



BVS Scaffold Thrombosis The Role of OCT



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The Role of OCT

Experience with BVS

The Role of OCT Experience with BVS

BVS-Thrombosis at Day 2 after PCI LAD :

The Role of OCT

Experience with BVS

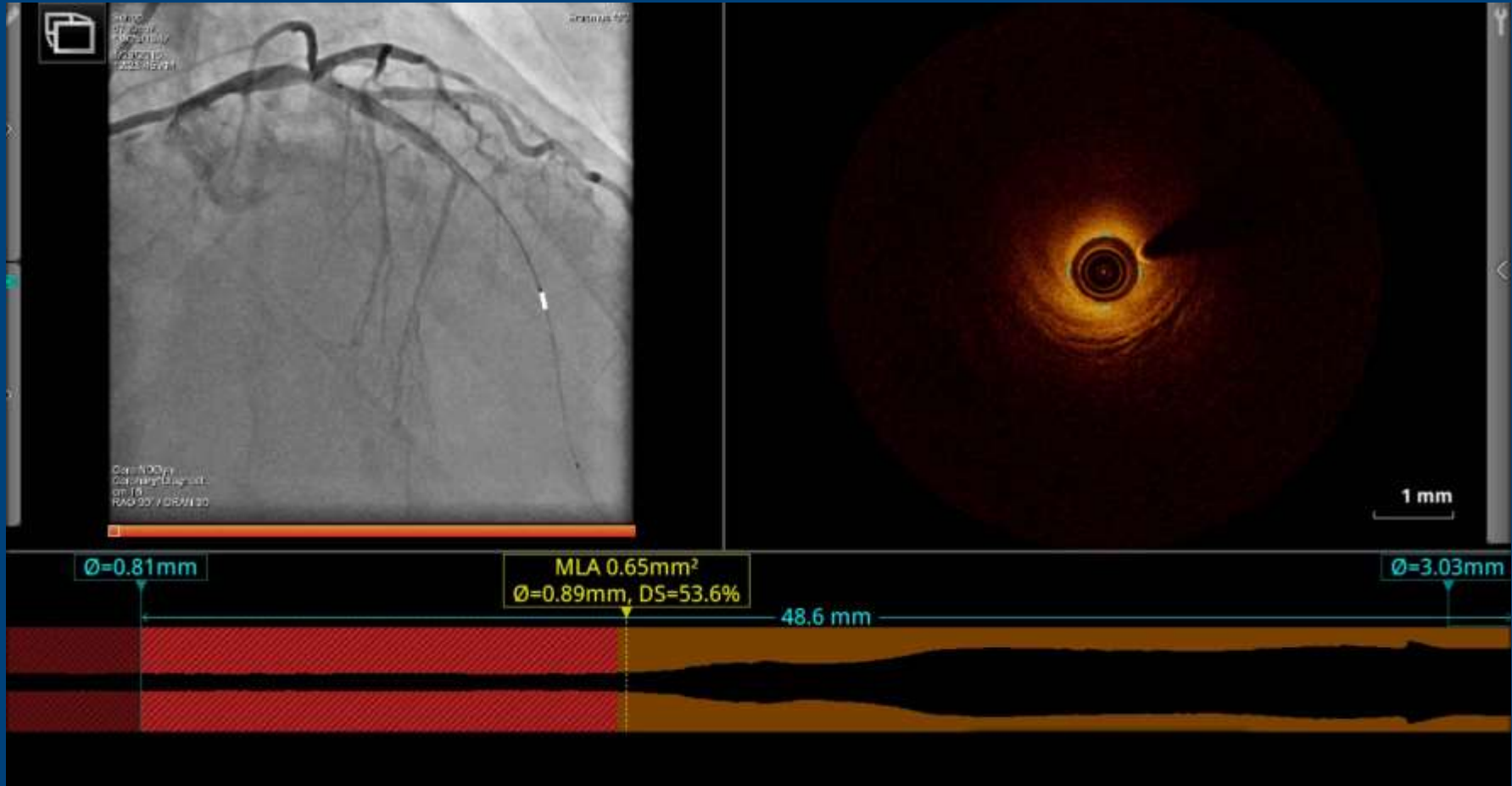
BVS-Thrombosis at Day 2 after PCI LAD (BVS 3.5/18mm):



LAD: Event

The Role of OCT Experience with BVS

BVS-Thrombosis at Day 2 after PCI LAD (BVS 3.5/18mm):

