Advantage of OCT-guided PCI in complex coronary lesions:

Diffuse, severe calcification, or LM bifurcation

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

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ESC European Society of Cardiology
European Heart Journal (2018) **00**, 1–96
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ESC/EACTS GUIDELINES

2018 ESC/EACTS Guidelines on myocardial revascularization

The Task Force on myocardial revascularization Society of Cardiology (ESC) and European Asso Cardio-Thoracic Surgery (EACTS)

Developed with the special contribution of the E Association for Percutaneous Cardiovascular In

Authors/Task Force Members: Franz-Josef Neumann* (ESC (Germany), Miguel Sousa-Uva*[1] (EACTS Chairperson) (Po (Sweden), Fernando Alfonso (Spain), Adrian P. Banning (U (UK), Robert A. Byrne (Germany), Jean-Philippe Collet (Fr (Ger Adna Josef Dirk (Swit

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Recommendations on intravascular imaging for procedural optimization

Recommendations	Class[a]	Level[b]
IVUS or OCT should be considered in selected patients to optimize stent implantation.[603,612,651–653]	IIa	B
IVUS should be considered to optimize treatment of unprotected left main lesions.[35]	IIa	B

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Restenosis		
DES are recommended for the treatment of in-stent restenosis of BMS or DES.[373,375,378,379]	I	A
Drug-coated balloons are recommended for the treatment of in-stent restenosis of BMS or DES.[373,375,378,379]	I	A
In patients with recurrent episodes of diffuse in-stent restenosis, CABG should be considered by the Heart Team over a new PCI attempt.	IIa	C
IVUS and/or OCT should be considered to detect stent-related mechanical problems leading to restenosis.	IIa	C

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European Heart Journal (2017) **0**, 1–9
doi:10.1093/eurheartj/ehx351

CLINICAL RESEARCH
Interventional cardiology

Optical frequency domain imaging vs. intravascular ultrasound in percutaneous coronary intervention (OPINION trial): one-year angiographic and clinical results

Takashi Kubo[1], Toshiro Shinke[2], Takayuki Okamura[3], Kiyoshi Hibi[4], Gaku Nakazawa[5], Yoshihiro Morino[6], Junya Shite[7], Tetsuya Fusazaki[6], Hiromasa Otake[2], Ken Kozuma[8], Tetsuya Ioji[9], Hideaki Kaneda[9], Takeshi Serikawa[10], Toru Kataoka[11], Hisayuki Okada[12], and Takashi Akasaka[1]*; on behalf of the OPINION Investigators†

...ased, high-resolution intravascular imaging
...l imaging technique for guiding percutane-
...riority of OFDI-guided PCI compared with

...trolled, non-inferiority study to compare
...generation drug-eluting stent. The primary
... death, target-vessel related myocardial
infarction, and ischaemia-driven target vessel revascularization until 12 months after the PCI. The major secondary endpoint was angiographic binary restenosis at 8 months. We randomly allocated 829 patients to receive OFDI-guided PCI ($n = 414$) or IVUS-guided PCI ($n = 415$). Target vessel failure occurred in 21 (5.2%) of 401 patients undergoing OFDI-guided PCI, and 19 (4.9%) of 390 patients undergoing IVUS-guided PCI, demonstrating non-inferiority of OFDI-guided PCI to IVUS-guided PCI (hazard ratio 1.07, upper limit of one-sided 95% confidence interval 1.80; $P_{non\text{-}inferiority} = 0.042$). With 89.8% angiographic follow-up, the rate of binary restenosis was comparable between OFDI-guided PCI and IVUS-guided PCI (in-stent: 1.6% vs. 1.6%, $P = 1.00$; and in-segment: 6.2% vs. 6.0%, $P = 1.00$).

Conclusion The 12-month clinical outcome in patients undergoing OFDI-guided PCI was non-inferior to that of patients undergoing IVUS-guided PCI. Both OFDI-guided and IVUS-guided PCI yielded excellent angiographic and clinical results, with very low rates of 8-month angiographic binary restenosis and 12-month target vessel failure.

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Optical coherence tomography compared with intravascular ultrasound and with angiography to guide coronary stent implantation (ILUMIEN III: OPTIMIZE PCI): a randomised controlled trial

Ziad A Ali, Akiko Maehara, Philippe Généreux, Richard A Shlofmi
Fernando Alfonso, Habib Samady, Takashi Akasaka, Eric B Carlsc
Ori Ben-Yehuda, Gregg W Stone, for the ILUMIEN III: OPTIMIZE P

Summary

Background Percutaneous coronary intervention (PCI) is most commonly guided by angiography alone. Intravascular ultrasound (IVUS) guidance has been shown to reduce major adverse cardiovascular events (MACE) after PCI, principally by resulting in a larger postprocedure lumen than with angiographic guidance. Optical coherence tomography (OCT) provides higher resolution imaging than does IVUS, although findings from some studies suggest that it might lead to smaller luminal diameters after stent implantation. We sought to establish whether or not a novel OCT-based stent sizing strategy would result in a minimum stent area similar to or better than that achieved with IVUS guidance and better than that achieved with angiography guidance alone.

Methods In this randomised controlled trial, we recruited patients aged 18 years or older undergoing PCI from 29 hospitals in eight countries. Eligible patients had one or more target lesions located in a native coronary artery with a visually estimated reference vessel diameter of 2·25–3·50 mm and a length of less than 40 mm. We excluded patients with left main or ostial right coronary artery stenoses, bypass graft stenoses, chronic total occlusions, planned two-stent bifurcations, and in-stent restenosis. Participants were randomly assigned (1:1:1; with use of an interactive web-based system in block sizes of three, stratified by site) to OCT guidance, IVUS guidance, or angiography-guided stent implantation. We did OCT-guided PCI using a specific protocol to establish stent length, diameter, and expansion according to reference segment external elastic lamina measurements. All patients underwent final OCT imaging (operators in the IVUS and angiography groups were masked to the OCT images). The primary efficacy endpoint was post-PCI minimum stent area, measured by OCT at a masked independent core laboratory at completion of enrolment, in all randomly allocated participants who had primary outcome data. The primary safety endpoint was procedural MACE. We tested non-inferiority of OCT guidance to IVUS guidance (with a non-inferiority margin of

(one-sided 97·5% lower CI –0·70 mm²; p=0·001), but not superior (p=0·42). OCT guidance was also not superior to angiography guidance (p=0·12). We noted procedural MACE in four (3%) of 158 patients in the OCT group, one (1%) of 146 in the IVUS group, and one (1%) of 146 in the angiography group (OCT *vs* IVUS p=0·37; OCT *vs* angiography p=0·37).

Interpretation OCT-guided PCI using a specific reference segment external elastic lamina-based stent optimisation strategy was safe and resulted in similar minimum stent area to that of IVUS-guided PCI. These data warrant a large-scale randomised trial to establish whether or not OCT guidance results in superior clinical outcomes to angiography guidance.

Interpretation OCT-guided PCI using a specific reference segment external elastic lamina-based stent optimisation strategy was safe and resulted in similar minimum stent area to that of IVUS-guided PCI. These data warrant a large-scale randomised trial to establish whether or not OCT guidance results in superior clinical outcomes to angiography guidance.

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See Online/Comment
http://dx.doi.org/10.1016/S0140-6736(16)32062-1

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Madrid, Spain (F Alfonso MD); Emory University Hospital, Atlanta, GA, USA (Prof H Samady MD); Wakayama Medical University, Wakayama, Japan (Prof T Akasaka MD); Eastern Cardiology, Greenville, NC, USA (E B Carlson MD); and University of Alabama, Birmingham, AB, USA (Prof M A Leesar MD)

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Similarities & differences between OCT & IVUS

Maehara A, et al. J Am Coll Cardiol Img 2017;10:1487-1503

OCT				IVUS		
Very good	Good	Feasible		Feasible	Good	Very good
			Pre-PCI			
●	●	●	Severity of calcium	●	●	
		●	Prediction of slow flow	●		
	●	●	Stent sizing by vessel wall	●	●	●
●	●	●	Stent length to cover normal to normal	●	●	●
			Post-PCI			
●	●	●	Stent expansion	●	●	●
●	●	●	Tissue protrusion through strut	●	●	
●	●	●	Stent malapposition	●	●	
	●	●	Stent deformation (frequently at aorto-ostium)	●	●	
●	●	●	Stent edge dissection	●	●	
●	●	●	Residual disease at stent edge	●	●	●
			Follow-up			
●	●	●	Old stent expansion	●	●	●
	●	●	Tissue coverage	●		
●	●	●	Neointimal hyperplasia	●	●	●
	●	●	Stent fracture	●	●	
●	●	●	Stent malapposition	●	●	
		●	Positive remodeling of vessel wall	●	●	●
●	●	●	Neoatherosclerosis	●	●	

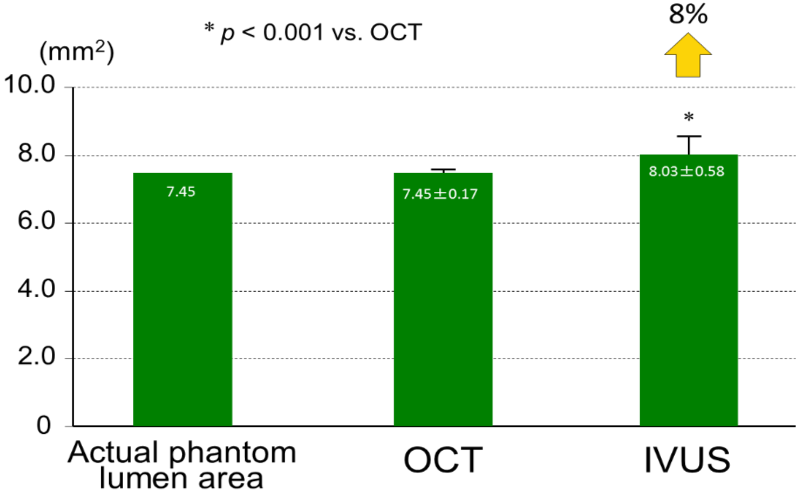
Comparison between OCT & IVUS in bifurcation treatment

Onuma Y, et al. EuroInterv 2018, doi: 10.4244/EIJ-D-18-00391

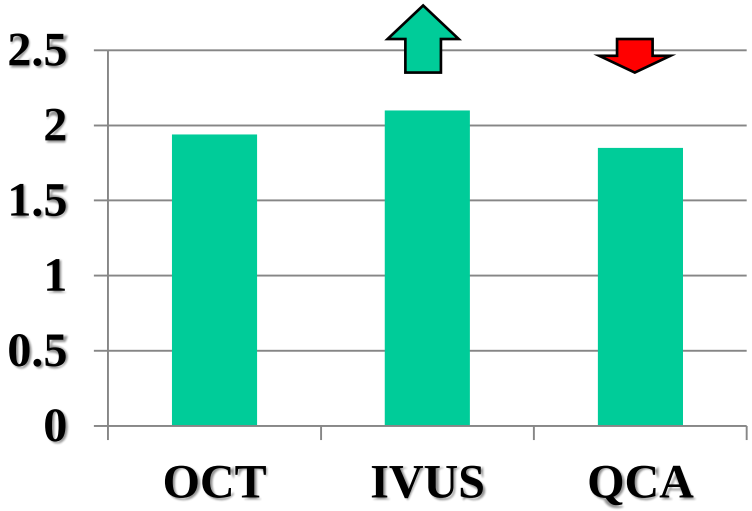
	IVUS	OCT
➢ Pre- procedure		
Co-registration with angiogram	++	++
Sizing of vessel	++	+
Sizing of lumen	++	++
Assessment of plaque distribution	++	+
Plaque characterization	++	+
Assessment of side branch ostium in the pullback of main branch	x	++
Determination of landing zone & stent length	++	++
➢ During Stent implantation		
Guidance of position of the guidewire toward side branch	x	++
➢ Post-procedure		
Evaluation of stent dimensions according to flow conservation law	++	++
Stent underexpansion	++	++
Edge dissection	+	++
ISA	+	++
➢ During Stent implantation		
LMT lesion	++	+

Comparison of measurements (OCT, IVUS & QCA)

(OPUS-CLASS study)

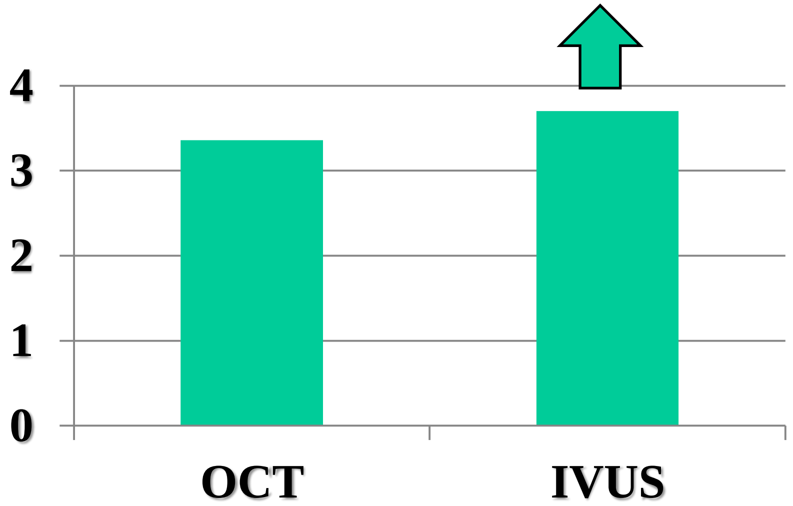


MLD



1.94±0.70 mm　2.10±0.59 mm　1.85±0.77 mm

MLA



3.36±2.28mm²　3.70±2.04mm²

Kubo T, Akasaka T, et al. JACC Cardiovasc Img. 2013;6:1095-1104

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European Heart Journal - Cardiovascular Imaging Advance Access published September 15, 2015

European Heart Journal – Cardiovascular Imaging
doi:10.1093/ehjci/jev229

Multi-laboratory inter-institute reproducibility study of IVOCT and IVUS assessments using published consensus document definitions

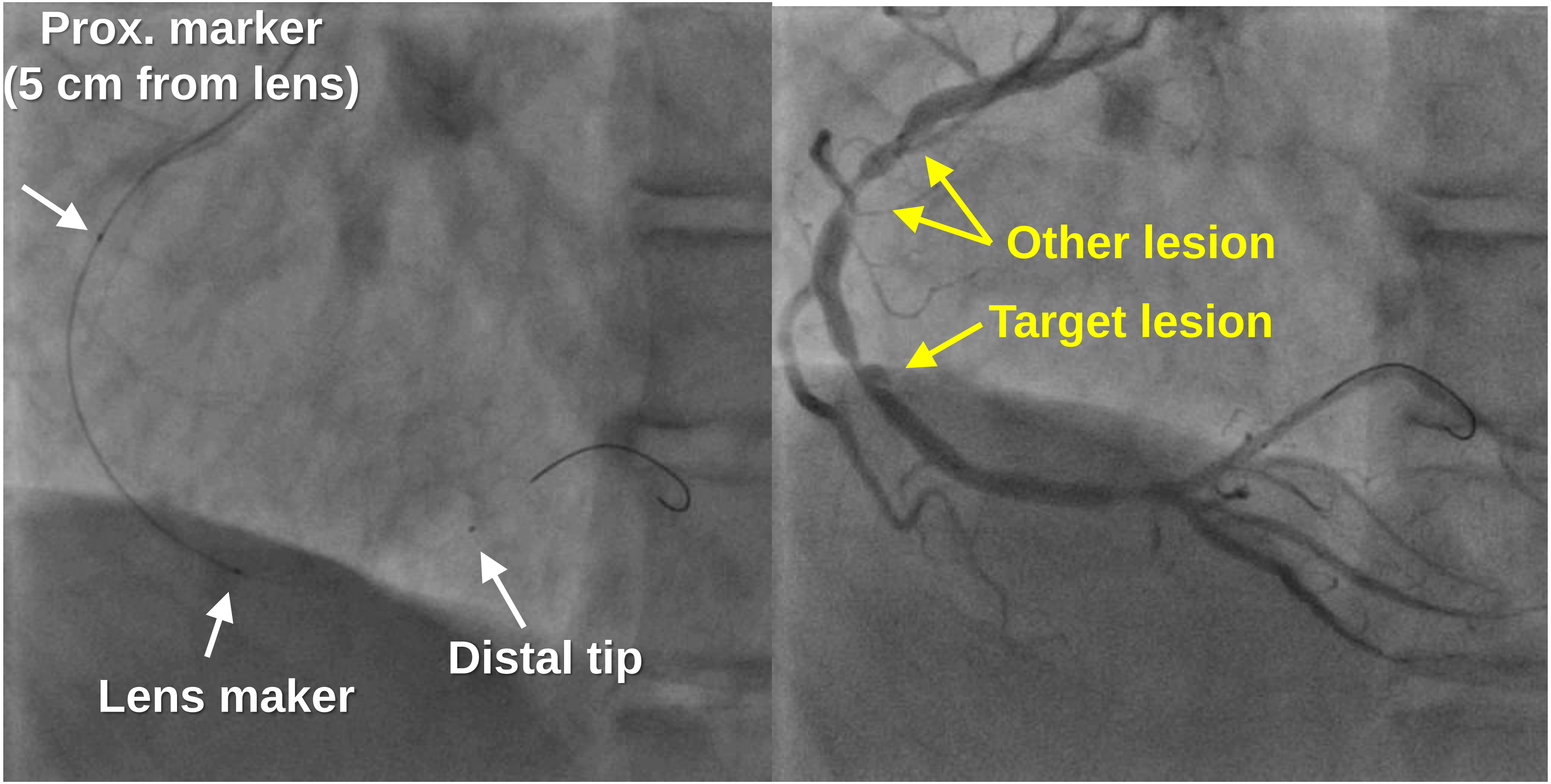
Edouard Gerbaud[1], Giora Weisz[2,3], Atsushi Tanaka[1], Manabu Kashiwagi[1],

Conclusion In the measurement of lumen CSA, maximum and minimum lumen diameters, stent CSA, and maximum and minimum stent diameters by analysts from two different laboratories, reproducibility of IVOCT was more consistent than that of IVUS.

