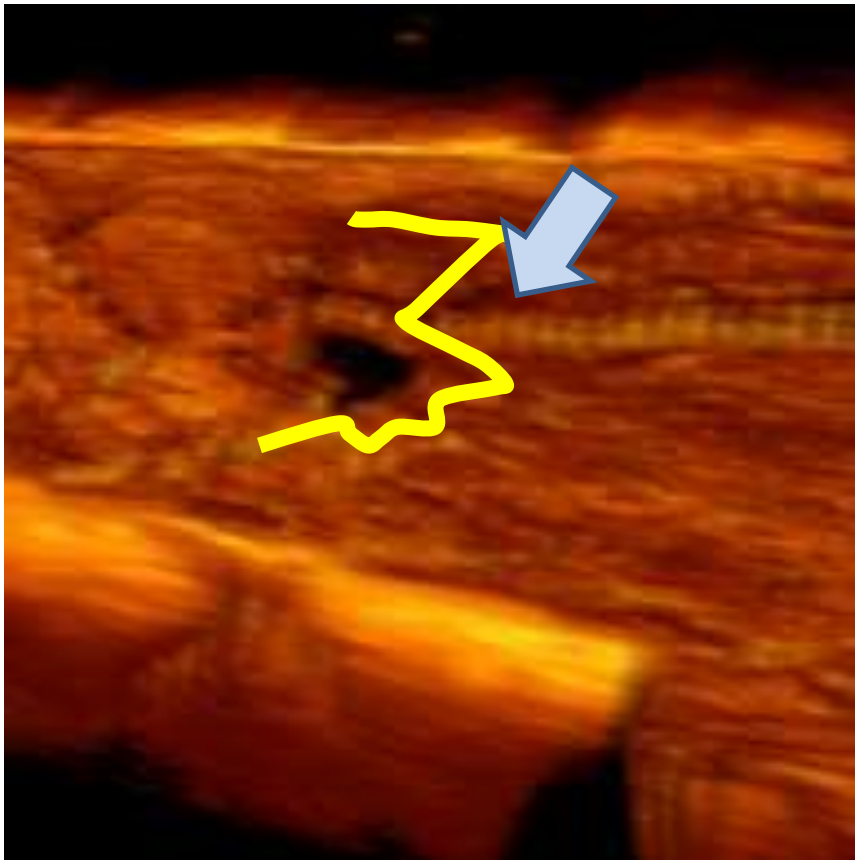


Nakao F, AsiaIntervention 2015;1:71

GW recross in the proximal cell

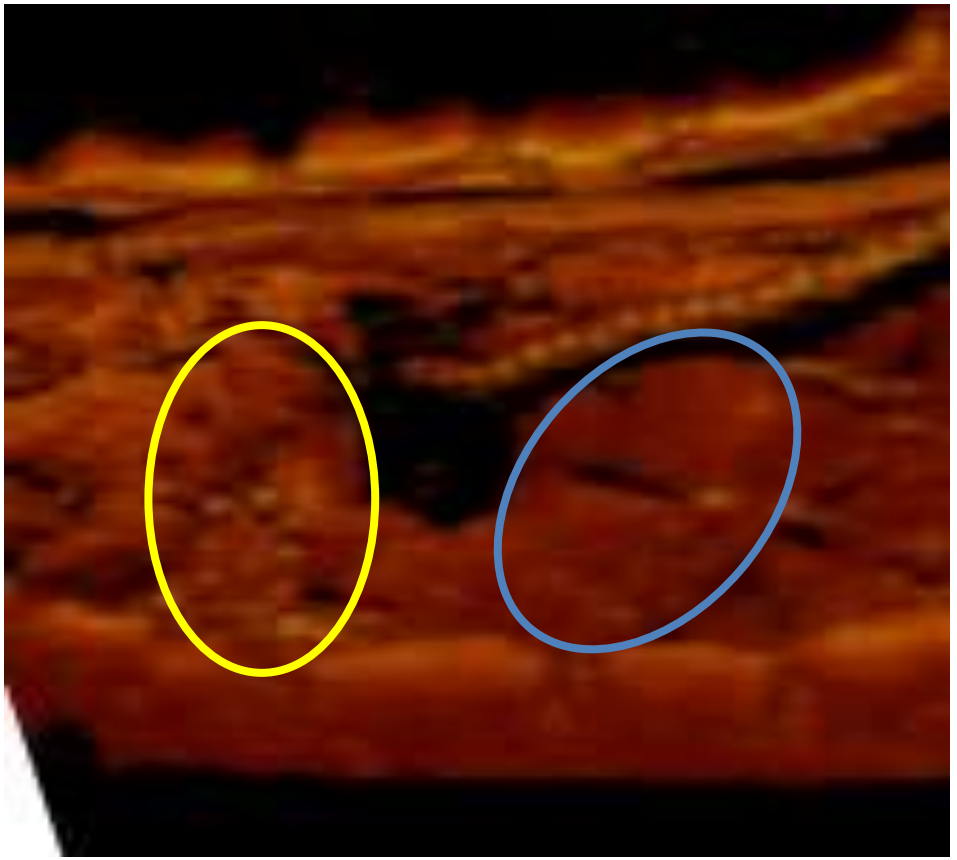
Murasato Y & Foin N.
AsiaInterv, in print