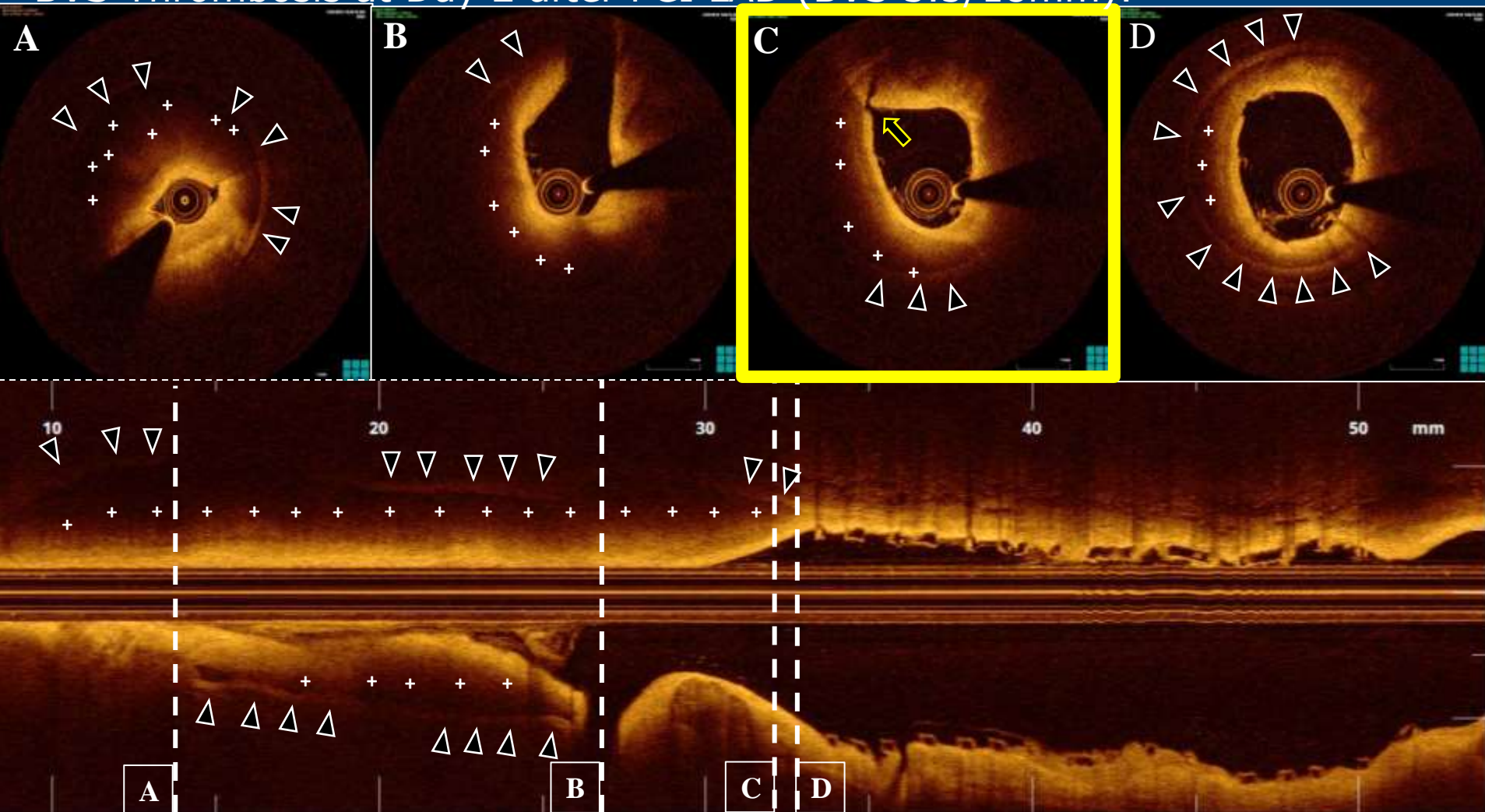


Optisi St.Jude

The Role of OCT

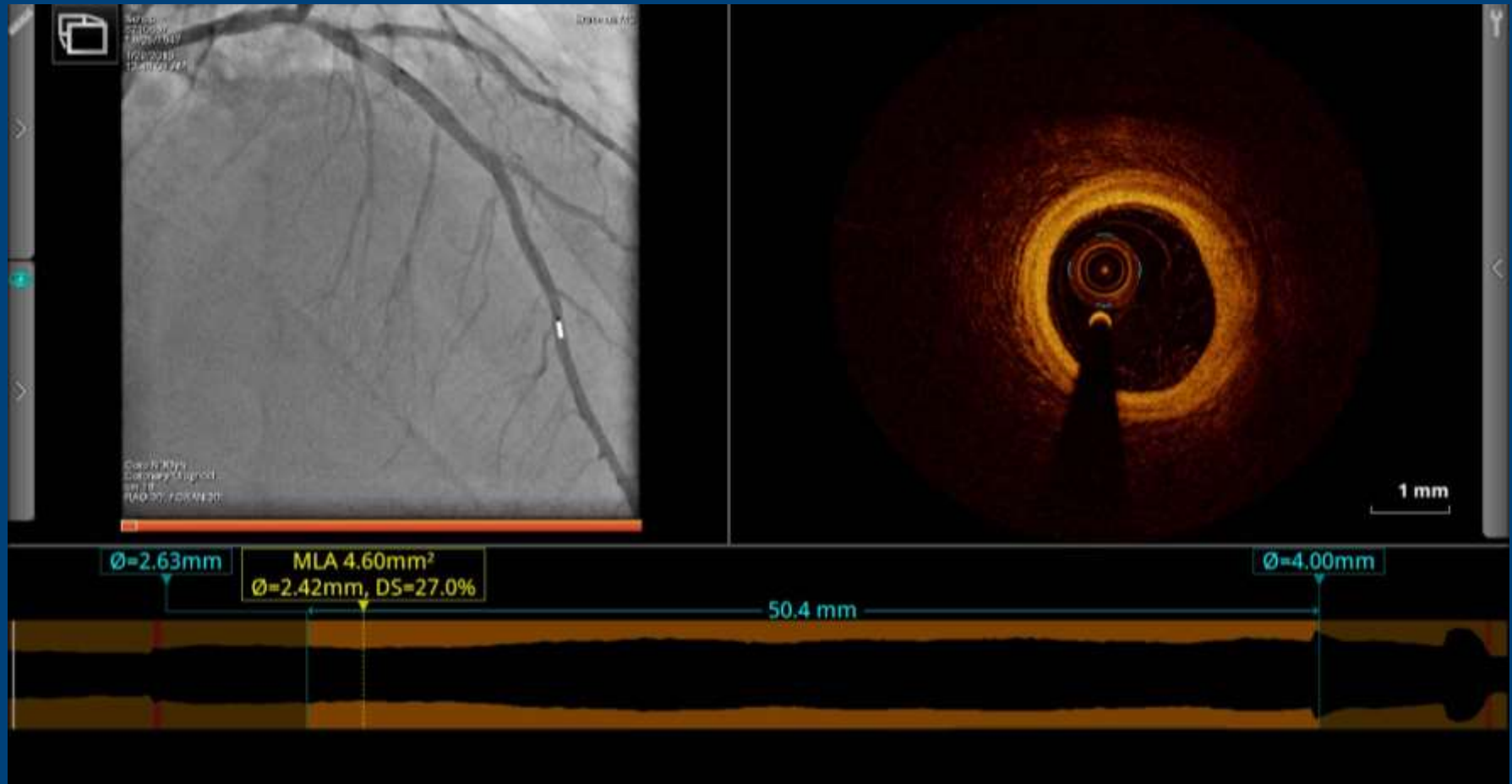
Experience with BVS

BVS-Thrombosis at Day 2 after PCI LAD (BVS 3.5/18mm):



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BVS-Thrombosis at Day 2 after PCI LAD (BVS 3.5/18mm):

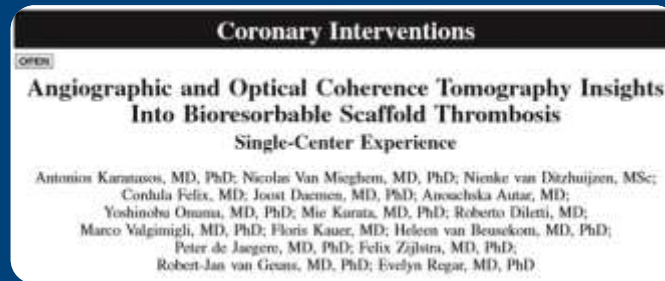


After implantation of distal overlapping BVS 3.5x23mm & 2.5x12mm

The Role of OCT Experience with BVS

**Device
Failure**

BVS Thrombosis



Main Pathomechanisms

- **Incomplete lesion coverage**
- **Underexpansion &**
- **Malapposition**

**Operator
Failure**

**Seems to be triggered
by implantation technique and thus,
potentially avoidable**

The Role of OCT Experience with BVS

Device
Failure

BVS Thrombosis

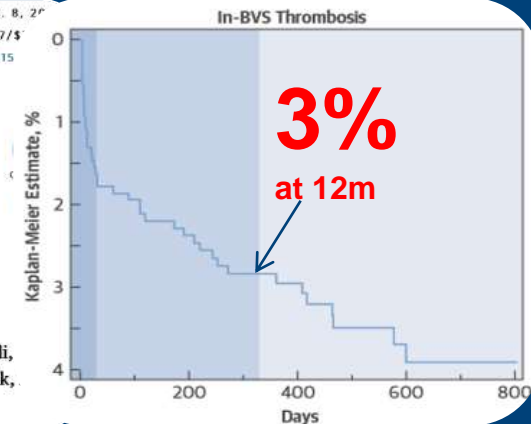
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Bioresorbable Coronary Scaffold Thrombosis

Multicenter Comprehensive Analysis of Clinical Presentation,
Mechanisms, and Predictors