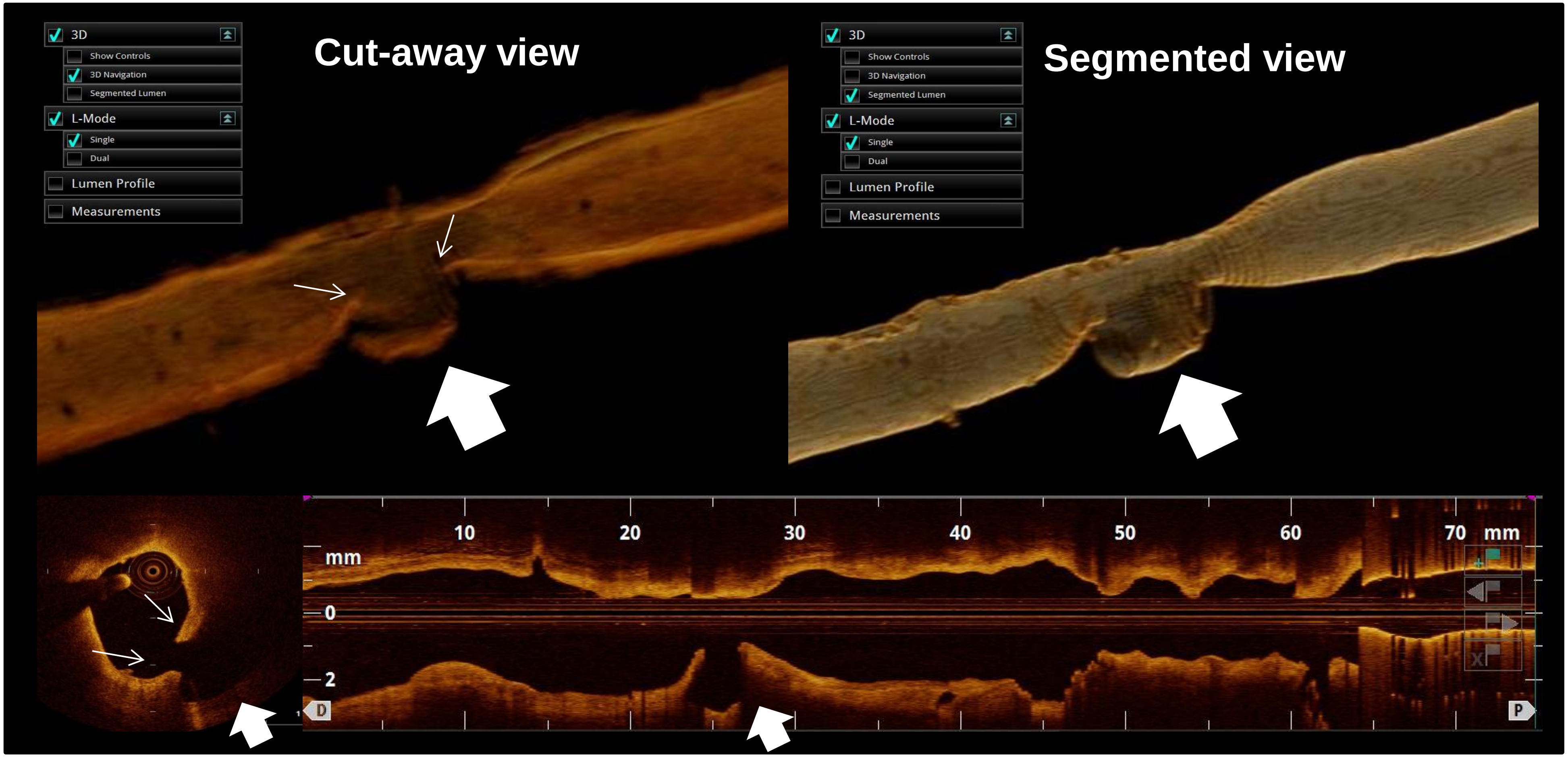
Akiko Maehara[2]

	Inter-institute measurement differences magnitude for IVUS	Inter-institute measurement differences magnitude for OFDI	P-value
Lumen CSA (mm^2)	0.33 (0.12–0.67)	0.10 (0.05–0.22)	<0.001
Lumen max. diameter (mm)	0.16 (0.06–0.30)	0.06 (0.03–0.10)	<0.001
Lumen min. diameter (mm)	0.12 (0.06–0.27)	0.04 (0.02–0.08)	<0.001
Stent CSA (mm^2)	0.26 (0.20–0.50)	0.17 (0.10–0.30)	0.02
Stent max. diameter (mm)	0.16 (0.09–0.20)	0.05 (0.03–0.09)	<0.001
Stent min. diameter (mm)	0.10 (0.03–0.14)	0.04 (0.01–0.08)	0.01
EEM CSA (mm^2)[a]	0.86 (0.39–1.28)	0.18 (0.05–0.36)	0.007
Atheroma CSA (mm^2)[a]	0.68 (0.53–1.05)	0.17 (0.06–0.34)	0.02
Plaque burden (%)[a]	5.6 (2.2–7.3)	1.9 (0.4–2.1)	0.002
Max. atheroma thickness (mm)[a]	0.14 (0.07–0.20)	0.06 (0.03–0.14)	0.03
Min. atheroma thickness (mm)[a]	0.07 (0.03–0.10)	0.03 (0.01–0.05)	0.01
Atheroma eccentricity index[a]	0.07 (0.04–0.15)	0.06 (0.04–0.11)	0.42

Positioning of OCT Catheter



Advantages of Newly developed FD-OCT system (ILUMIEN OPTIS ™)



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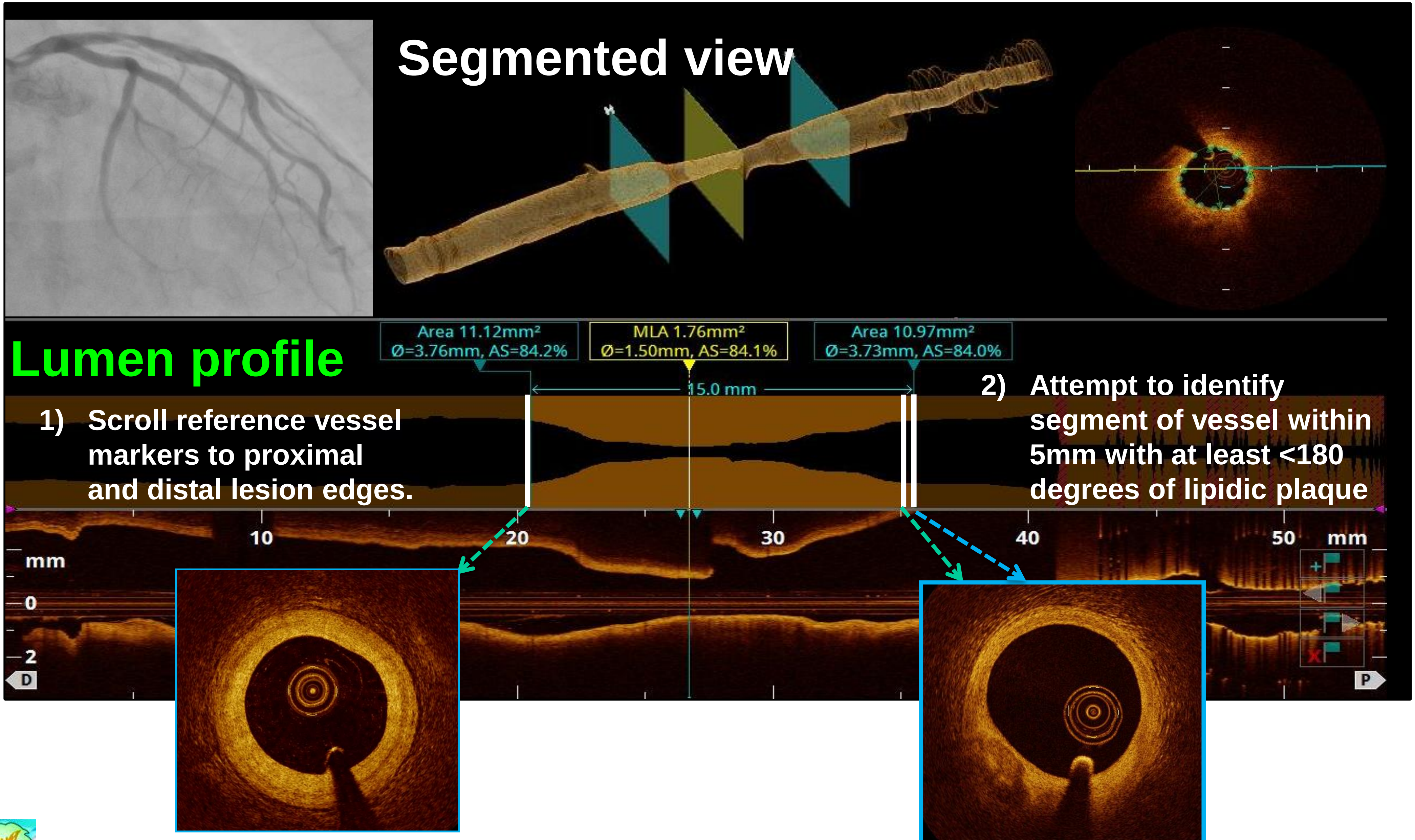
FD-OCT and IVUS criteria of optimal stent deployment

	FD-OCT-guided PCI	IVUS-guided PCI
Reference site	• **Most normal looking** • **No lipidic plaque**	• Largest lumen • **Plaque burden < 50%**
Determination of stent diameter	• By measuring **lumen** diameter at proximal and distal reference sites	• By measuring **vessel** diameter at proximal and distal reference sites
Determination of stent length	• By measuring distance from distal to proximal reference site	
Goal of stent deployment	• **In-stent minimal lumen area ≥ 90% of the average reference lumen area** • Complete apposition of the stent over its entire length against the vessel wall • Symmetric stent expansion defined by minimum lumen diameter / maximum lumen diameter ≥ 0.7 • No plaque protrusion, thrombus, or edge dissection with potential to provoke flow disturbances	

Kubo T, et al. J Cardiol 2016;68:455-460

Pre-PCI assessment, #6 90%, (DES 4.0 × 15mm)



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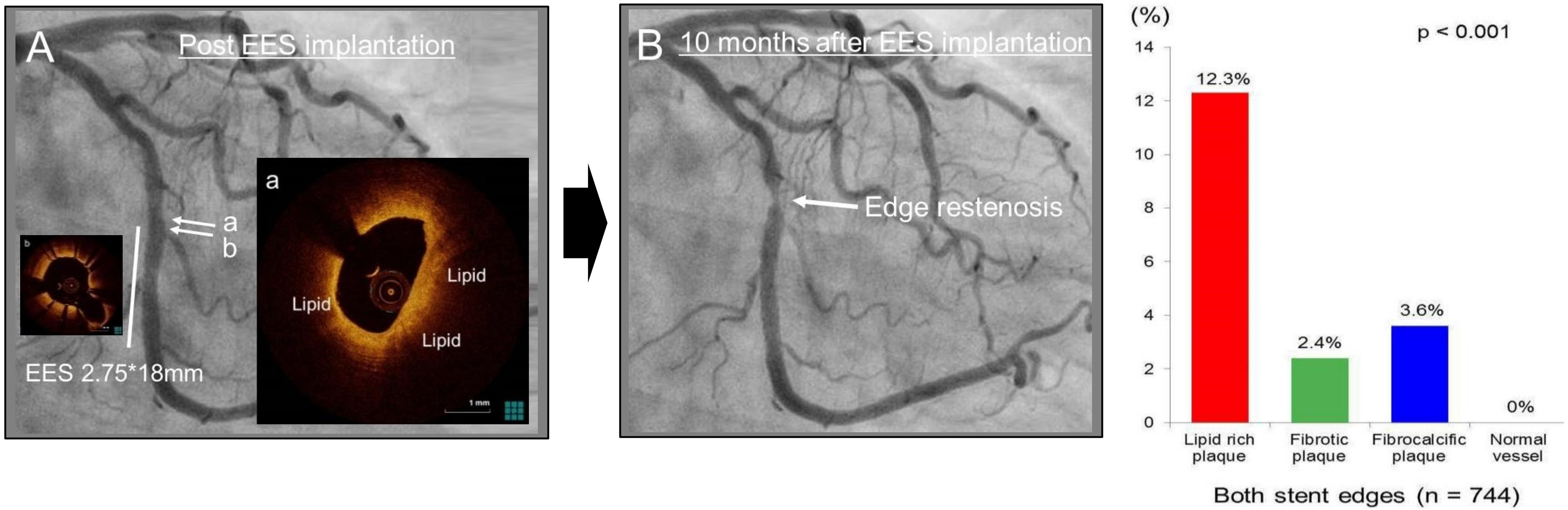
Precursor lesion of stent edge restenosis

In 744 stent (EES) edge segments, OCT was used to evaluate morphological characteristics of the coronary plaques that developed stent edge restenosis.

Post-stenting — 10 months follow-up — Stent edge restenosis



(A) Immediately after EES implantation, OCT images showed lipid rich plaque at the proximal stent edge (a, b).
(B) At 10-month follow-up, angiography demonstrated stent edge restenosis at the proximal edge of the stent.

Conclusion: Lipidic plaque in the stent edge segments at post- PCI was a predictor of late stent edge restenosis.

Ino Y, et al. Cric CV Interv 2016;9:e004231
DOI:10.1161/CIRCINTERVENTIONS.116.004231.

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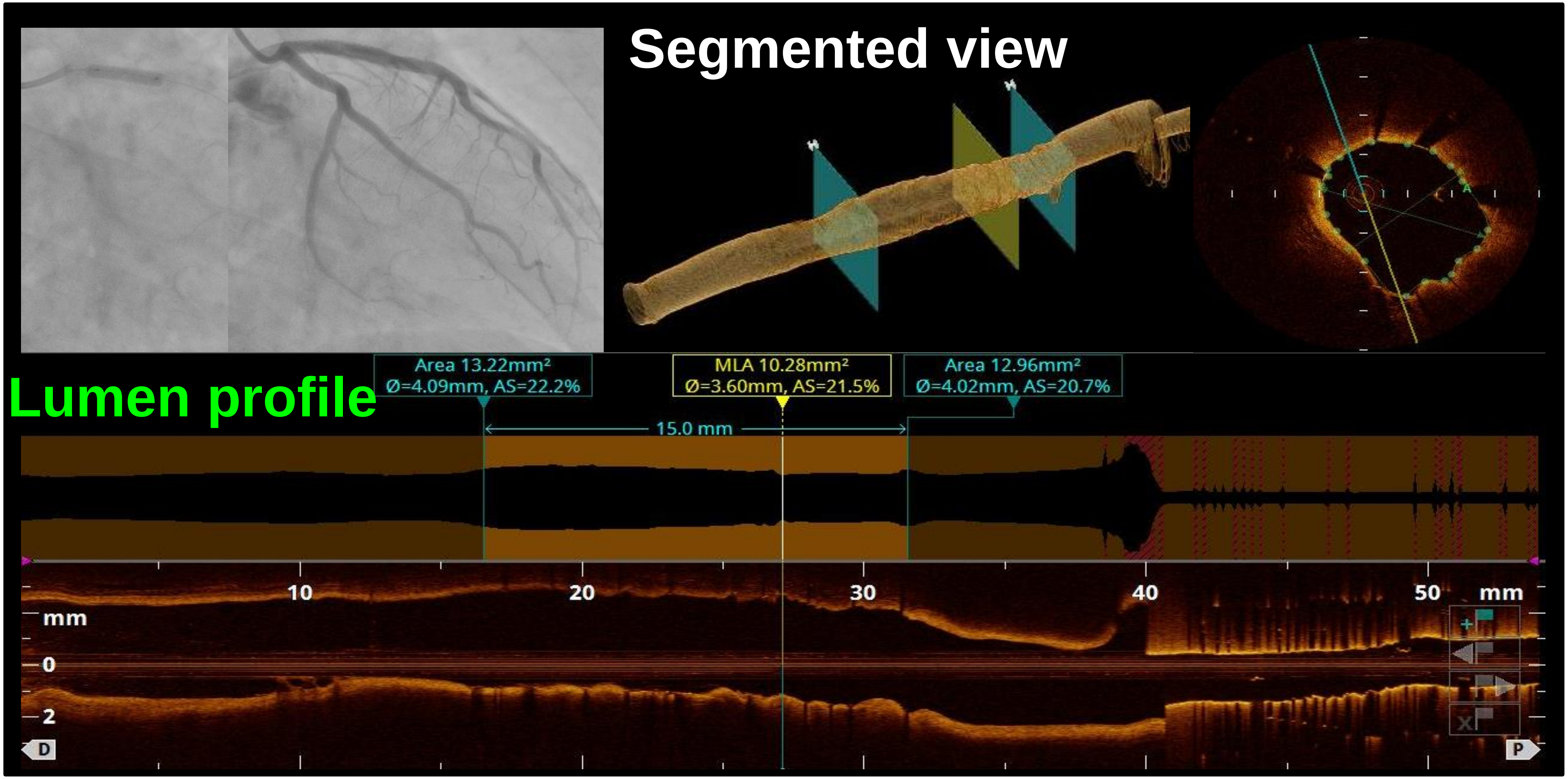
Post-PCI assessment, #6 90%, (DES 4.0×15mm)



MLA ≥ 90% of the average reference lumen area

Stent sizing

ESC European Society of Cardiology
European Heart Journal (2018) **00**, 1–20
doi:10.1093/eurheartj/ehy285
*FAST*TRACK CLINICAL RESEARCH
Coronary artery disease

Clinical use of intracoronary imaging. Part 1: guidance and optimization of coronary interventions. An expert consensus document of the European Association of Percutaneous Cardiovascular Interventions

Endorsed by the Chinese Society of Cardiology

Lorenz Räber[1], Gary S. Mintz[2], Konstantinos C. Koskinas[1], Thomas W. Johnson[3], Niels R. Holm[4], Yoshinubo Onuma[5], Maria D. Radu[6], Michael Joner[7,8], Bo Yu[9], Haibo Jia[9], Nicolas Meneveau[10,11], Jose M. de la Torre Hernandez[12], Javier Escaned[13], Jonathan Hill[14], Francesco Prati[15], Antonio Colombo[16], Carlo di Mario[17], Evelyn Regar[18], Davide Capodanno[19], William Wijns[20], Robert A. Byrne[21], and Giulio Guagliumi[22]*

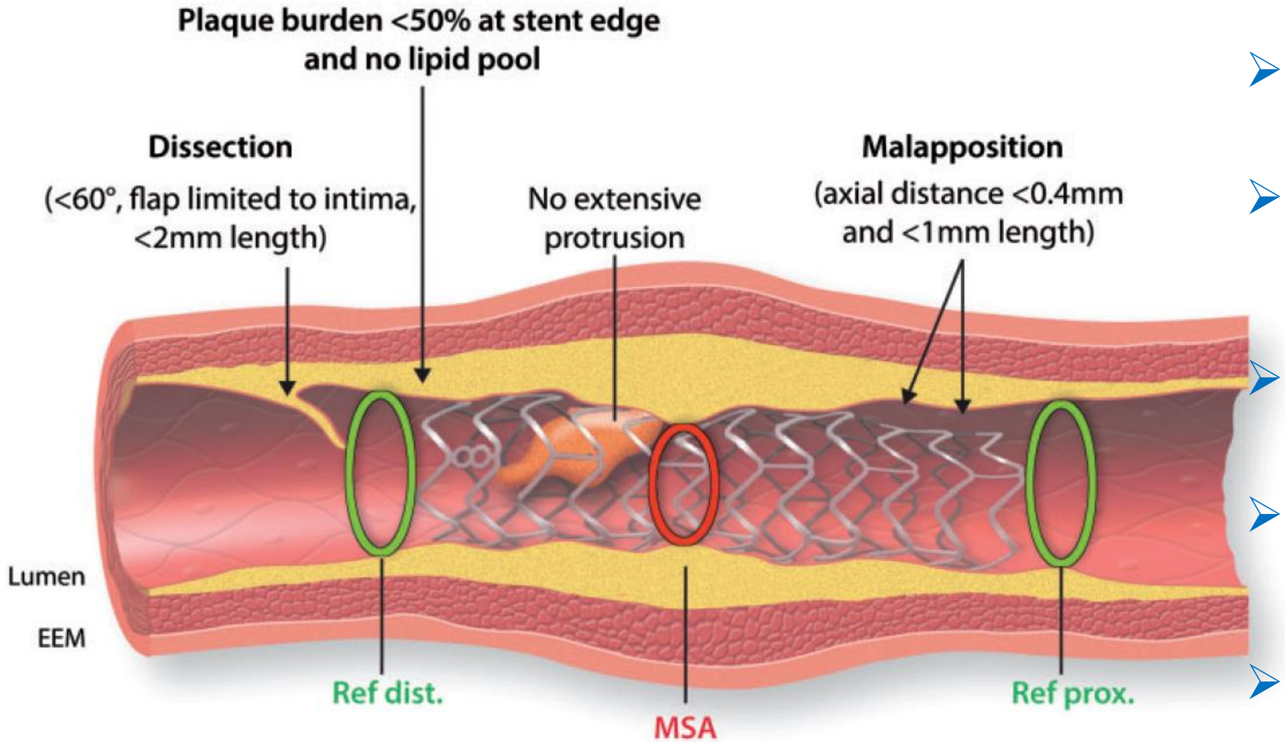
Coordinating editor: Prof Patrick W. Serruys, MD, PhD, Imperial College, London, UK

Document Reviewers: Fernando Alfonso[23], Ravinay Bhindi[24], Ziad Ali[25], Rickey Carter[26]

- The beneficial effect of imaging-guided PCI does not appear to be strictly linked to the algorithm used for stent sizing by IVUS or OCT.
- From a practical standpoint, a distal lumen reference based sizing may represent a safe and straightforward approach with subsequent optimization of the mid and proximal stent segments. Specifically, the mean distal lumen diameter with up rounding stent (0–0.25 mm) may be used (e.g. 3.76 → 4.0 mm), or the mean EEM (2 orthogonal measurements) with down rounding to the nearest 0.25 mm stent size (e.g. 3.76 → 3.5 mm).
- When using OCT, an EEM reference based sizing strategy appears feasible, although more challenging than a lumen based approach for routine clinical practice.
- Appropriate selection of the landing zone is crucial as residual plaque burden (<50%) and particularly lipid rich tissue at the stent edge is associated with subsequent restenosis.
- Co-registration of angiography and IVUS or OCT is a useful tool to determine stent length and allows for precise stent placement.