GW recrossing

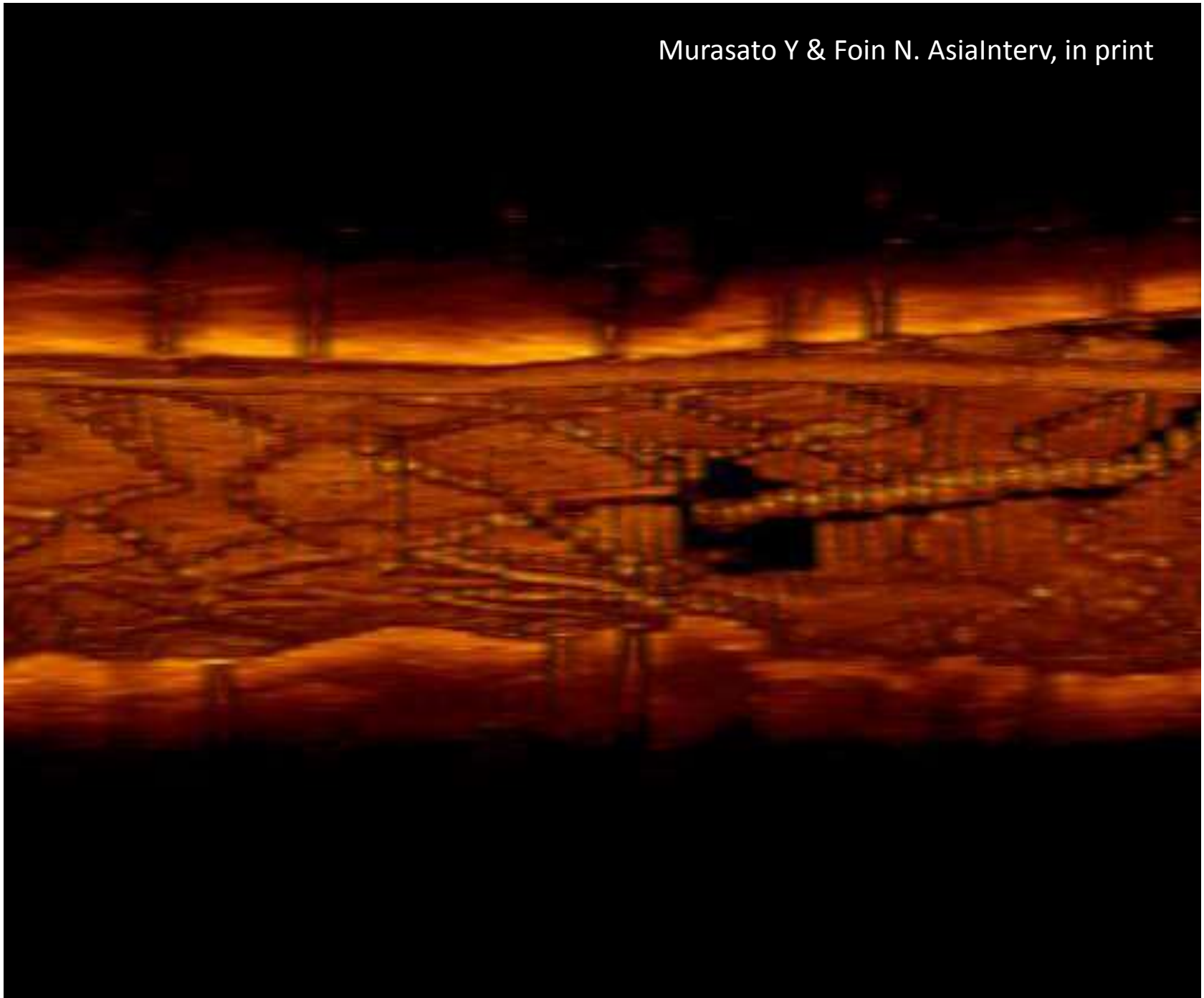


Actually, the GW slipped under the proximal stent strut.

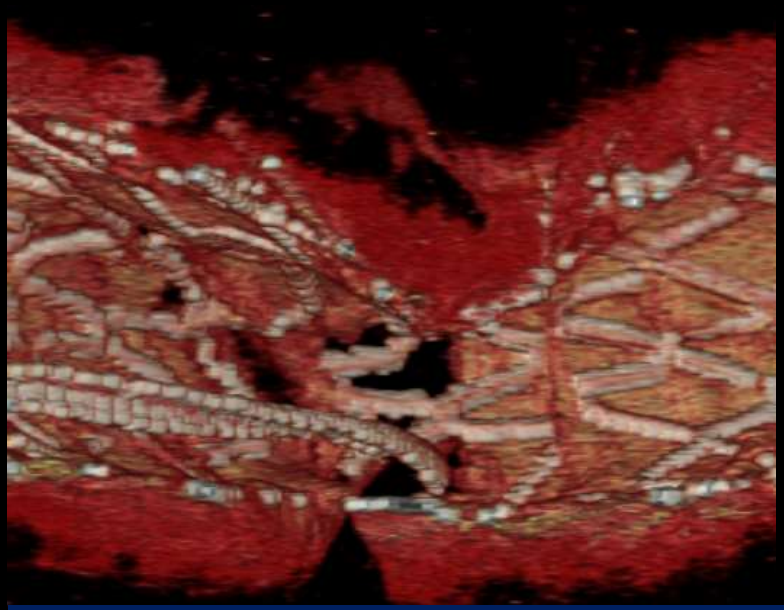
SB ballooning