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Tobias Nyffenegger, MD,^b Harald Binder, PhD,^e Holger Eggebrecht, MD,^d Thomas Münzel, MD,^c Stephane Cook,
Tommaso Gori, DOTT MED CHIR, PhD^c



Multi-center, all comer registry, n=1305 pts

Operator
Failure

“can be reduced by $\approx 70\%$
using a specific implantation technique”

The Role of OCT

Experience with BVS

Emphasis on implantation technique:



Scaffold diameter must not be too SMALL

Scaffold diameter must not be too LARGE

Scaffold length must not be too SHORT

Scaffold expansion must be OPTIMAL

If BVS Diameter Is Selected Too SMALL:

-

If BVS Diameter Is Selected Too SMALL: Struts Can Break!

Key issue with the ABSORB scaffold

Limited range of expansion

2.5 mm scaffold → up to 3.0mm

3.0 mm scaffold → up to 3.5mm

3.5 mm scaffold → up to 4.0mm

If BVS Diameter Is Selected Too SMALL: Struts Can Break!

Key issue with the ABSORB scaffold

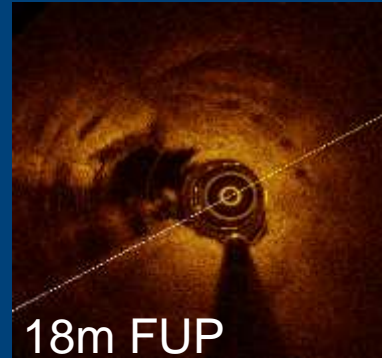
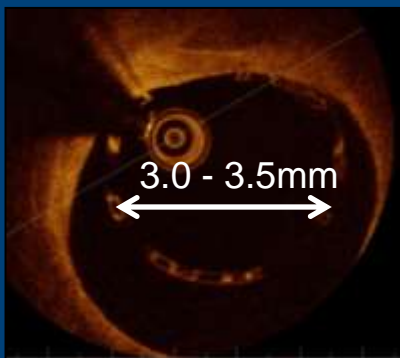
Limited range of expansion

2.5 mm scaffold → up to 3.0mm

3.0 mm scaffold → up to 3.5mm

3.5 mm scaffold → up to 4.0mm

Beyond that range, struts can break when postdilated.



If BVS Diameter Is Selected Too LARGE

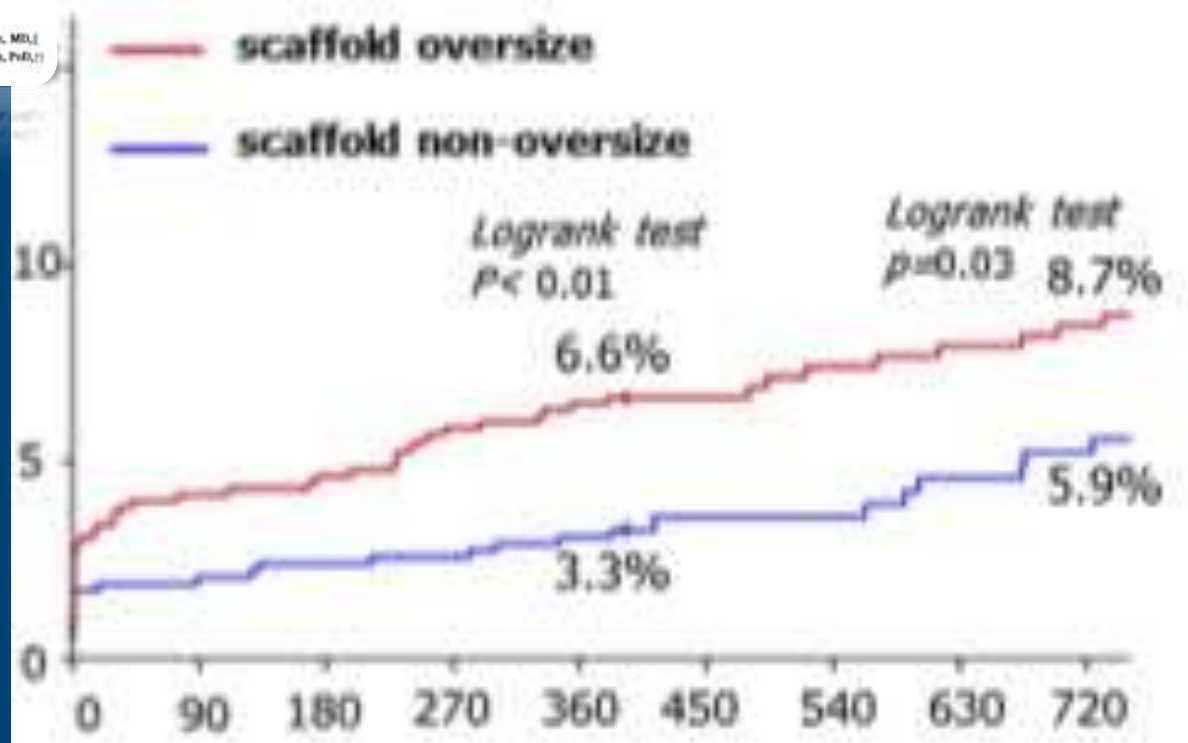
If BVS Diameter Is Selected Too LARGE Increased Risk For Failure (TLF & ST)