Räber L, et al. Eur Heart J 2018 May 22. doi: 10.1093/eurheartj/ehy285

Post PCI optimization



- MSA>4.5 cm2, or > 80% of RA.
- Malaposition < 400μm distance, <1mm lenghth.
- No extensive protrusion.
- Distal landing: PB < 50% No lipid pool
- Distal edge dissection: <60° Flap: limited to intima < 2 mm length

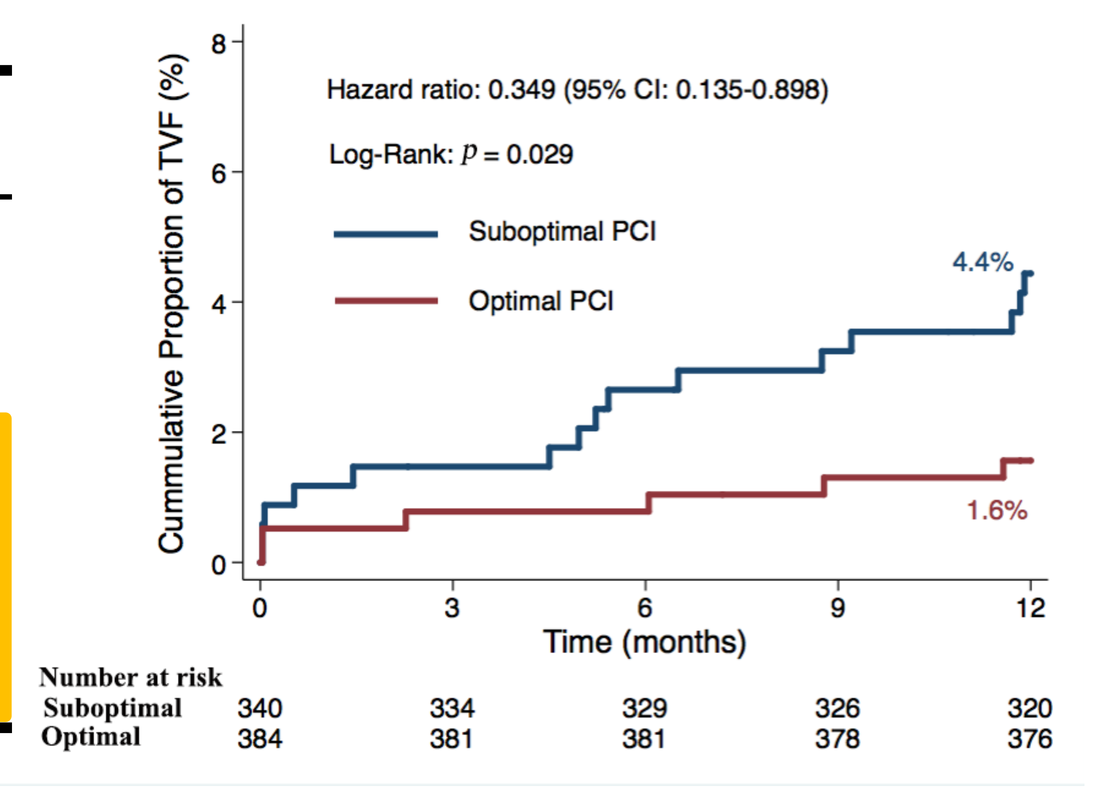
Raber L, et al. Eur Heart J 2018 May 22. doi: 10.1093/eurheartj/ehy285

Optimal vs Suboptimal IVUS-guided PCI (ULTIMATE trial)

PCI results

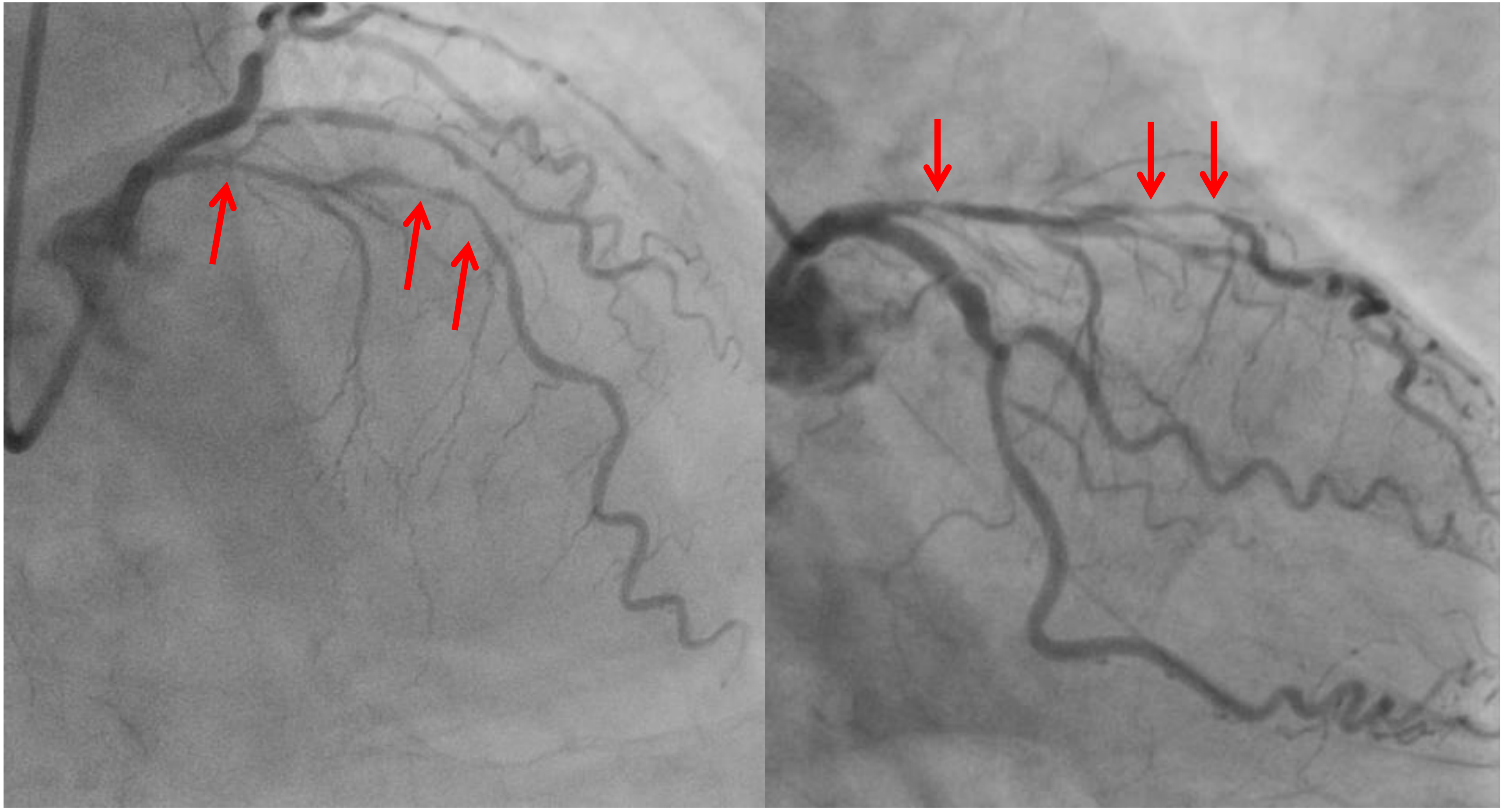
	Optimal group	Suboptimal group	*P*
No. of patients n (%)	384 (53.0)	340 (47.0)	
No. of lesions n (%)	578 (60.1)	384 (39.9)	
MSA, mm^2	6.09	5.45	<0.001
Prox. edge plaque burden	37.2%	51.2%	<0.001
Dist. edge plaque burden	24.2%	35.1%	<0.001

TVF at 12 months

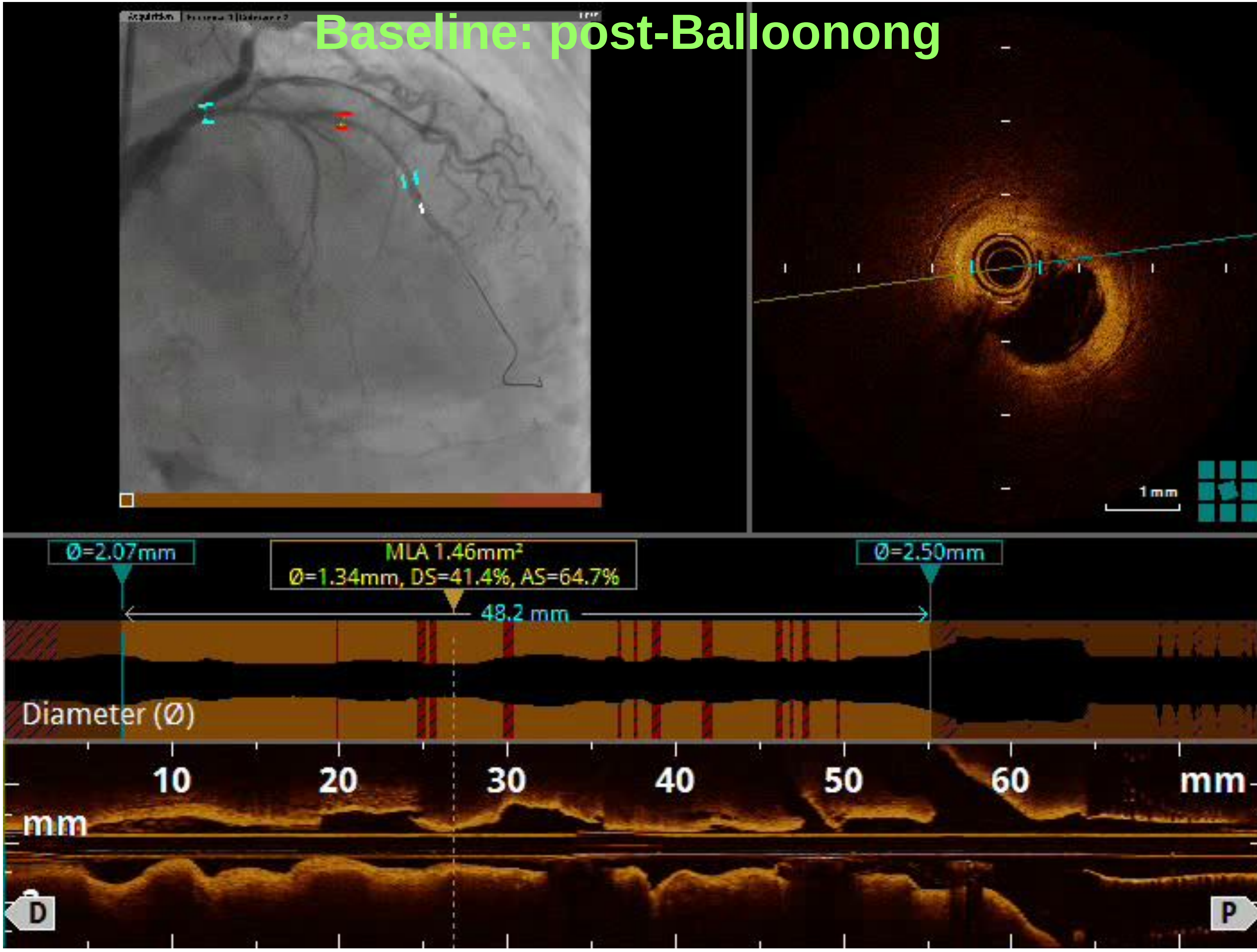


Zhang J, et al. J Am Coll Cardiol 2018;DOI:10.1016/j.jacc2018.09.013

Coronary angio. (Pre PCI)

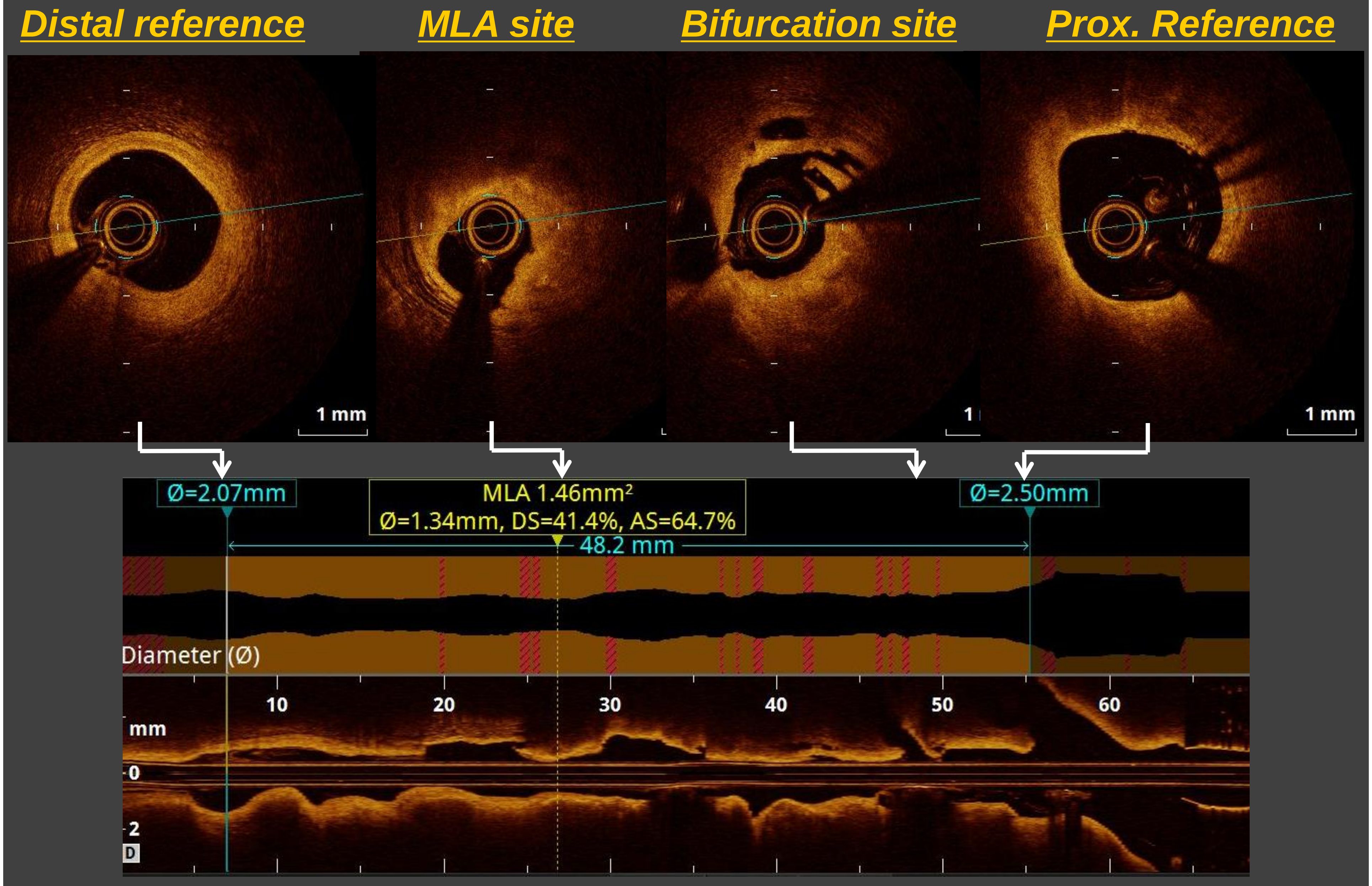


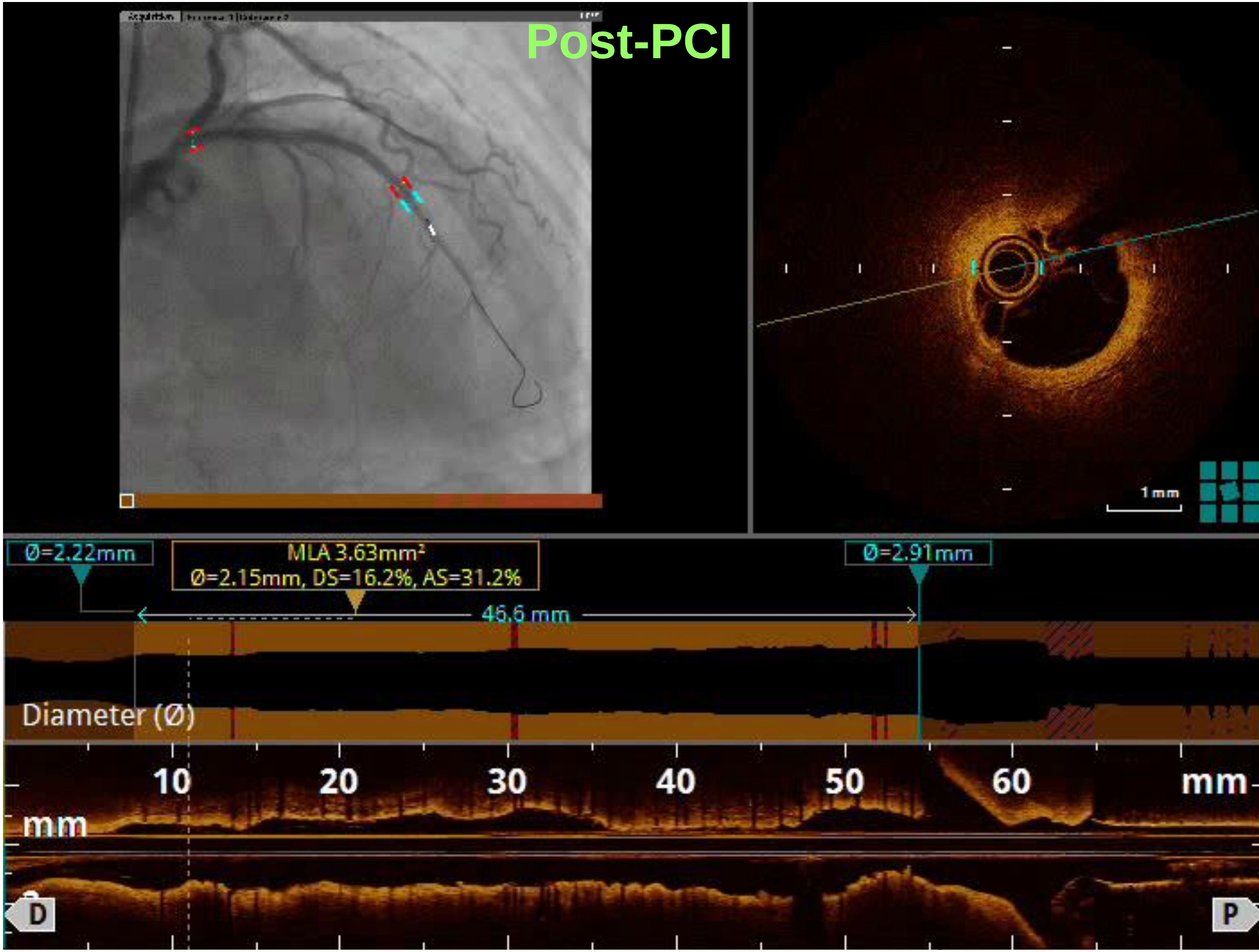
Baseline: post-Balloonong



rsity

Baseline: post-Balloonong

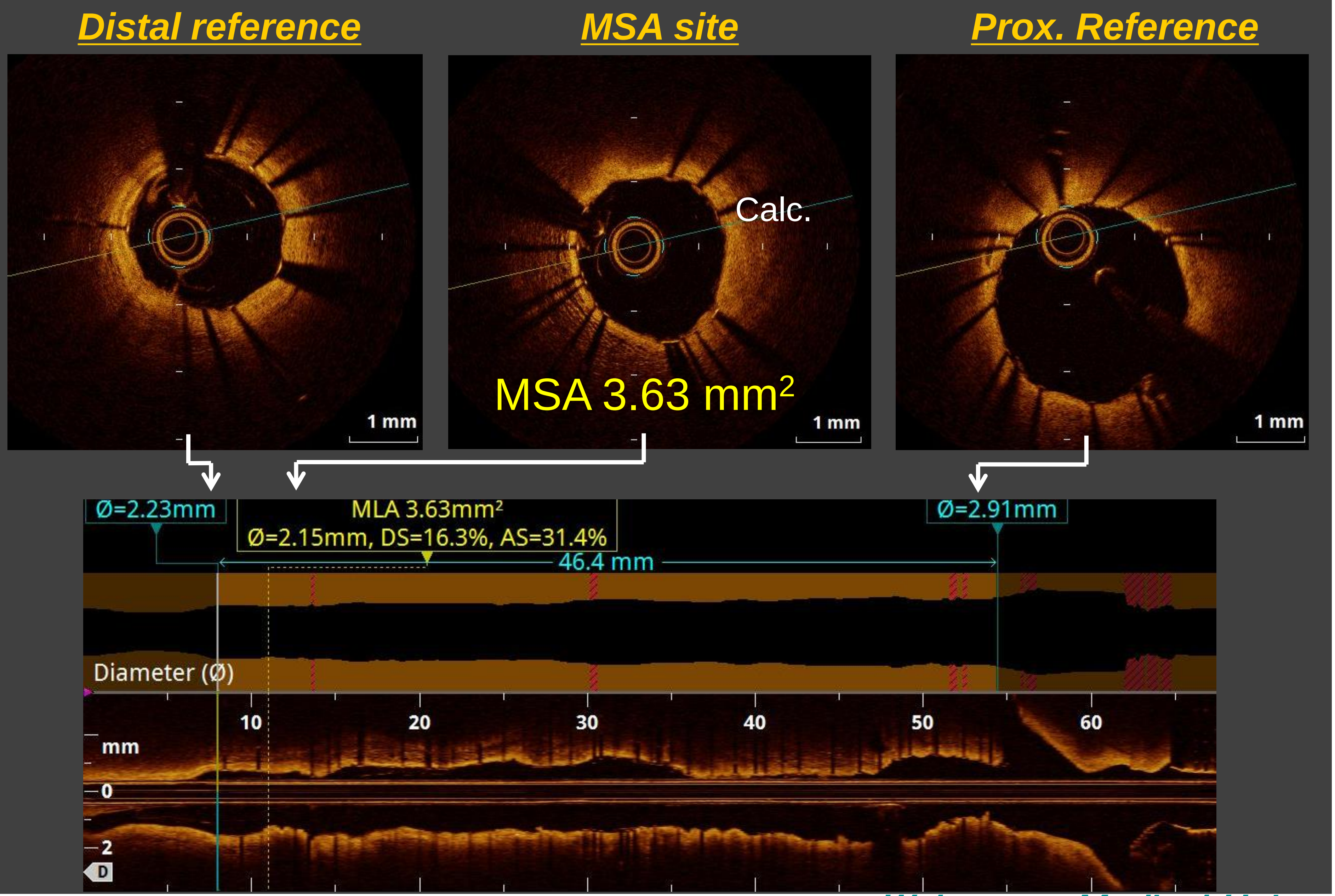




Post-PCI
1 mm
Ø=2.22mm
MLA 3.63mm²
Ø=2.15mm, DS=16.2%, AS=31.2%
Ø=2.91mm
46.6 mm
Diameter (Ø)
10
20
30
40
50
60
mm
mm
D
P