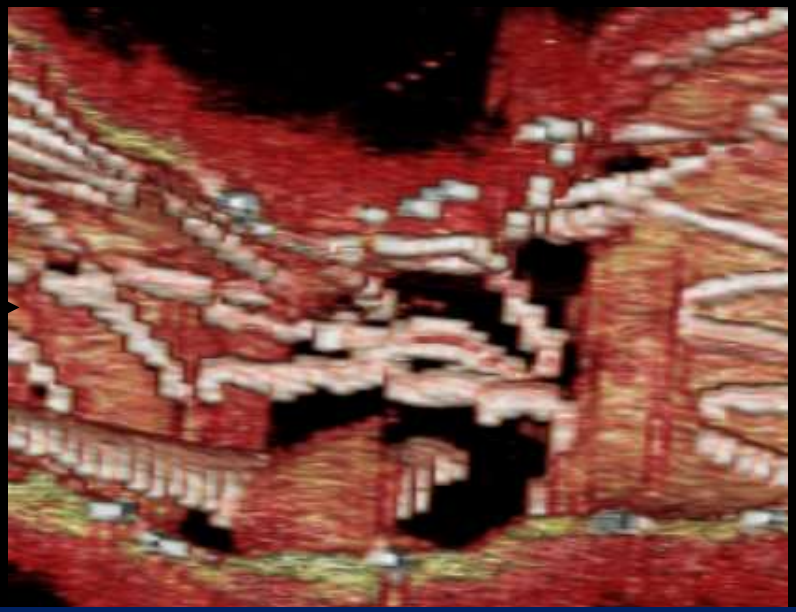


The proximal strut was raised up and protruded into the MV (yellow circle).
No strut was observed in the area proximal to the SB ostium (blue circle).