Relation Between Bioresorbable Scaffold Sizing Using QCA-Dmax and Clinical Outcomes at 1 Year in 1,232 Patients From 3 Study Cohorts (ABSORB Cohort B, ABSORB EXTEND, and ABSORB II)

Yuki Ishizashi, MD, PhD,* Shimppei Nakatani, MD,* Yuhei Sonomi, MD,† Parvira Srivannasom, MD,**
Mak J. Grundeken, MD,† Hector M. Garcia-Garcia, MD, PhD,* Antonio L. Bartorelli, MD,† Robert Whitbourn, MD,†
Bernard Chevalier, MD,‡ Alexandre Abizaid, MD, PhD,§ John A. Orsinato, MS, CDR, PhD,** Richard J. Raposa, PhD,††
Susan Veldhof, RN,‡ Yoshinobu Onuma, MD, PhD,* Patrick W. Serruys, MD, PhD,‡

ABSORB Cohort B, Extend, II

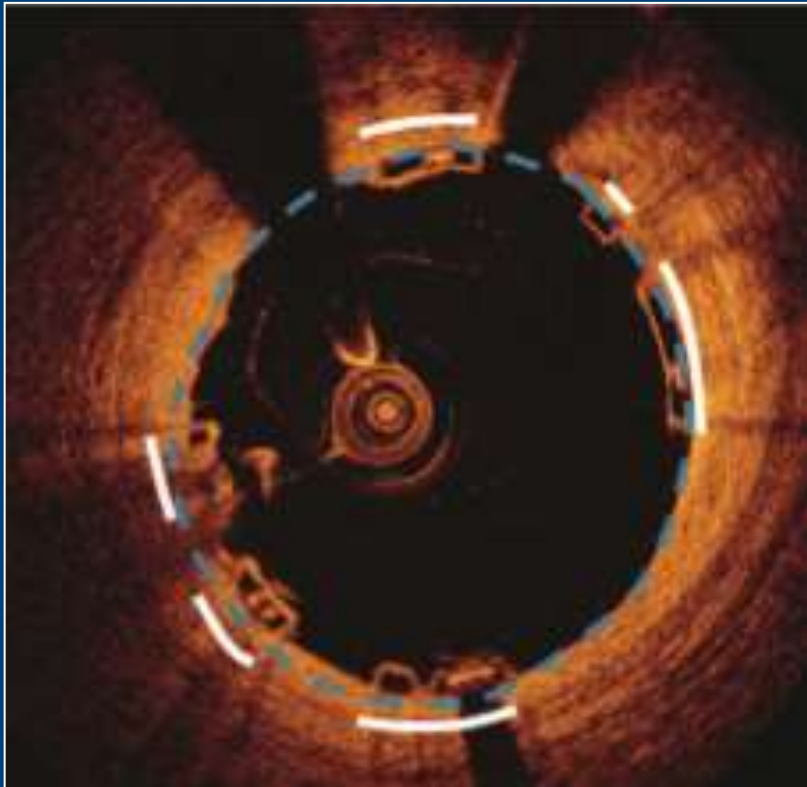
Incidence of cardiac death, MI & TLR (%)



Follow-up (days)