rsity

Post-PCI



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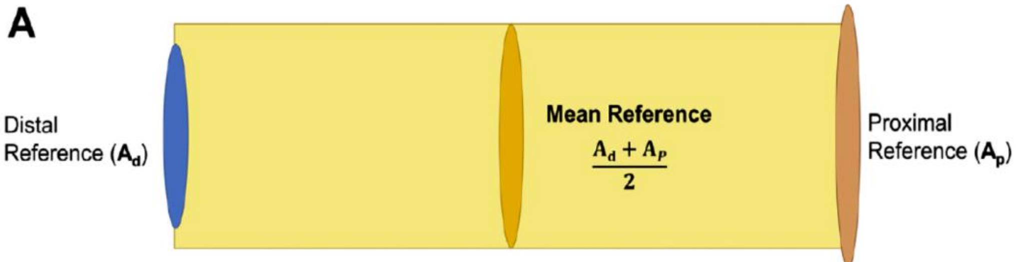
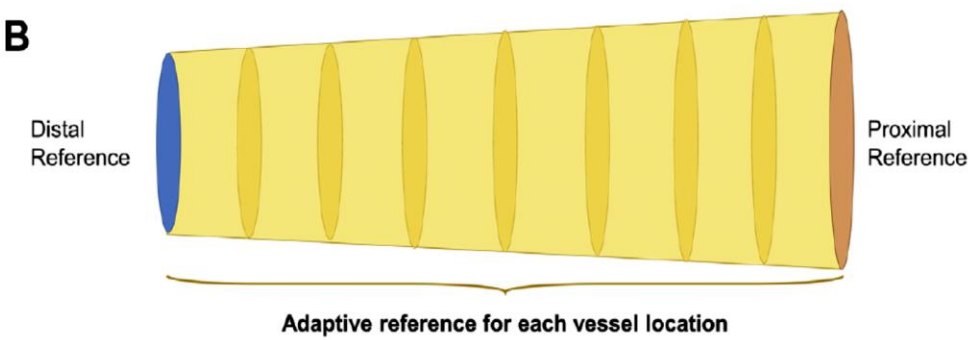
Volumetric Stent Expansion Assessment

Nakamura D, et al. J Am Coll Cardiol Intv 2018;11:1467-1478

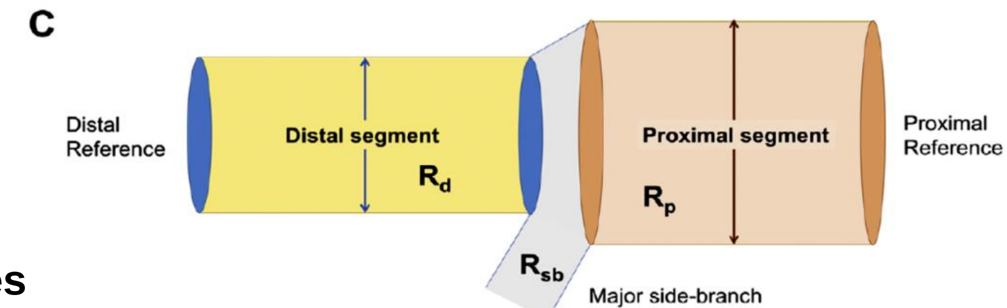
Conventional Method



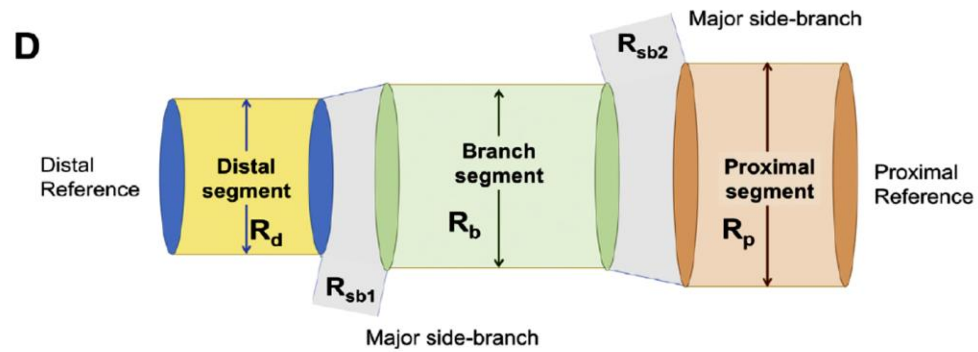
New method for vessels with no major side -branches

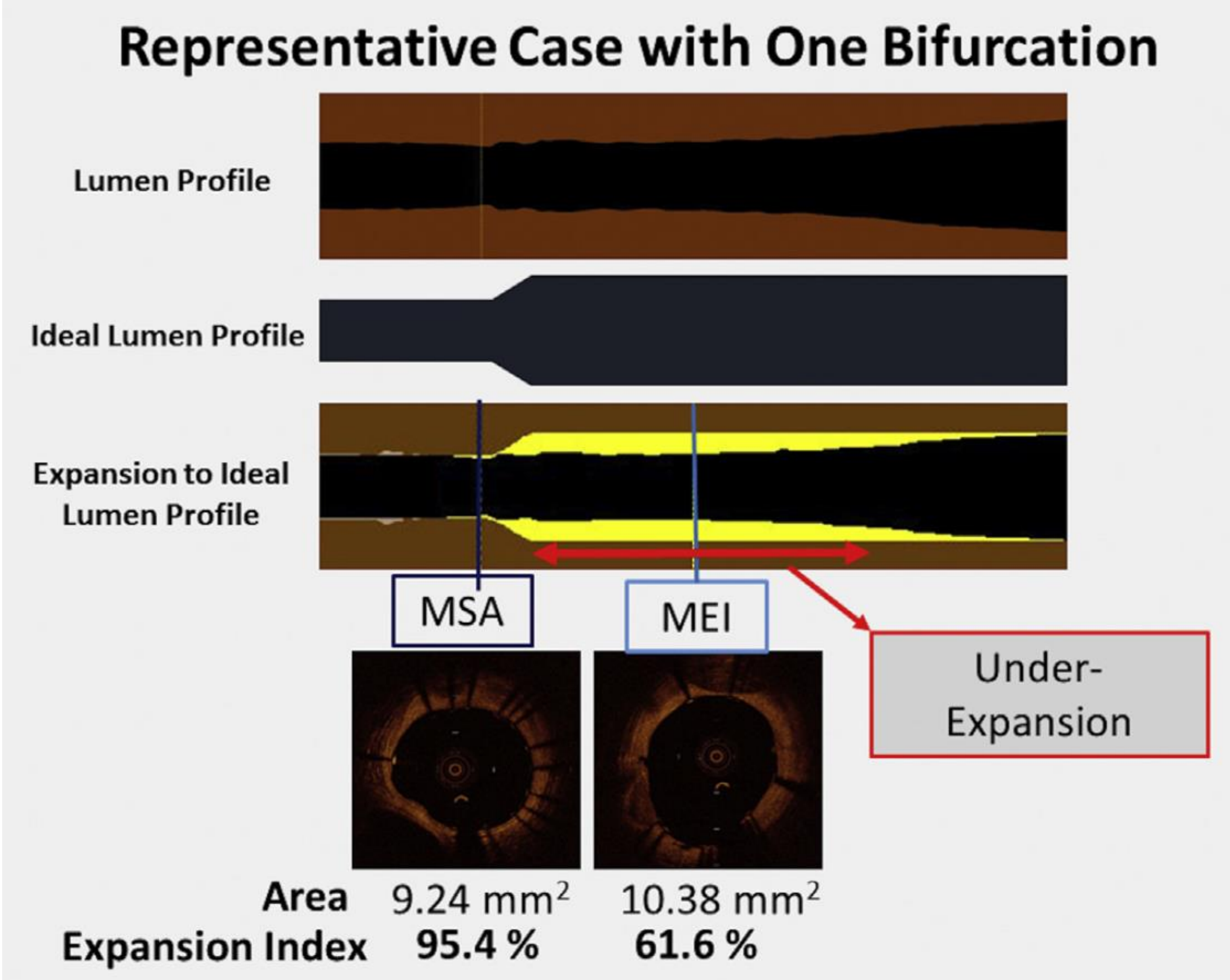


Method for vessels with 1 major side -branches



Method for vessels with 2 major side -branches





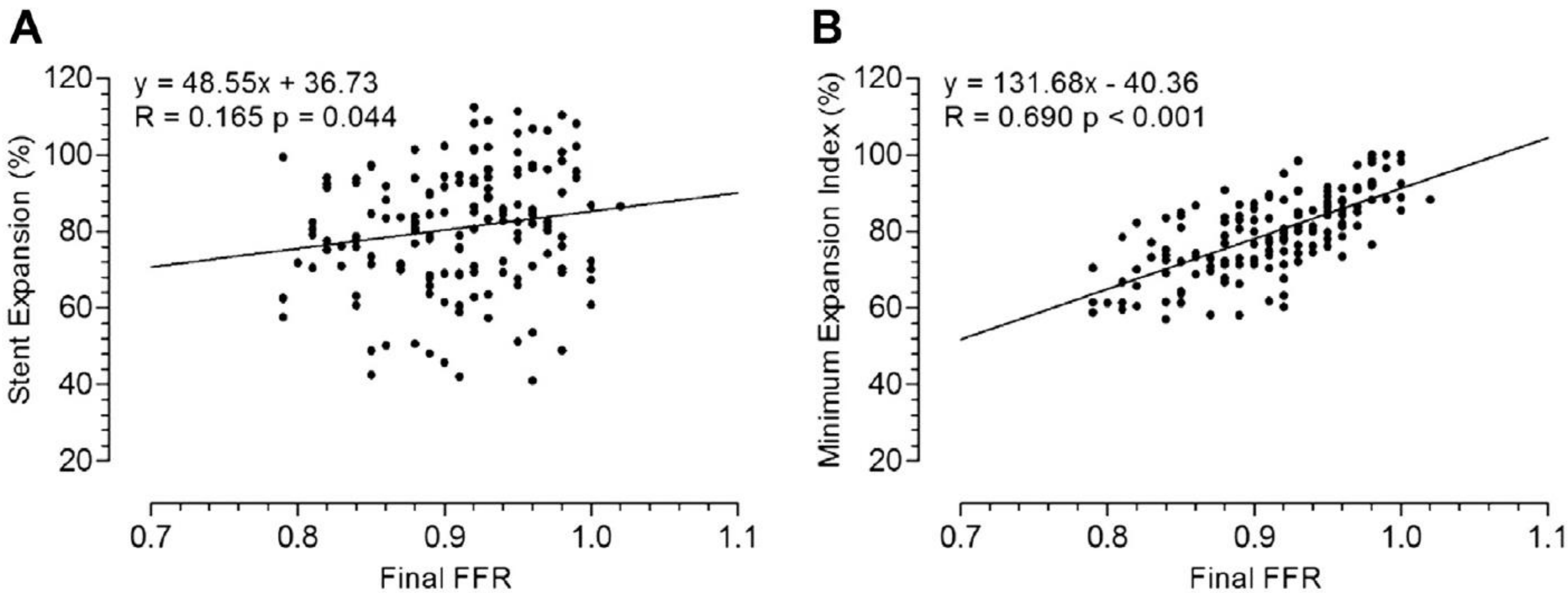
Normalized Expansion Index Value=actual lumen area/ideal lumen area X 100

MEI=cross section with lowest expansion index along the entire stented segment

Nakamura D, et al. J Am Coll Cardiol Intv 2018;11:1467-1478

Correlation of %AS with Final FFR Value for Conventional Method and New Volumetric Method

Nakamura D, et al. J Am Coll Cardiol Intv 2018;11:1467-1478



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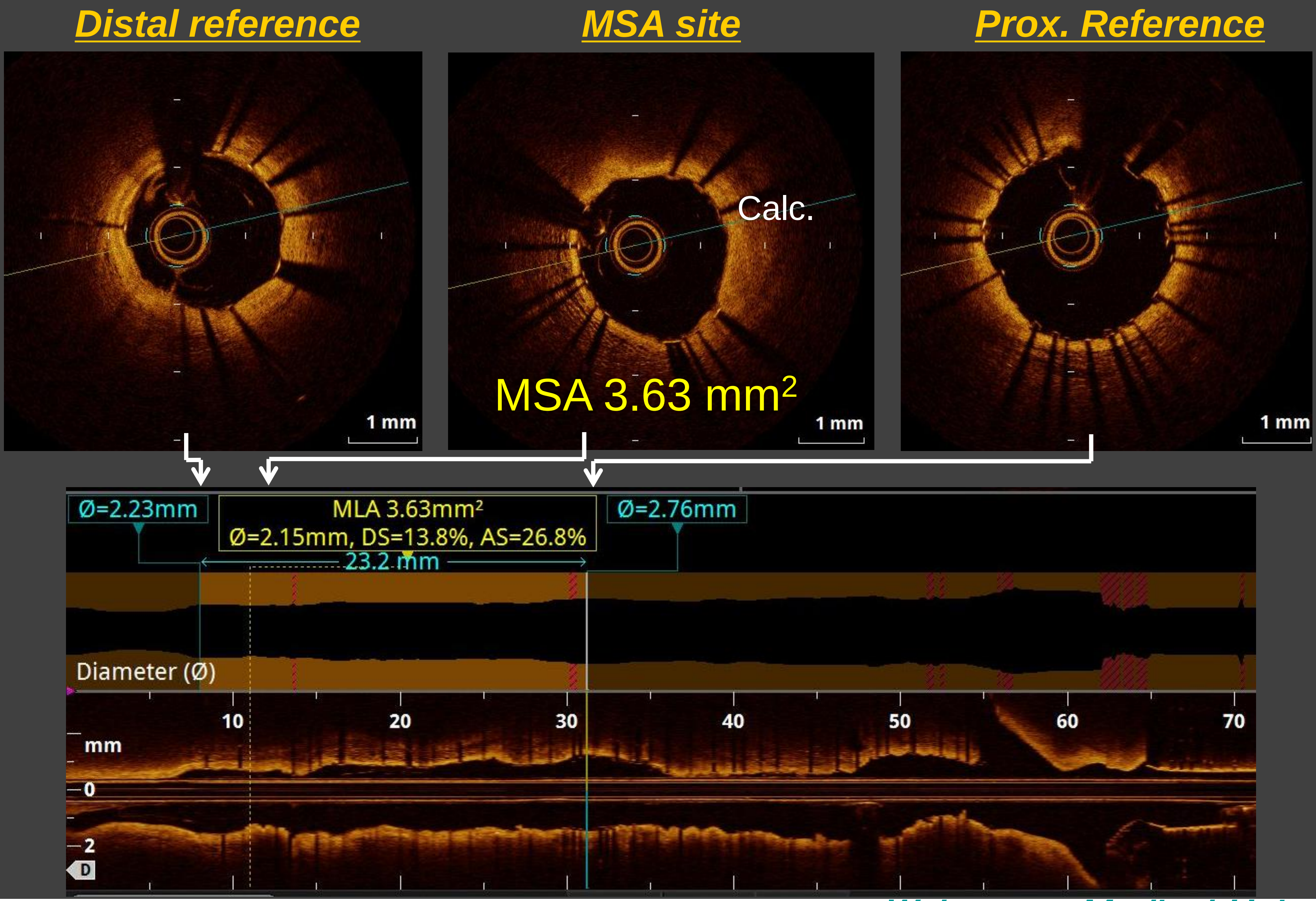
Post-PCI



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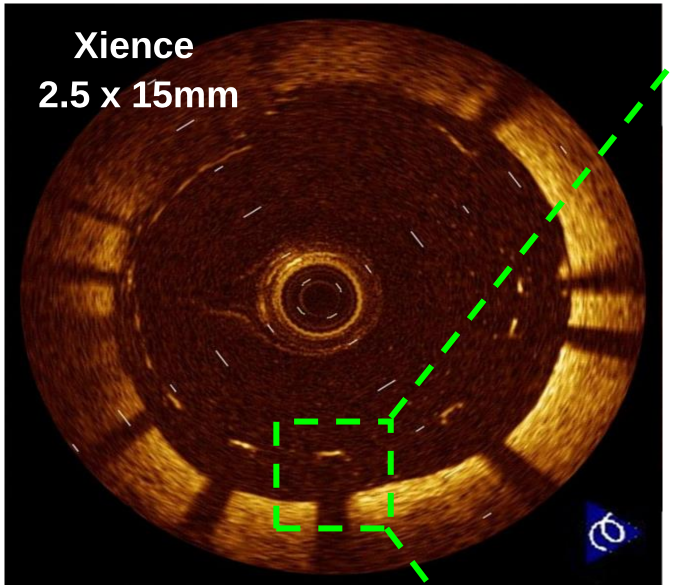
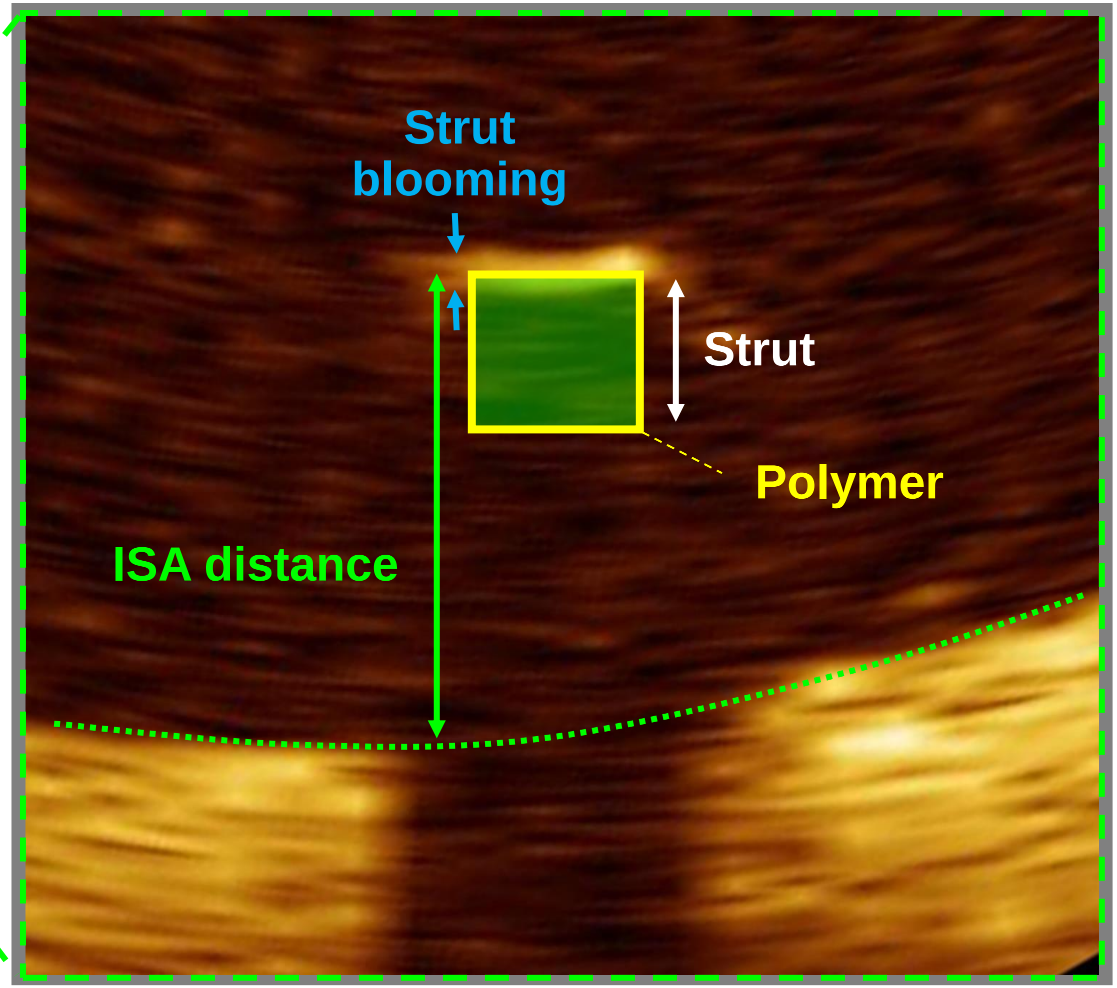
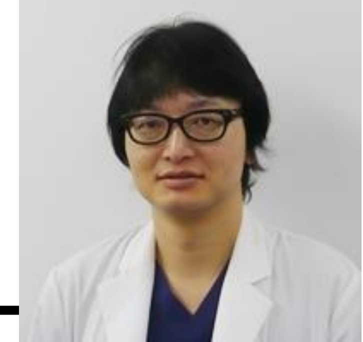
Definition of incomplete stent appostion (ISA)