Murasato Y & Foin N. AsiaInterv, in print

Connecting to carina type in 2-link stent





Unsolved issue

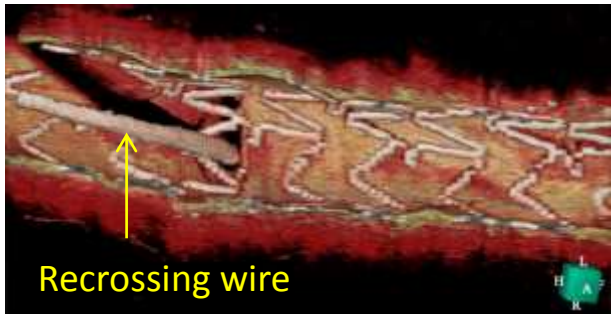
Aggressive SB dilatation or leave without any procedure?

Any other novel technique?

A novel push-fold method for removing side branch-jailed stent struts under 3D-OCT

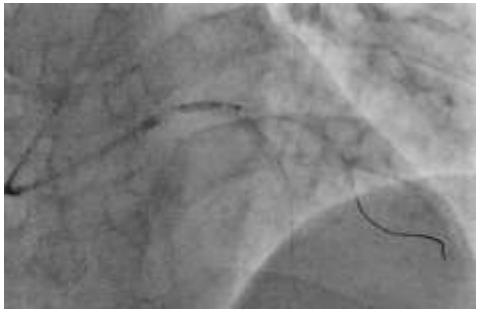
Nagoshi R, Okamura T, Shite J. J Am Coll Cardiol Intv. 2016;9:e107

a) 1st GW recross

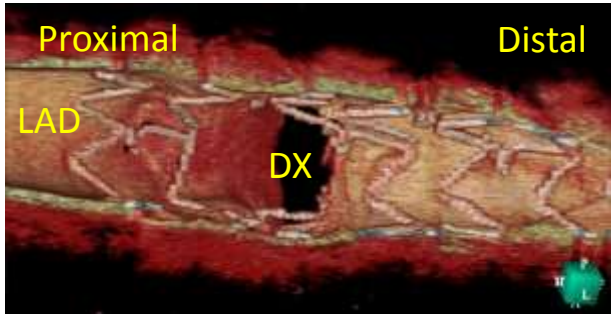


b) 2nd GW recross

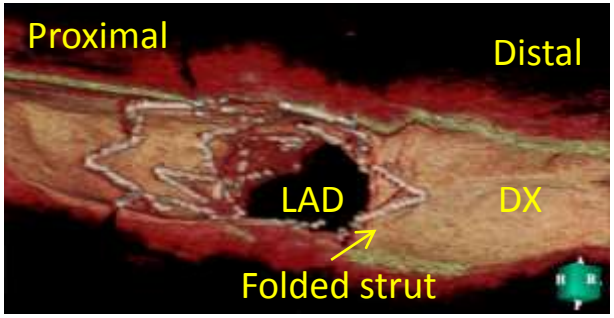
c) Balloon push over stent side



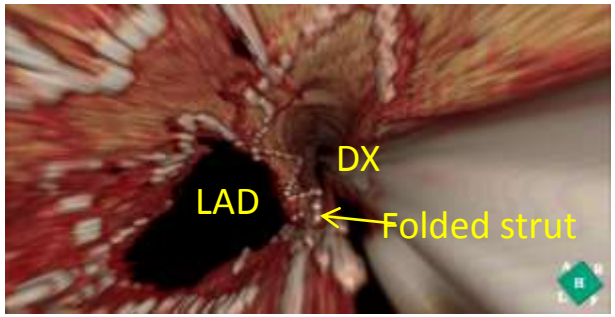
d) After KBI



e) Diagonal View



f) Diagonal view



3D OCT investigators

Conclusion

- Confirmation of GW recrossing point and link-connection in the SBOS under the high-resolution 3D OCT guidance may improve clinical outcome of the bifurcation intervention.
- We will investigate the efficacy of 3D OCT guided bifurcation PCI in the next Japanese 3D-OCT Bifurcation Registry in which 1000 cases will enroll.

Thank you for your attention!