TLR: Target Lesion Revascularization
ST: Scaffold Thrombosis

If BVS Diameter Is Selected Too LARGE: The Scaffold Footprint Is Large



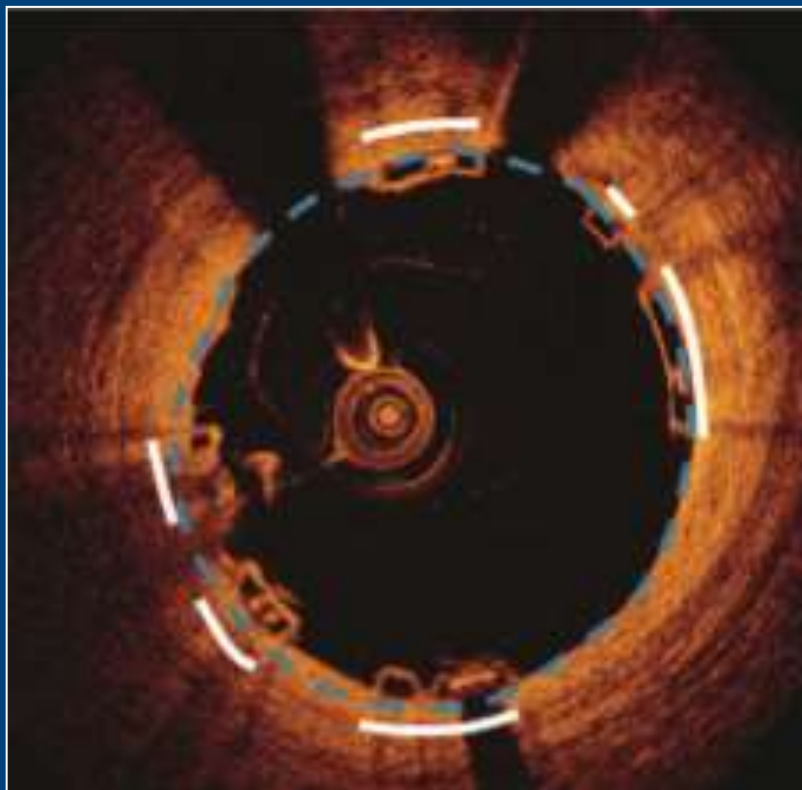
Footprint 26 %

Footprint (%) =

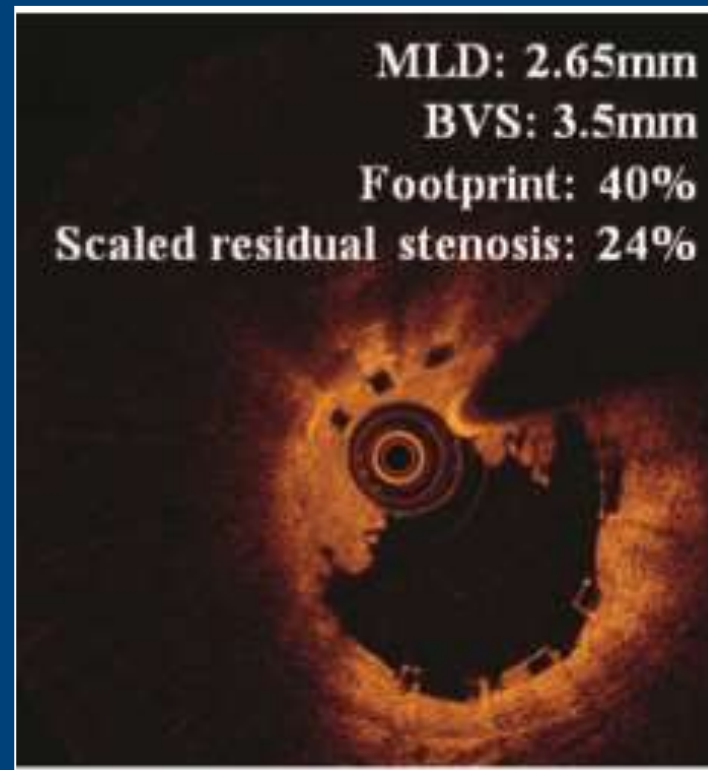
■ fraction covered by struts

■ lumen circumference

If BVS Diameter Is Selected Too LARGE: The Scaffold Footprint Is Large



Footprint 26 %



Footprint 40 %

If BVS Diameter Is Selected Too LARGE: Large Footprint & Association To Thrombosis

	BVS Thrombosis N=42	Control N=84	p	HR (95% CI)
MLD (mm)	2.39±0.58	2.85±0.49	0.001	0.05 (0.01-0.28)
RVD (mm)	2.93±0.58	3.41±0.52	0.002	0.13 (0.04-0.46)
DS (%)	19±12	16±7	0.071	1.05 (0.10-1.10)
Max.FootPrint (%)	43±0.11	35±6	0.001	1.20 (1.08-1.33)
SRS (%)	0.21±0.18	0.07±0.14	0.001	1.71 (20.0-146)

QCA Predictors of BVS thrombosis (post procedure)

Max FP = Maximum footprint:

the scaffold outer surface area divided by actual arterial surface area calculated from the MLD

**If BVS Length Is Selected Too SHORT:
The Lesion Is Not Covered Completely**

**If BVS Length Is Selected Too SHORT:
An Additional Scaffold Is Needed...**



If BVS Length Is Selected Too SHORT: Scaffold Overlap Increases Risk for MI!