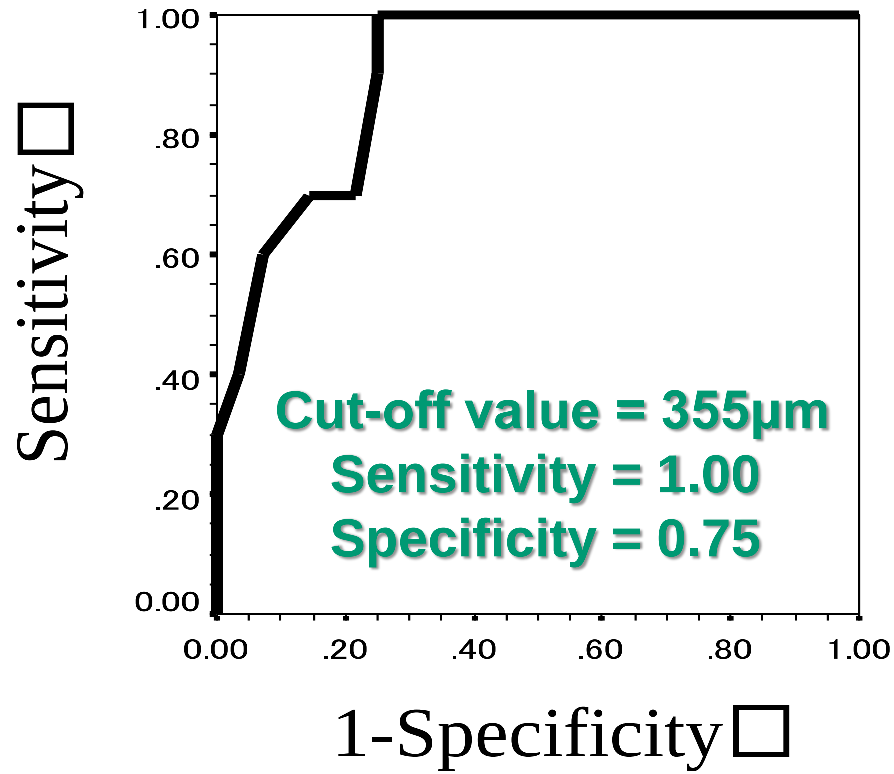


ISA was defined as a ISA distance of >100 μm in EES and >170 μm in SES.

ROC curve analysis of maximum ISA distance for predicting persistent ISA (Subanalysis of RESET study)

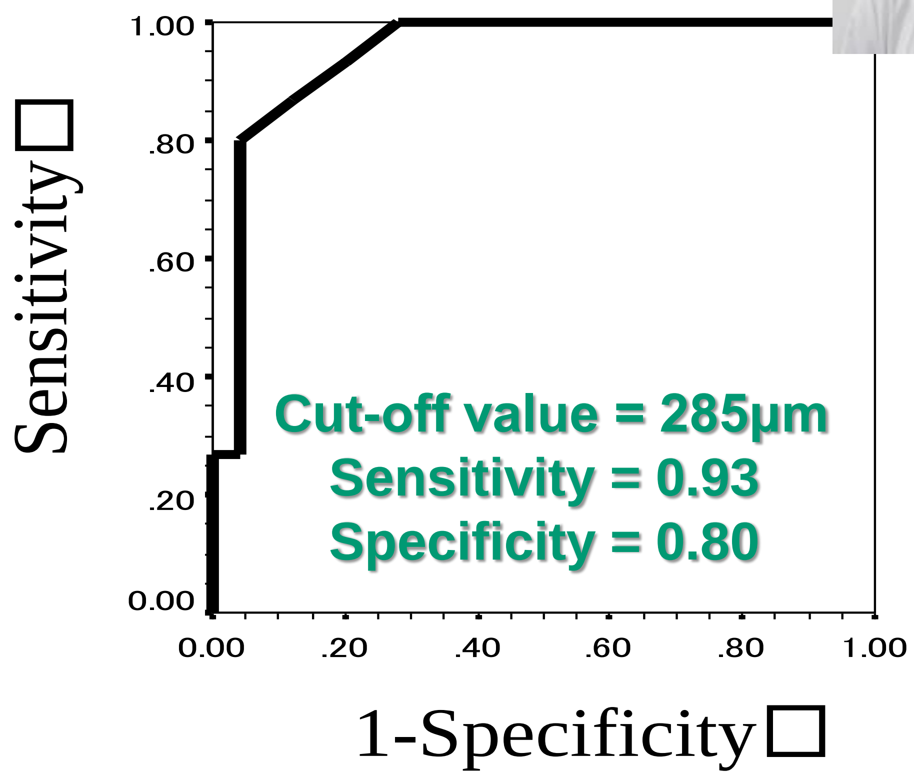


EES



ROC curve analysis identified a maximum ISA distance of EES > 355μm with as separating persistent from resolved ISA (sensitivity 100%, specificity 75%, area under the curve = 0.905; 95%CI, 0.812 to 0.999).

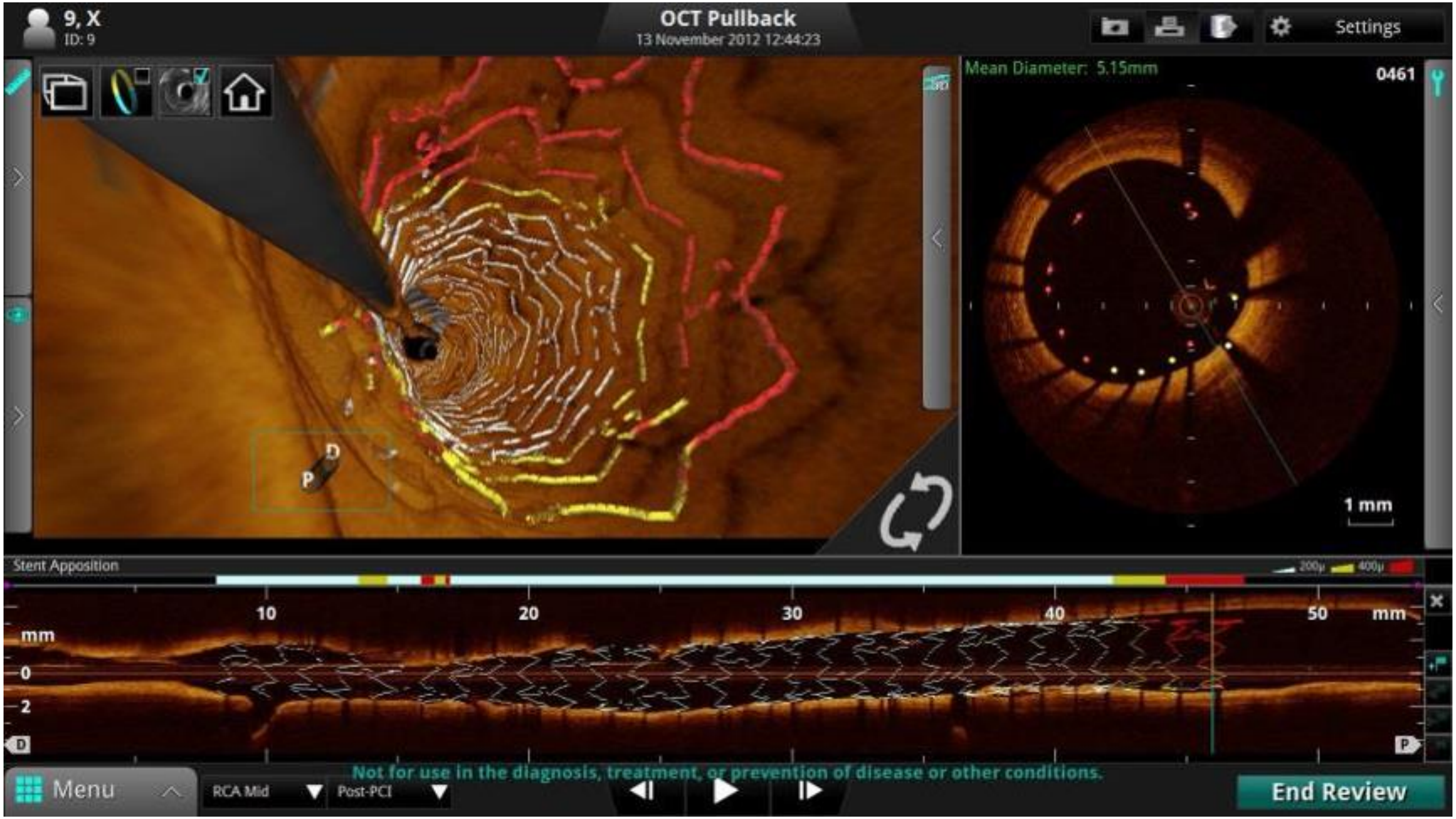
SES



ROC curve analysis identified a maximum ISA distance of SES > 285μm with as separating persistent from resolved ISA (sensitivity 93%, specificity 80%, area under the curve = 0.947; 95%CI, 0.878 to 1.015).

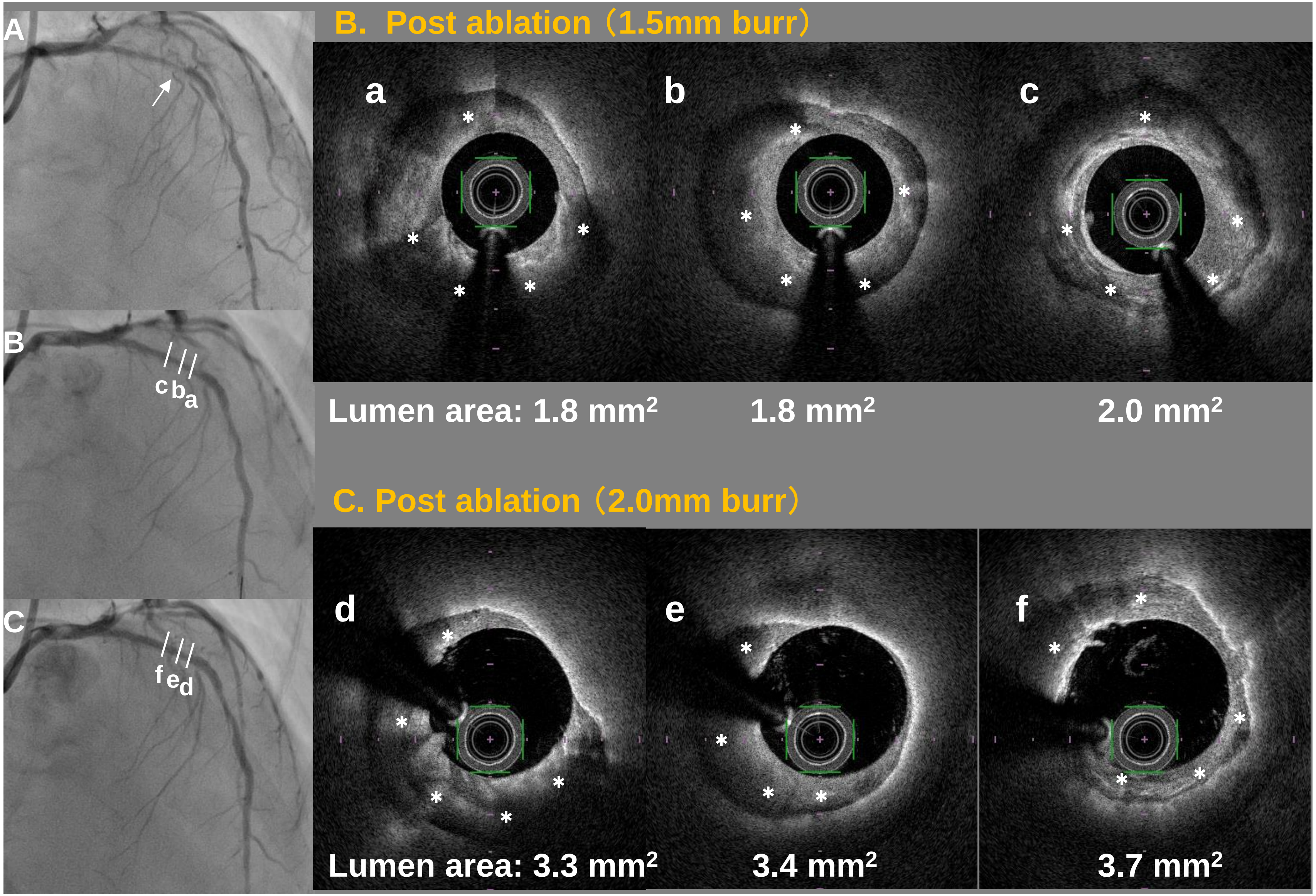
Shimamura K. et al, Eur Heart J CV Imaging 2015;16:23-28

New Development in OCT



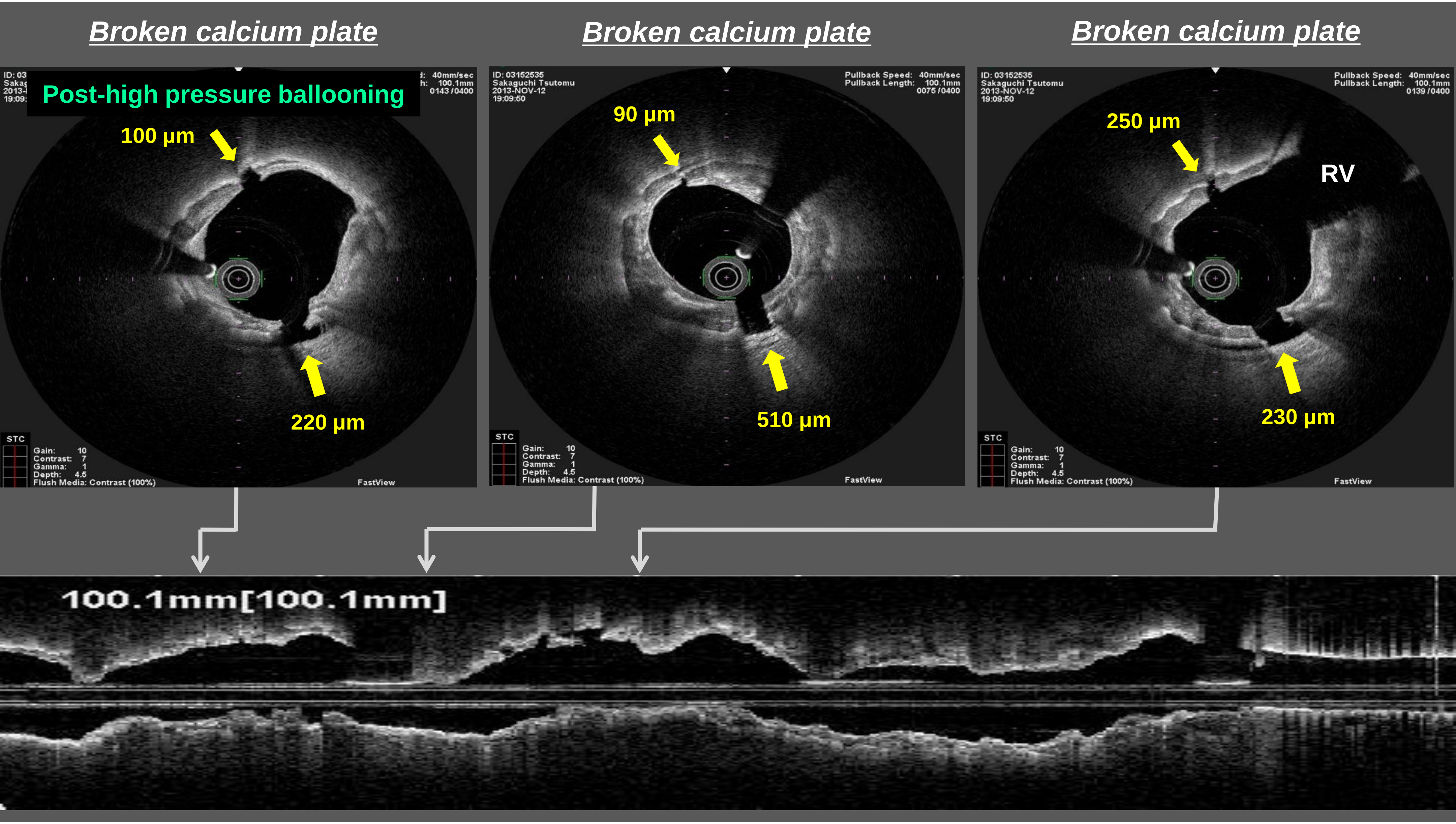
3-D reconstruction and color coded auto-detection of stent incomplete apposition can be demonstrated as fly through image by new OCT.

Step by step calcium ablation by OCT-guide

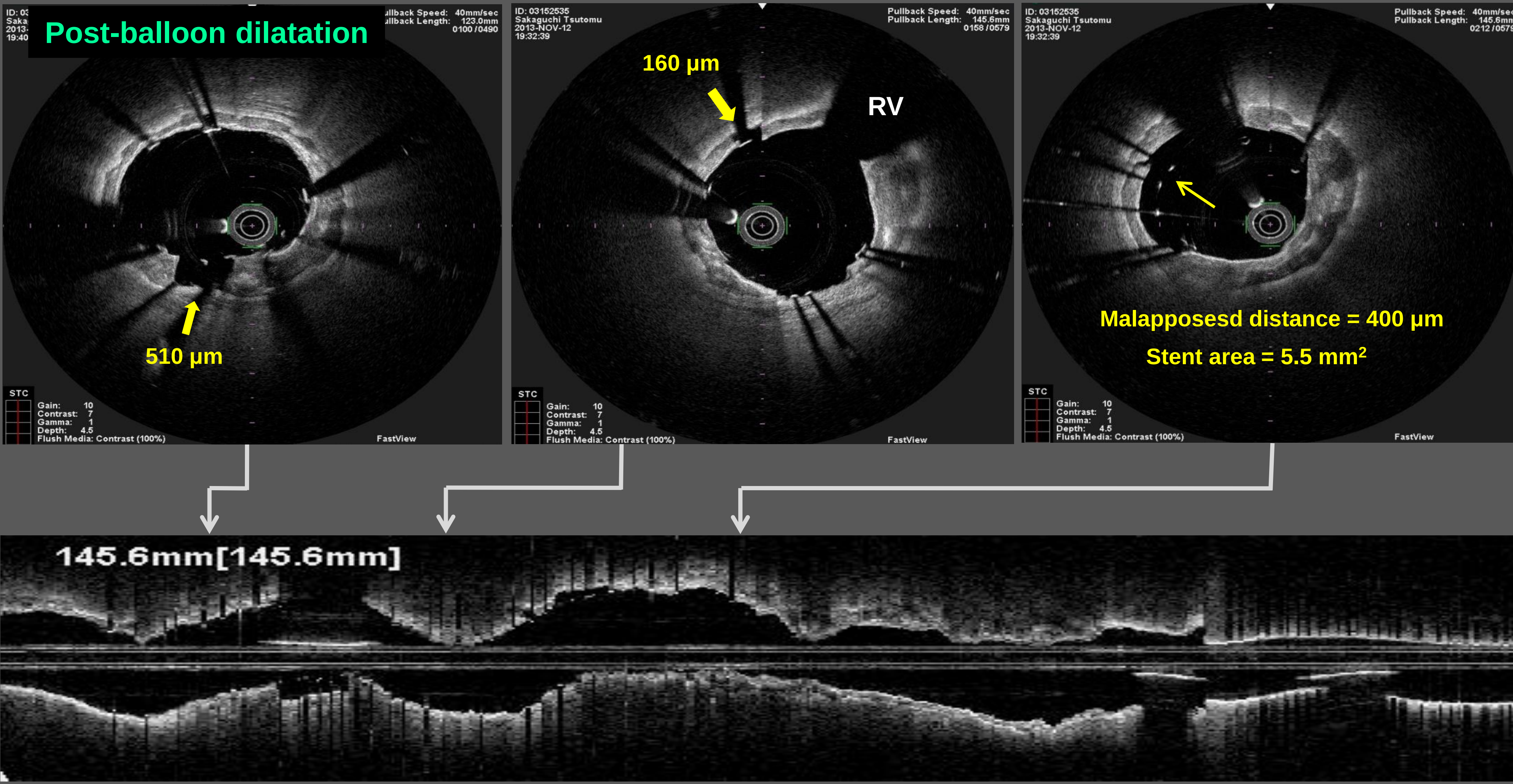


Non-stent strategy was selected because of subsequent colon cancer operation.

Making calcium fractures after rotablator by OCT-guide



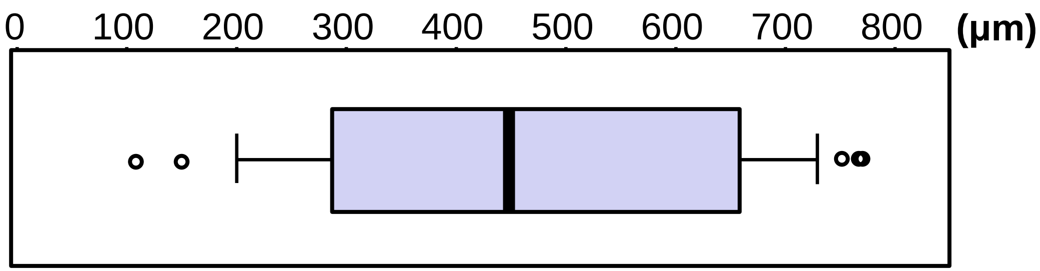
Broken calcium plate | *Broken calcium plate* | *Stent malappsoition*



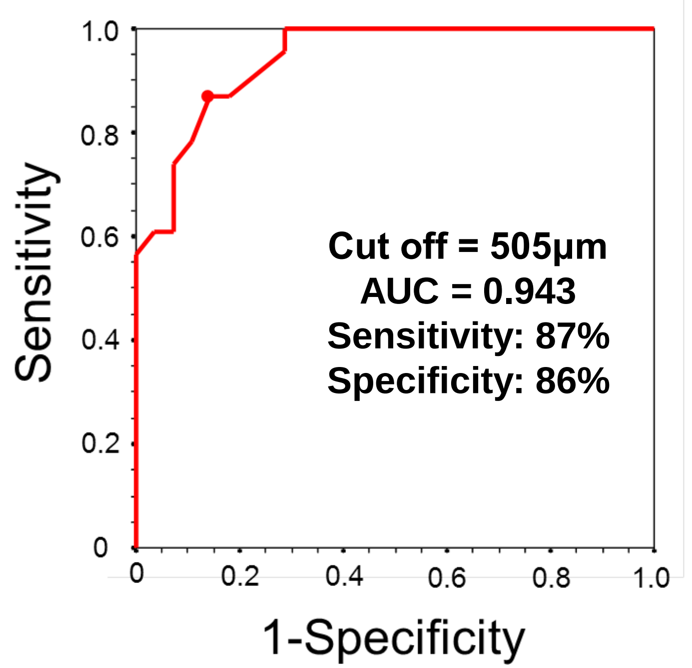
Prediction of calcium plate fracture by ballooning

OFDI was performed to assess vascular response immediately after high pressure ballooning in 61 patients with severe calcified coronary lesion.

Thickness distribution of calcium fracture



Median = 450μm; Lower quartile = 300μm; Upper quartile = 660μm; Minimum = 110μm; and Maximum = 770μm.



Conclusion: A calcium plate thickness < 505 μm was the corresponding cut-off value for predicting calcium plate fracture by high pressure ballooning.

Kubo, Akasaka et al. JACC Imag 2015;8:1228-9

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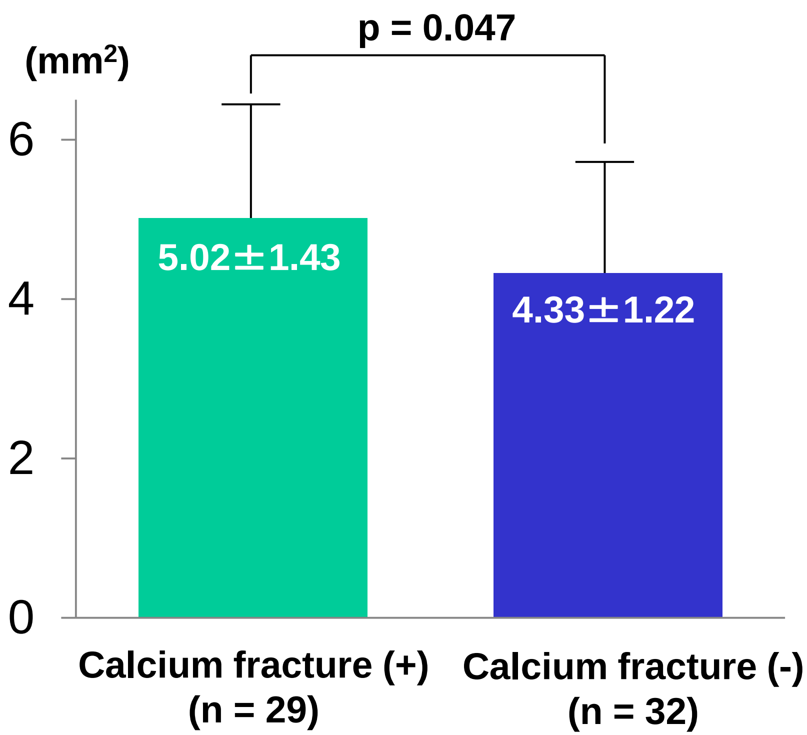
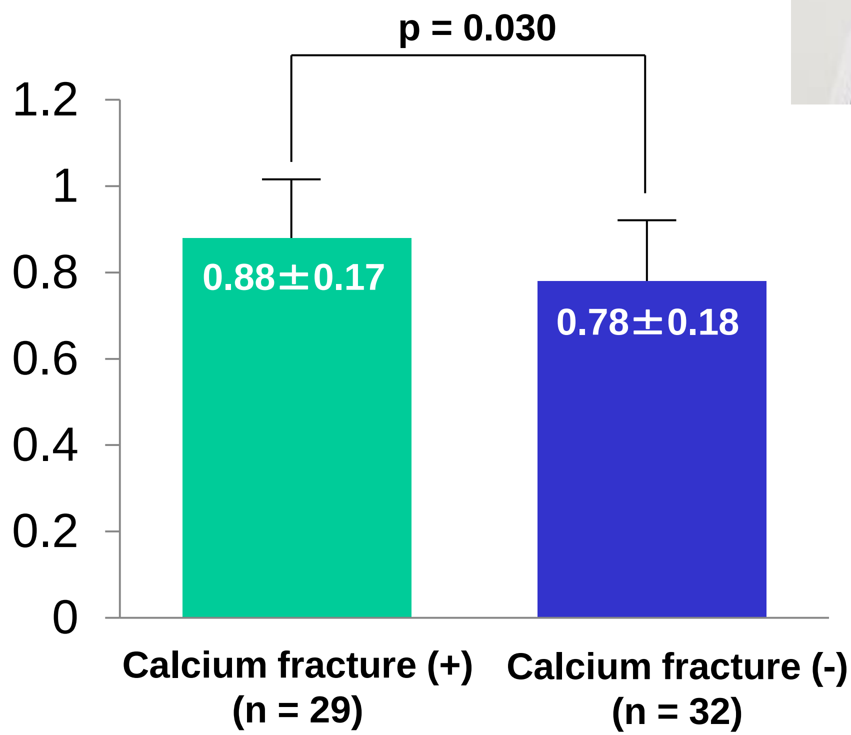
Stent expansion at post-PCI

Minimum stent area



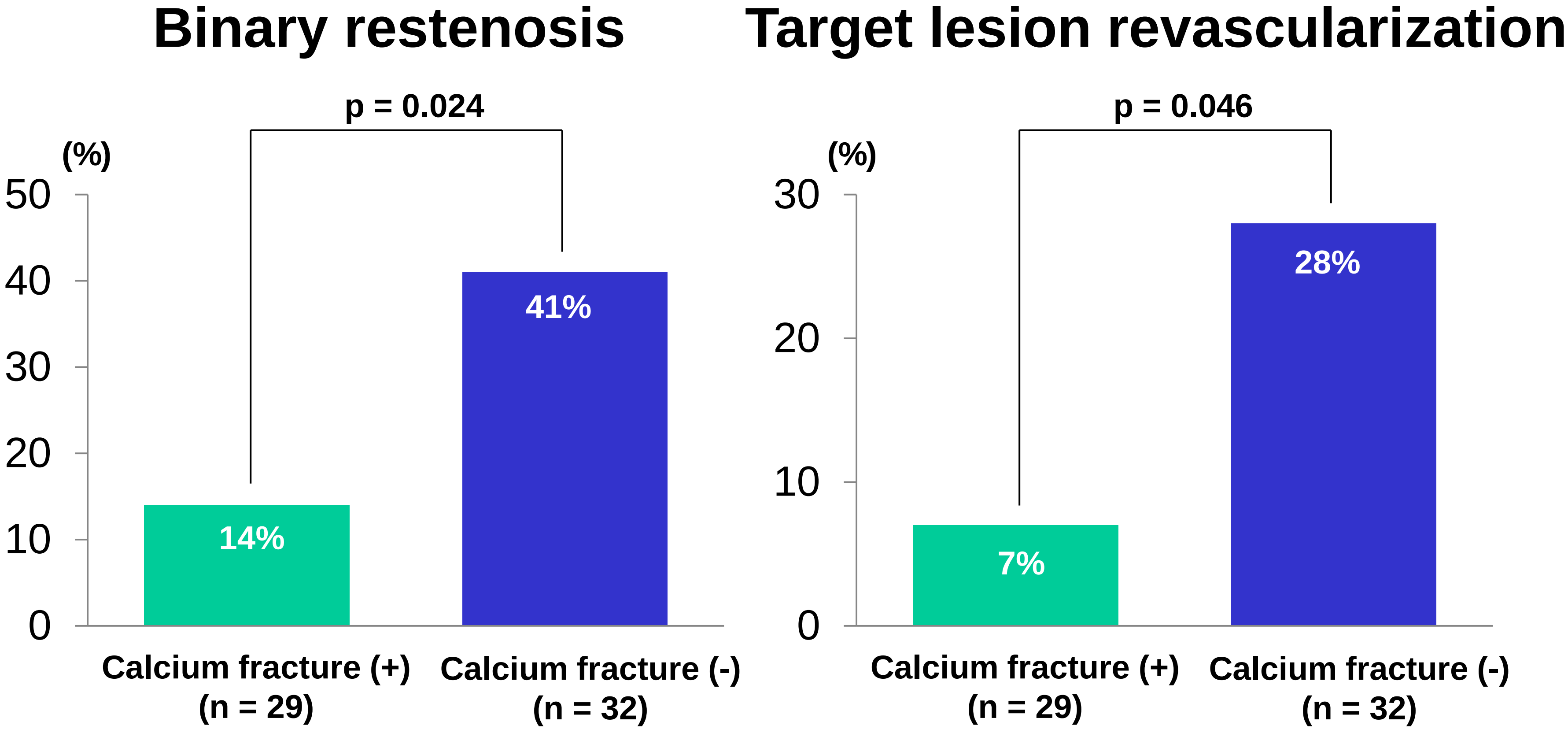
Stent expansion index



Minimum stent area and stent expansion index were significantly greater in the group with calcium fracture compared with the group without calcium fracture.

Kubo, Akasaka et al. JACC Imag 2015;8:1228-9

Restenosis and TLR at 10 months follow-up



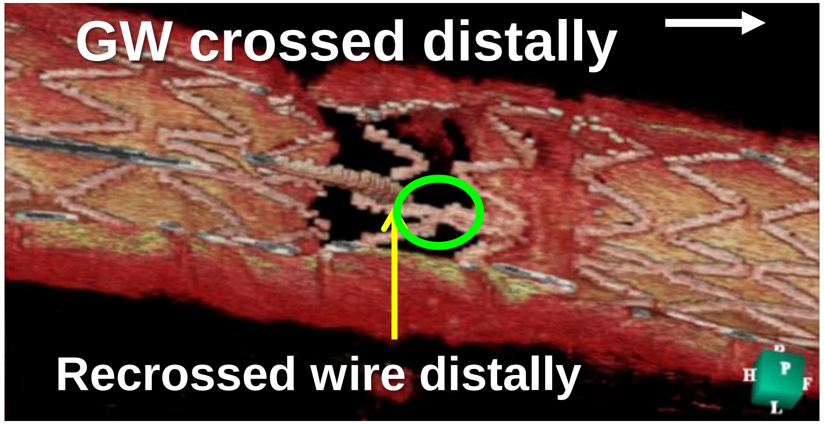
The frequency of binary restenosis and target lesion revascularization was significantly lower in the group with calcium fracture compared with the group without calcium fracture.

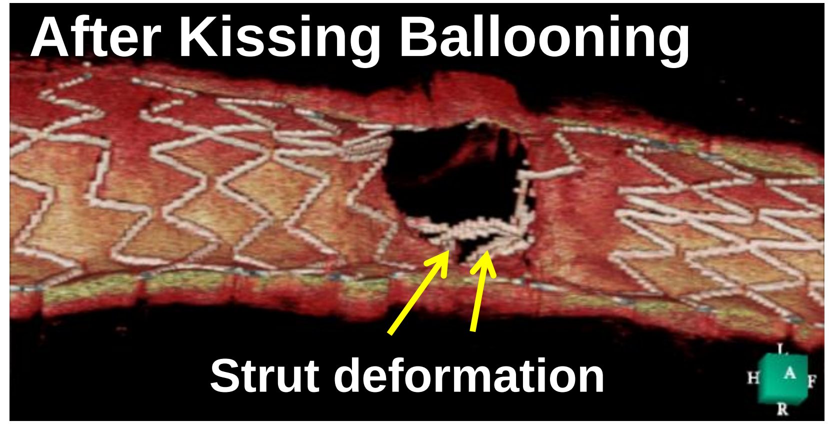
Kubo, Akasaka et al. JACC Imag 2015;8:1228-9

3D-OCT demonstration

Link connecting to carina type

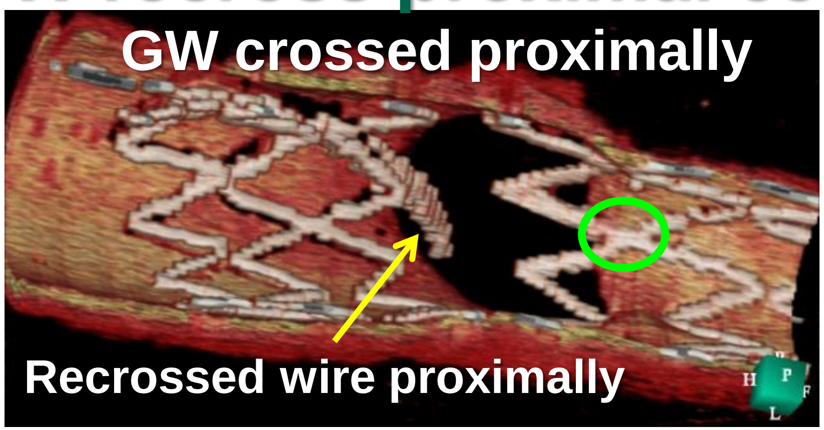
GW recross distal cell





suboptimal

GW recross proximal cell

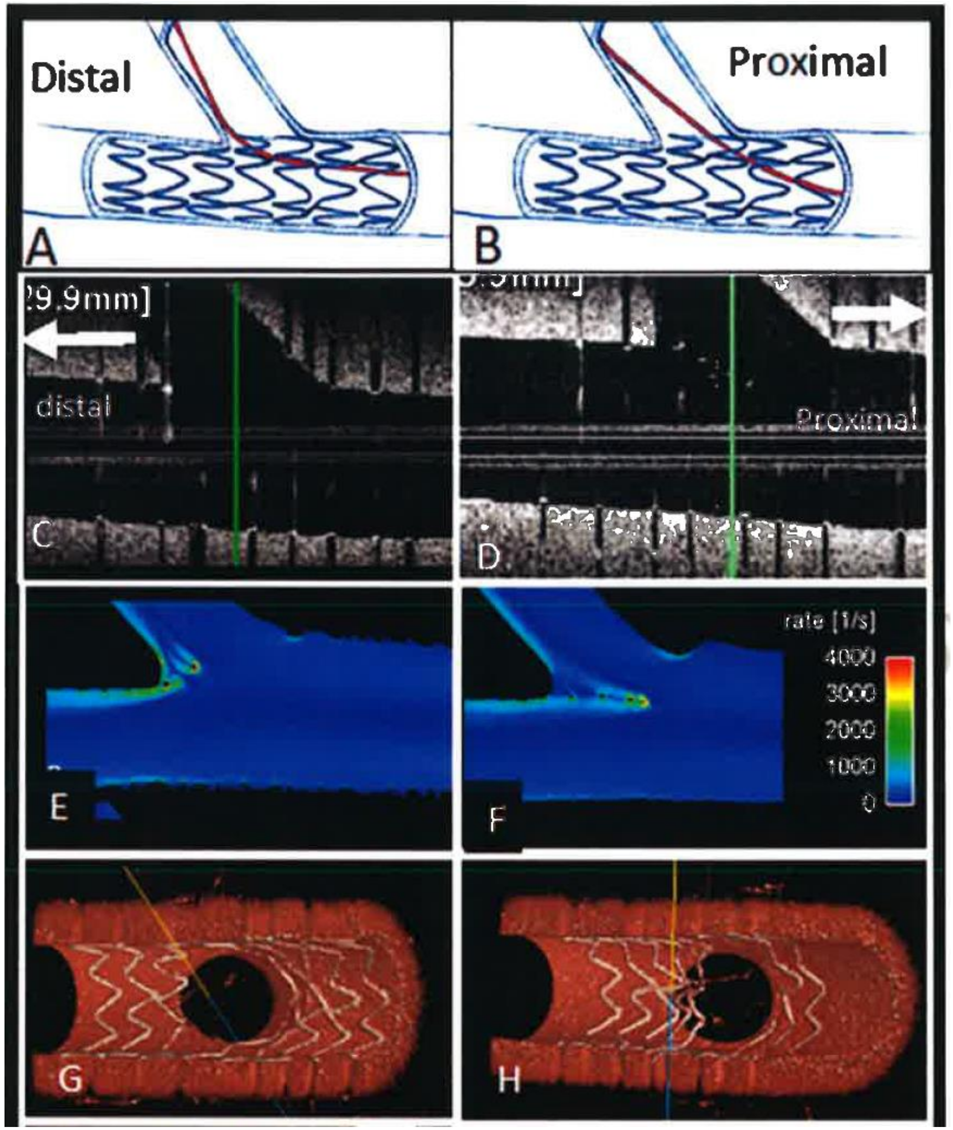


We cannot control the rink position on the side branch orifice, and it should be by chance.