Predictors for Periprocedural MI

Incidence and Potential Mechanism(s) of Post-Procedural Rise of Cardiac Biomarker in Patients With Coronary Artery Narrowing After Implantation of an Everolimus-Eluting Bioresorbable Vascular Scaffold or Everolimus-Eluting Metallic Stent

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TABLE 5 Predictors of Per-Protocol PMI

	Univariate Logistic Regression		Multivariate Model (I, II, III, IV/V and Device Type)	
	OR (95% CI)	p Value	OR (95% CI)	p Value
Patient-related factors				
Age, yrs	1.02 (0.96-1.07)	0.56	—	—
Male	1.21 (0.34-4.37)	0.77	—	—
Body mass index, kg/m ²	0.94 (0.81-1.08)	0.36	—	—
Current smoker	1.71 (0.57-5.11)	0.34	—	—
Hypertension requiring treatment	0.43 (0.15-1.22)	0.11	—	—
Dyslipidemia requiring treatment	0.57 (0.20-1.64)	0.30	—	—
Any diabetes mellitus	0.48 (0.11-2.16)	0.34	—	—
Unstable angina	0.94 (0.26-3.40)	0.93	—	—
Lesion-related factors assessed by angiography				
Pre-procedural diameter stenosis, %	0.98 (0.93-1.02)	0.28	—	—
Pre-procedural minimal lumen diameter, mm	1.38 (0.28-6.72)	0.69	—	—
Pre-procedural reference diameter, mm	0.48 (0.12-1.92)	0.30	—	—
Obstruction length, mm	0.99 (0.92-1.08)	0.85	—	—
Pre-procedural curvature, cm ⁻¹	0.20 (0.19-2.16)	0.19	—	—
Lesion-related factors assessed by grayscale IVUS				
Pre-procedural minimal lumen area, mm ²	0.78 (0.35-1.70)	0.53	—	—
Pre-procedural EEM, mm ²	0.99 (0.86-1.16)	0.98	—	—
Pre-procedural mean total plaque area in treated region, mm ²	1.05 (0.88-1.27)	0.58	—	—
Pre-procedural total plaque volume in treated region, mm ³	1.00 (1.00-1.01)	0.22	—	—
Pre-procedural plaque burden in treated region, %	1.03 (0.99-1.07)	0.14	—	—
Lesion-related factors assessed by IVUS-VH				
Pre-procedural dense calcium, mm ²	1.86 (0.15-23.83)	0.63	—	—
Pre-procedural necrotic core, mm ²	1.16 (0.34-3.99)	0.81	—	—
Pre-procedural fibrotic tissue, mm ²	1.33 (0.70-2.51)	0.39	—	—
Pre-procedural fibro-fatty tissue, mm ²	0.92 (0.63-1.34)	0.67	—	—
Treatment with overlapping devices	5.32 (1.88-15.05)	<0.01	5.07 (1.78-14.41)	0.002
Post-dilation	1.18 (0.40-3.50)	0.77	—	—
Bail-out	3.79 (0.45-31.96)	0.22	—	—
Expected balloon diameter of the last balloon, mm	3.06 (0.76-12.33)	0.12	—	—

Dashes indicate that there were no applicable data.

CI = confidence interval; IVUS = intravascular ultrasound; OR = odds ratio; VH = virtual histology; other abbreviations as in Tables 1 and 4.