Impact of the rewiring position

Strut malapposition & shear stress

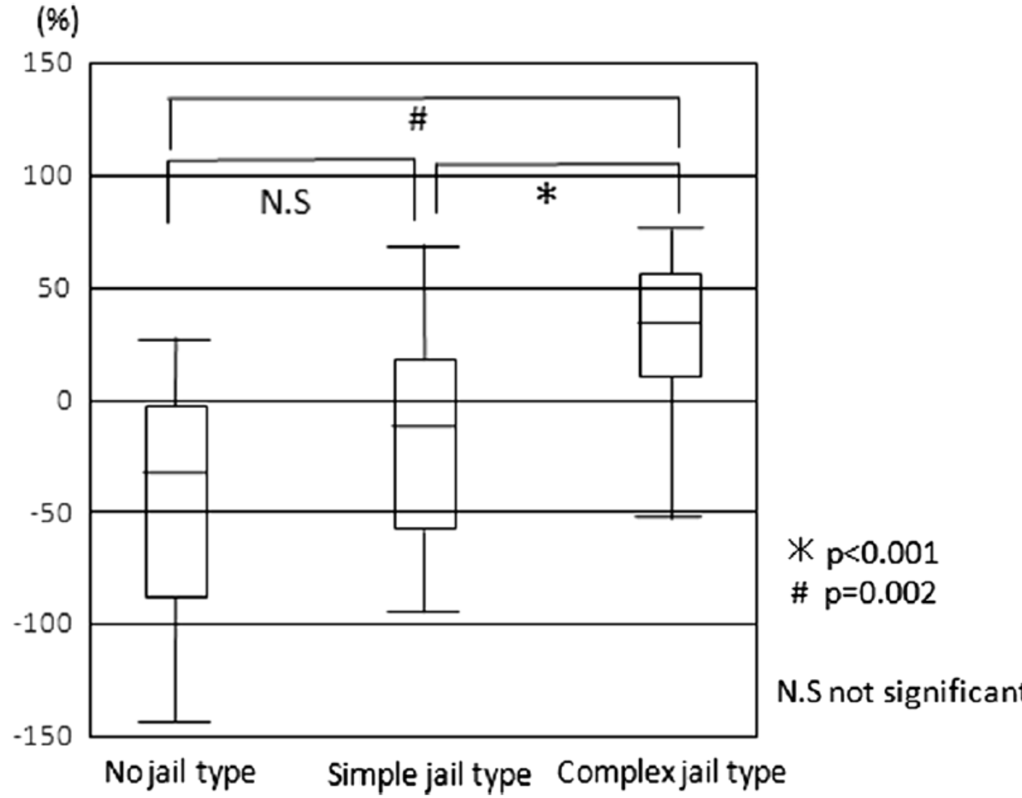
Onuma Y, et al. EuroInterv 2018, doi: 10.4244/EIJ-D-18-00391



Comparison of % reduction of the side branch flow area

Comparison among each jailed type

Nakamura T, et al. Int J CV Imag 2017;33: 797 – 806



Residual stent strut on the surface of bifurcation orifice may reduce the side branch flow area during follow up.

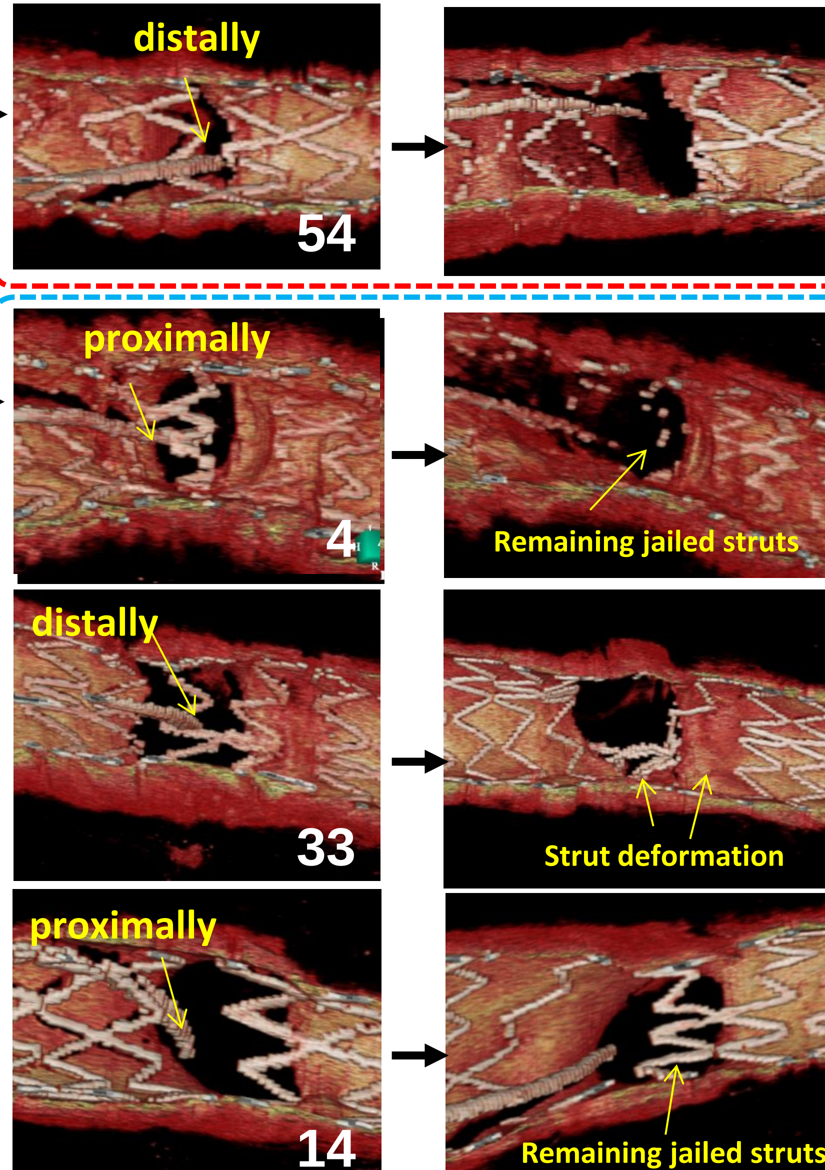
Frequency of jailing configuration & GW rewiring position

Okamura T, et al. EuroIntervention 2018;13: e1785 – e1793

105 cases

- *"Link-free type"* 58
- *"Link-connecting to carina* type" **47**

Guidewire recrossing	After kissing ballooning	Group
Link-free type: distally 54		Optimal 54 cases
Link-free type: proximally 4	Remaining jailed struts	Suboptimal 51 cases
Link-connecting to carina type: distally 33	Strut deformation	Suboptimal 51 cases
Link-connecting to carina type: proximally 14	Remaining jailed struts	Suboptimal 51 cases



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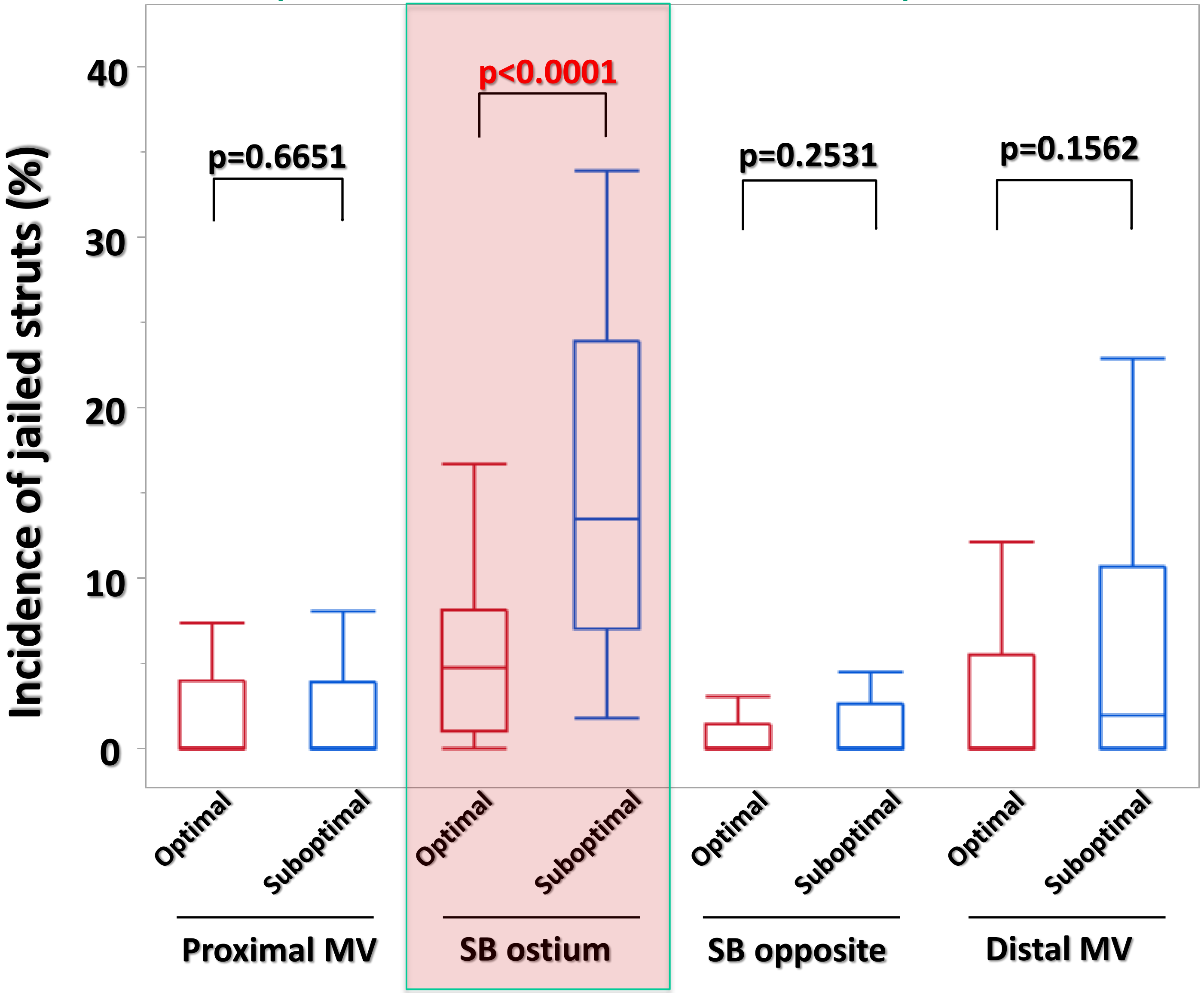
Incidence of ISA at each segment

Okamura T, et al. EuroIntervention 2018;13:e1785-e1793



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Angiographic ISR at 9 Month

Okamura T, et al. EuroIntervention 2018;13:e1785-e1793

	All	Optimal	Suboptimal	P value
n	87	48	39	
ISR	12(13.8%)	4(8.3%)	8(20.5%)	0.1254
PMV	0(0%)	0(0%)	0(0%)	-
DMV	1(1.1%)	1(2.1%)	0(0%)	1.0000
Side Br Orifice	12(13.8%)	4(8.3%)	8(20.5%)	0.1254

Japanese registry for 3-D OCT guided bifurcation stenting

Study population

600 bifurcation lesions

Side branch opening guided by 3-D OCT:400

Optimal

Suboptimal

No side branch opening:200

Primary endpoint

Incidence of side branch restenosis at 1 year.

Secondary endpoint

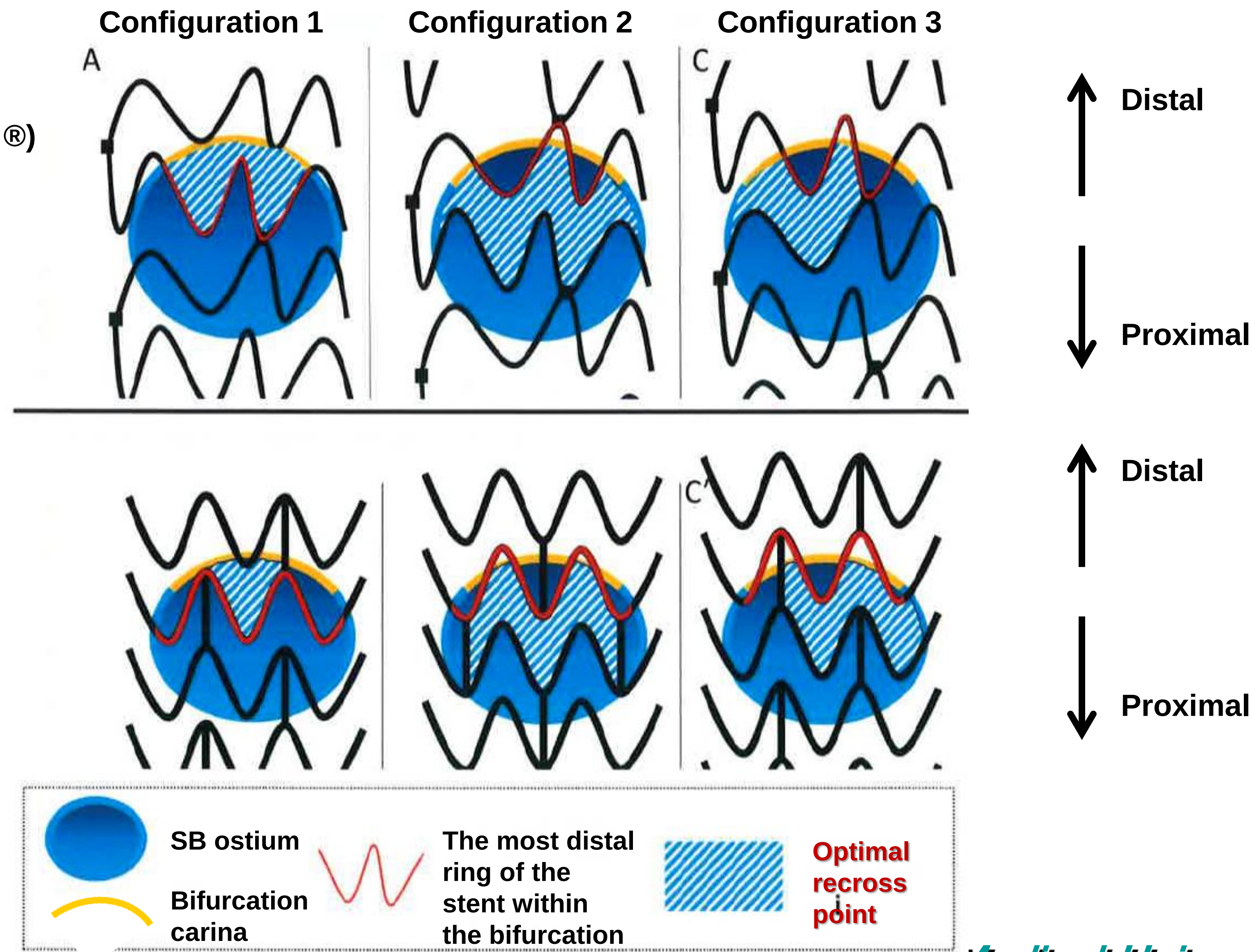
MACE at 3 years

Optimal rewiring point in side branch ostium accoroding to different configurations of overhanging struts

Onuma Y, et al. EuroInterv 2018;accepted

Out-of-phase,
Peak to peak design
(Ultimaster ® , Resolute ®)

In-phase,
Peak to valley design
(Xience ®)



wakayama Medical University

ESC European Society of Cardiology
European Heart Journal (2018) **00**, 1–96
doi:10.1093/eurheartj/ehy394

2018 ESC/EACTS Guidelines on myocardial revascularization

The Task Force on myocardial revascularization of the European Society of Cardiology (ESC Cardio-Thoracic Surgery (

Developed with the special Association for Percutaneo

Authors/Task Force Members: Fr (Germany), Miguel Sousa-Uva*[1] ((Sweden), Fernando Alfonso (Spa (UK), Robert A. Byrne (Germany (Germany), Stuart J. Head[1] (The Adnan Kastrati (Germany), Akos Josef Niebauer (Austria Dirk Sibbing (Germany (Switzerland), Rashmi Yadav[1] (U

Document Reviewers: William Wijns (ESC Co-ordinator) (Canada), Victor Aboyans ((Norway), Felicita Andreotti (Italy), Eman (Canada), Héctor Bueno (Spain), Patrick A

Recommendations on intravascular imaging for procedural optimization

Recommendations	Class[a]	Level[b]
IVUS or OCT should be considered in selected patients to optimize stent implantation.[603,612,651–653]	IIa	B
IVUS or OCT should be considered to optimize treatment of unprotected left main lesions.[35]	IIa	B

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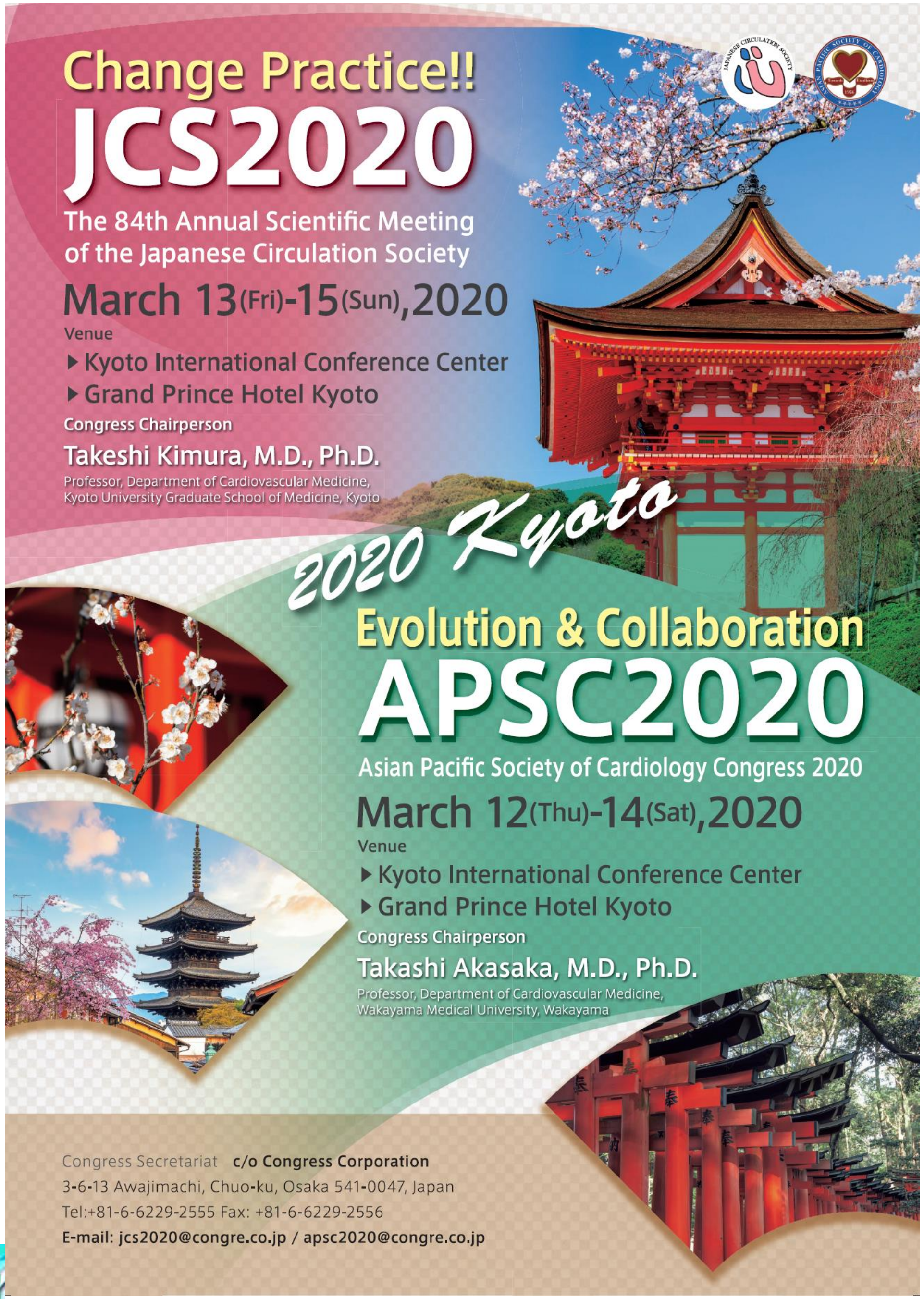
Take home message

- Pre- & post-PCI lesion morphology can be assessed easily and precisely by OCT because of higher resolution with high frame rate, auto-pullback & auto-measurement systems, and 3D reconstruction, etc.

- Improvement of clinical outcomes in bifurcation lesion PCI can be expected by the guidance of 3D-OCT, although there are not enough data to support the reduction of the adverse clinical events using OCT guided PCI for bifurcation lesions at the moment.

- Randomized prospective studies with greater number of study population should be planned to demonstrate the improvement of clinical outcome by OCT-guided PCI for specific lesions such as diffuse lesion, severe calcified lesion, and LM bifurcation lesions in the near future.

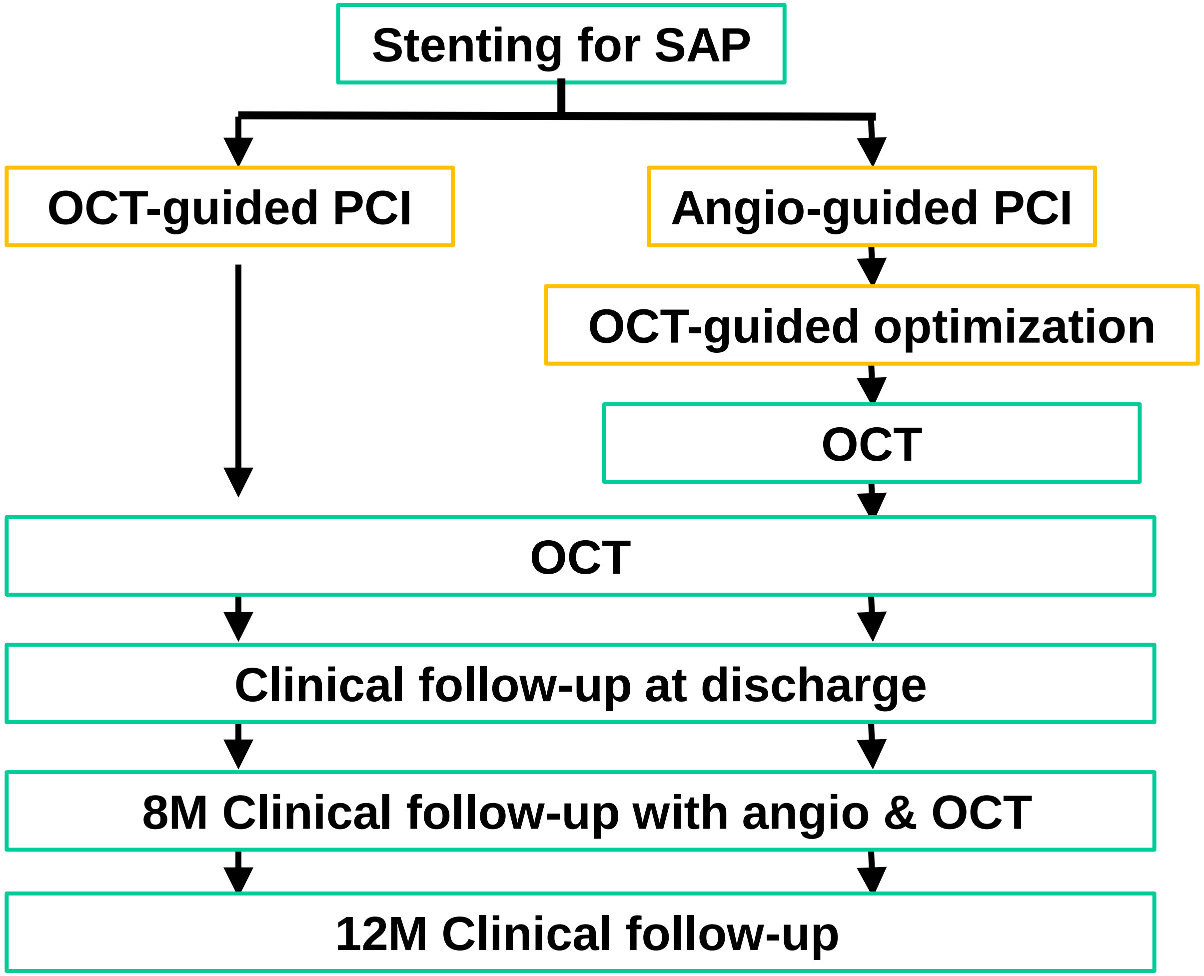


Thank you for your kind attention !!

Welcome to APSC 2020 in Kyoto, Japan!!

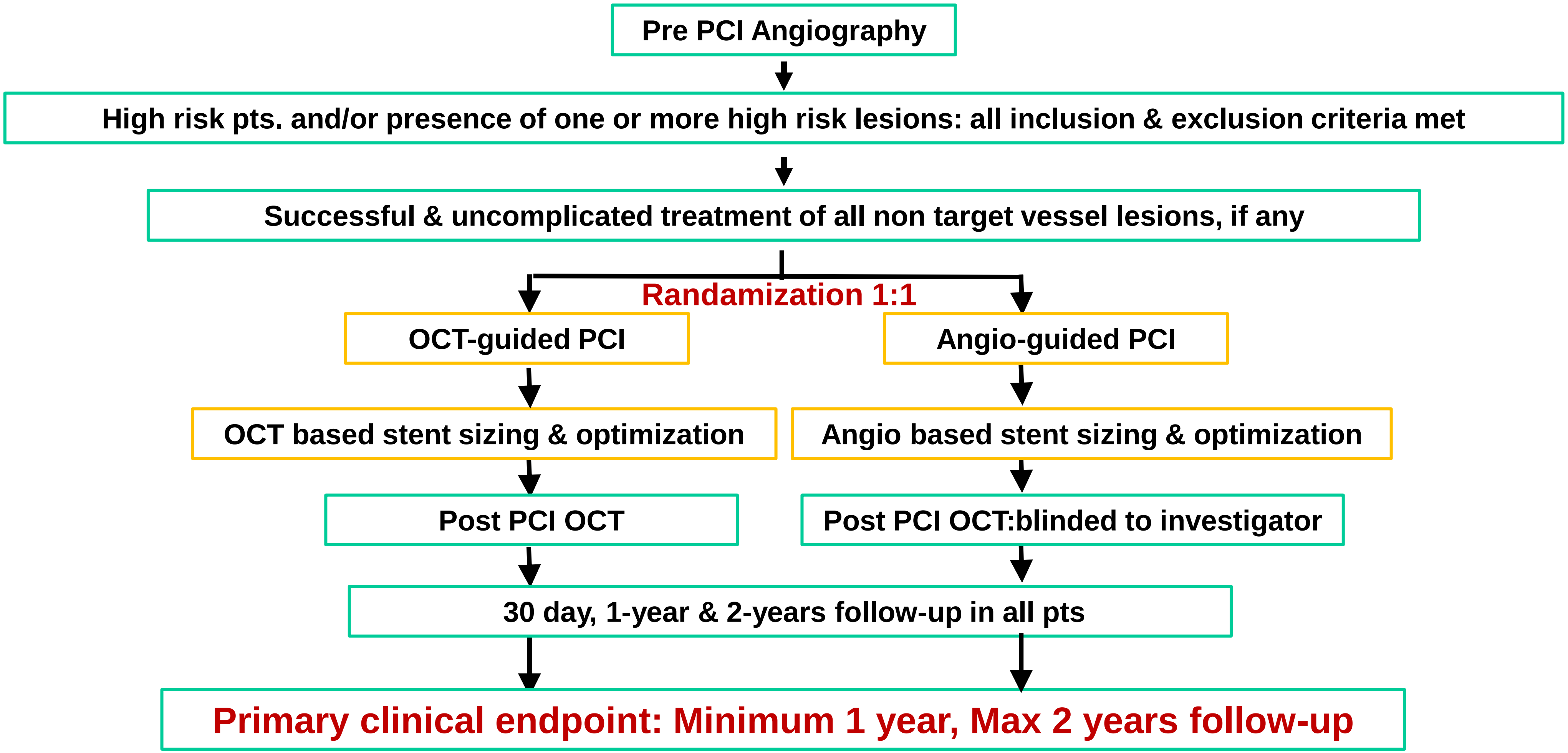
COCOA

Comparison between Optical Coherence tomography guidance and Angiography Guidance in percutaneous coronary intervention



ILUMIEN IV: OPITIMAL PCI

Optical Coherence Tomography guided Coronary Stent Implantation Compared to Angiography: a Multicenter Randamized Trial in PCI

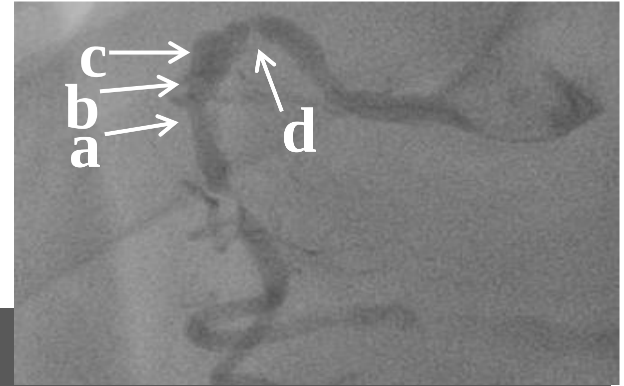


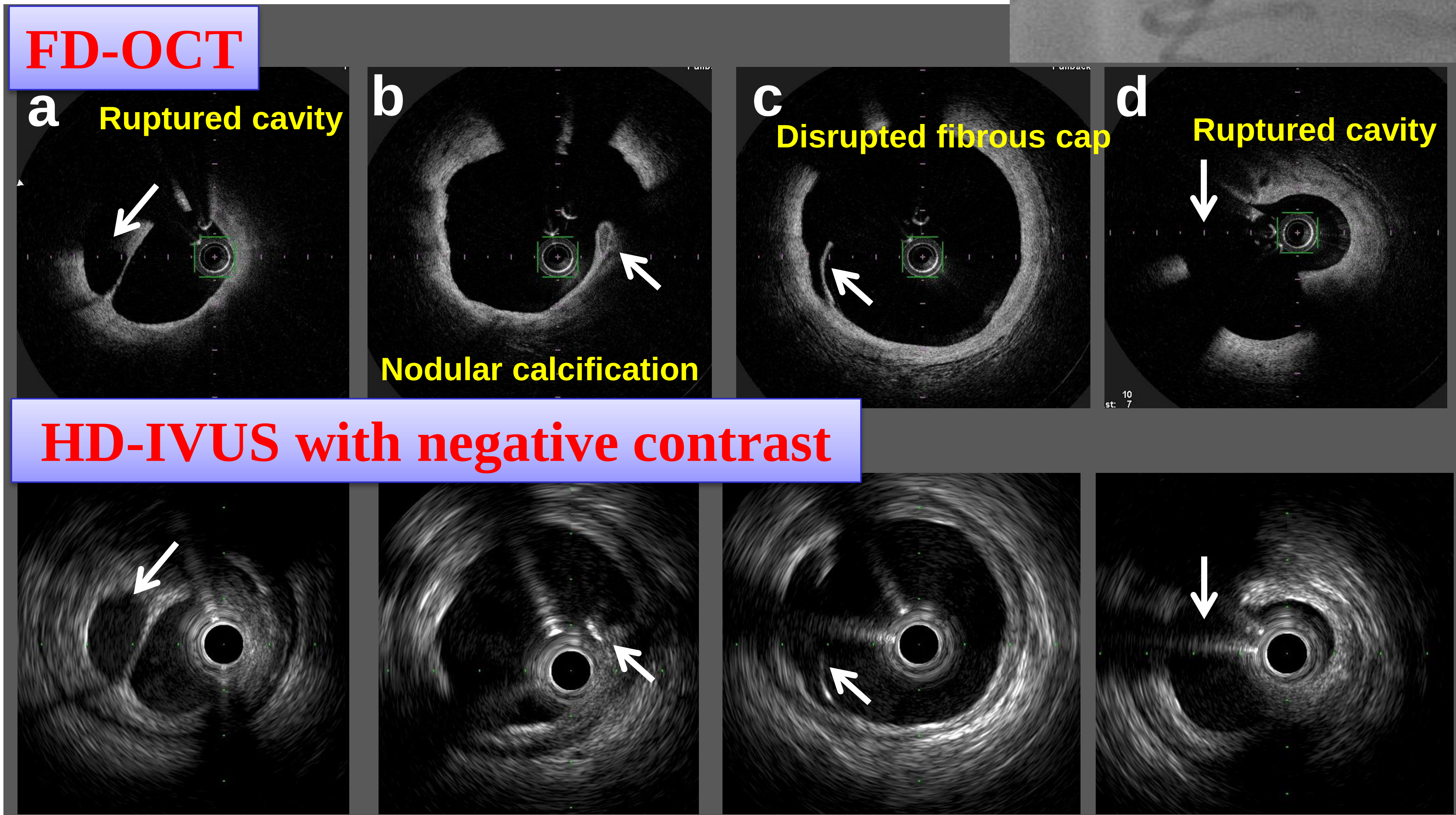
Comparison of HD-IVUS system with OCT

Feature	ACIST HDi / Kodama	Boston Scientific	Volcano FACT	Nipro InfraReDx	Abbott Vascular OCT
Frequency or Wavelength	60 MHz	55 MHz	NA	50 MHz	**1.3 μm**
Nature of the Energy	Ultrasound				**Optical**
Axial Resolution	40 μm	22 μm	<50 μm	20 μm	**15 μm**
Lateral Resolution	90 μm	50-140 μm	100-200 μm	<200 μm	**40 μm**
Soft Tissue Penetration	> 2.5 mm	>3.5 mm			**0.8-1.2 mm***
Blood Penetration	> 3.4 mm	>4.0 mm			**≤ 1.2 mm**
Pullback Speed (mm/s)	0.5, 1.0, 2.5, 5.0, 10	0.5,1.0		0.5	**20**
Pullback Length (mm)	130	100		150	**75**

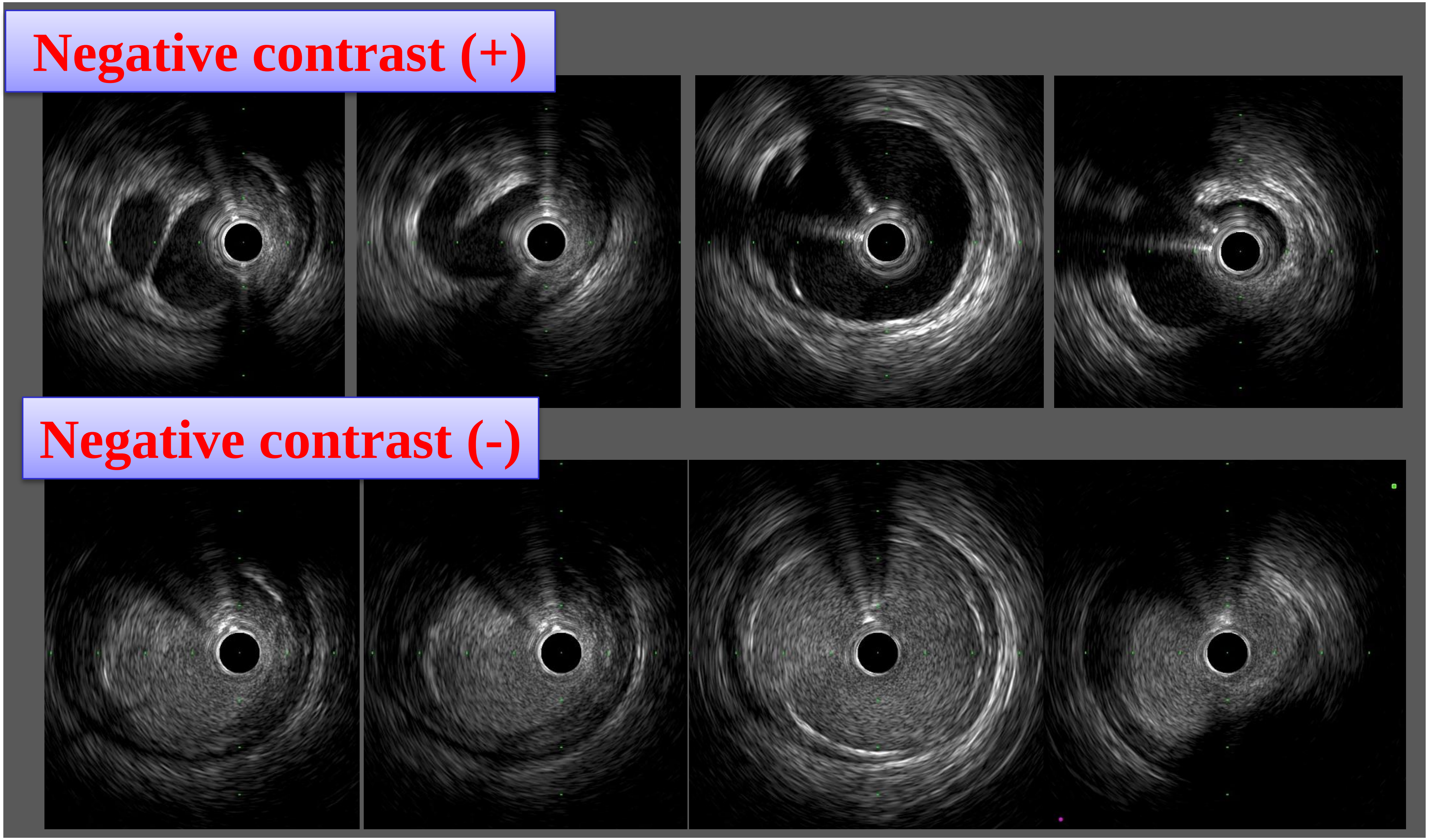
* **Soft Tissue Penetration with contrast injection to achieve blood clearing.**

FD-OCT and HD-IVUS (Pre PCI)

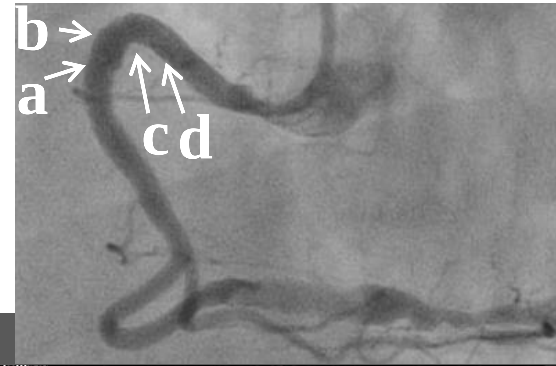


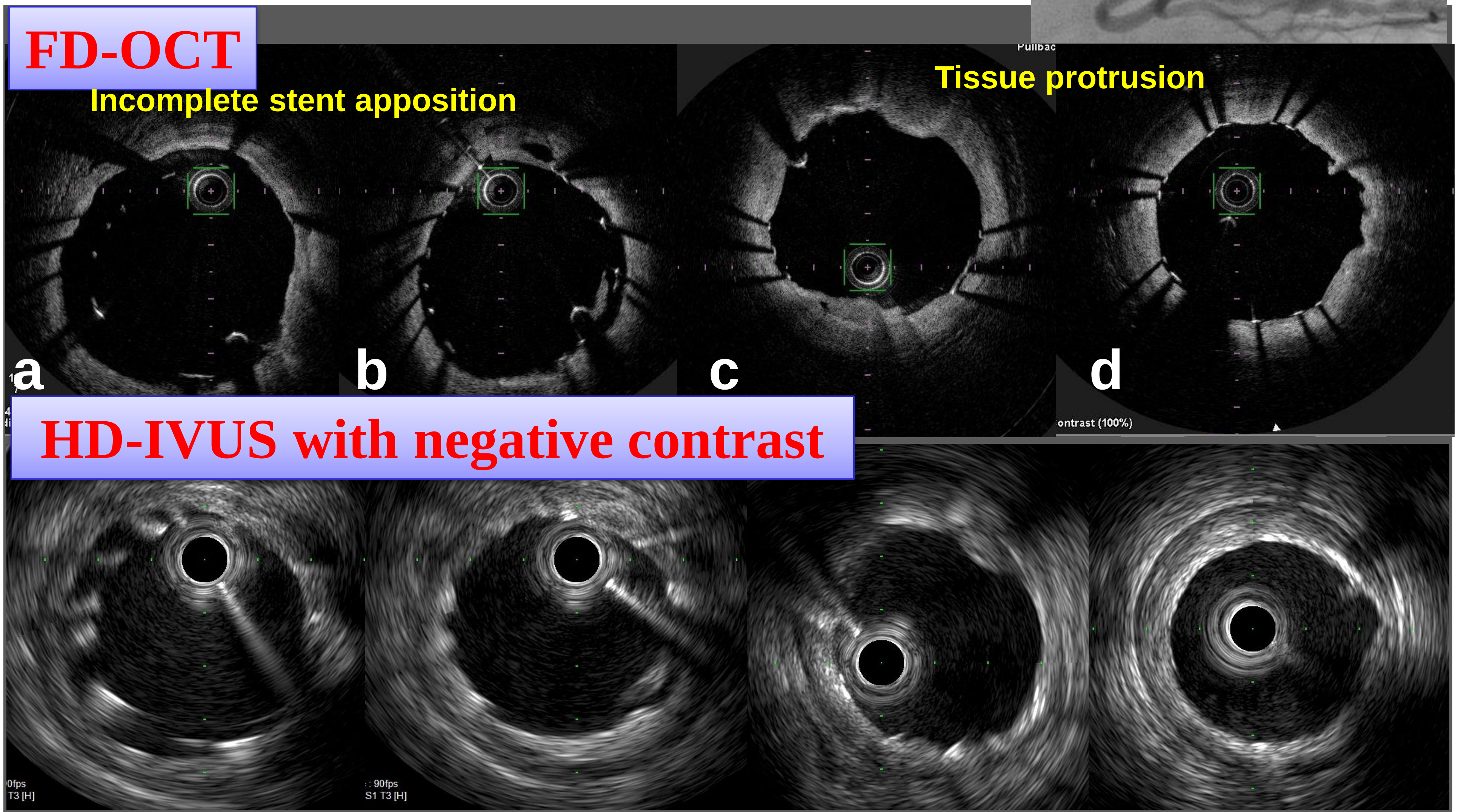


HD-IVUS images with & without negative contrast (Pre PCI)



FD-OCT and HD-IVUS (Post PCI)





HD-IVUS images with & without negative contrast (Post PCI)