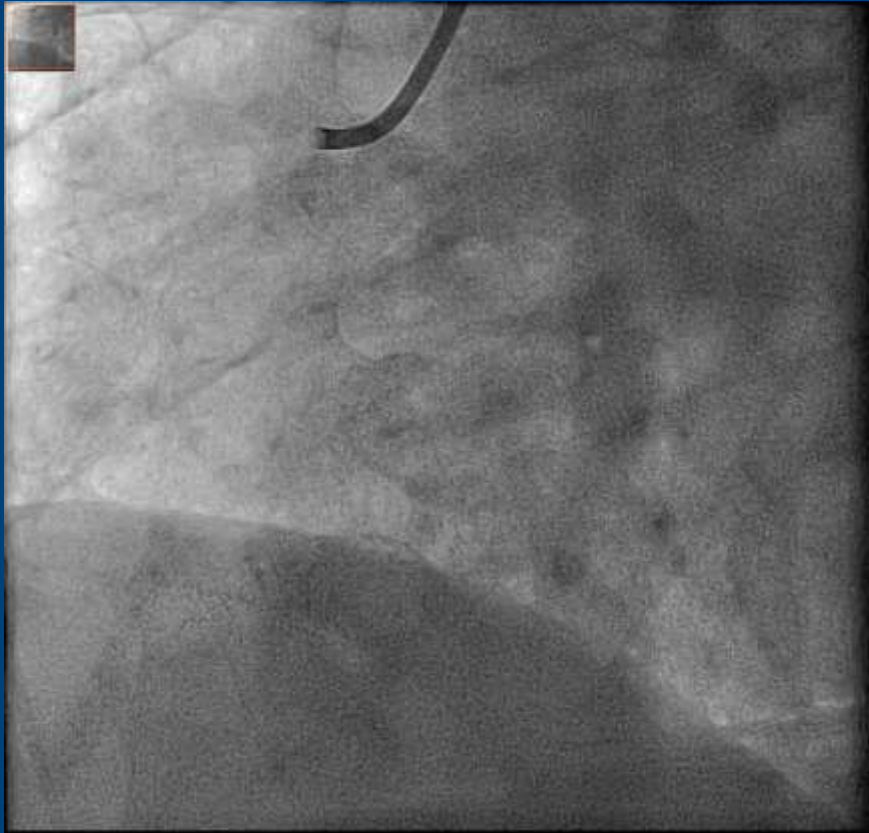
Multivariate

Treatment with Overlapping Devices

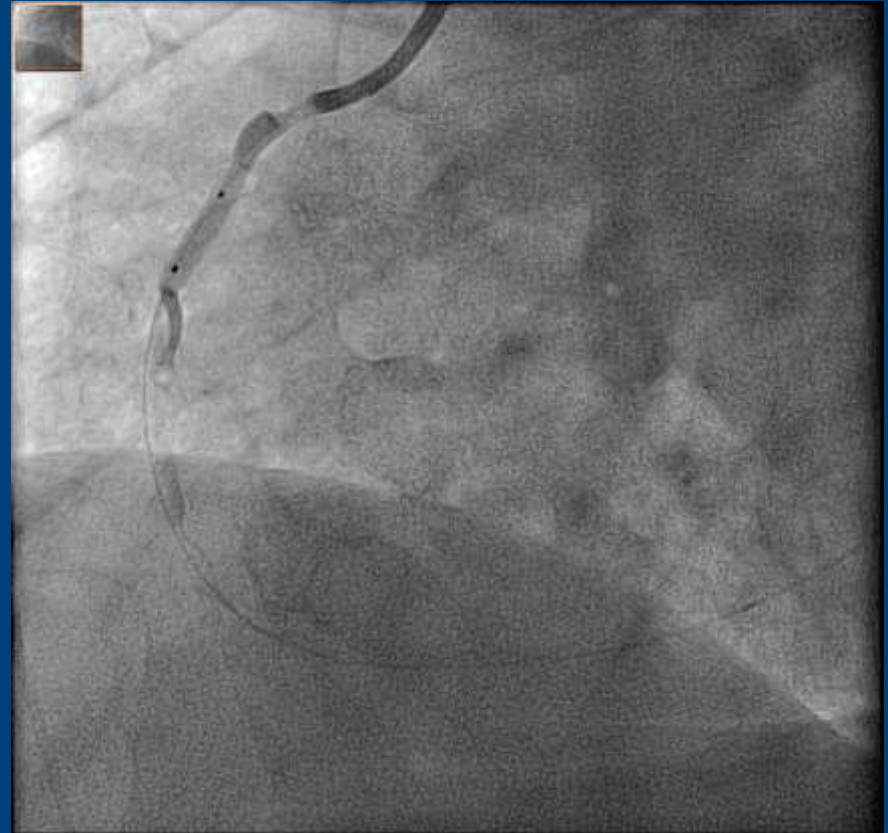
OR
5

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Case Example NSTEMI; 62 year old male, active smoker, CVA



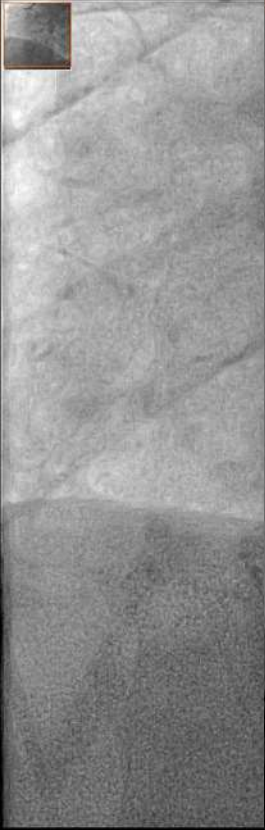
Pre-interventional



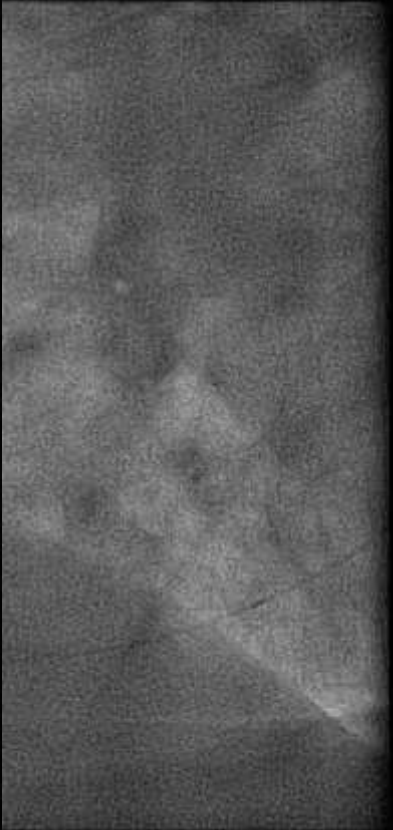
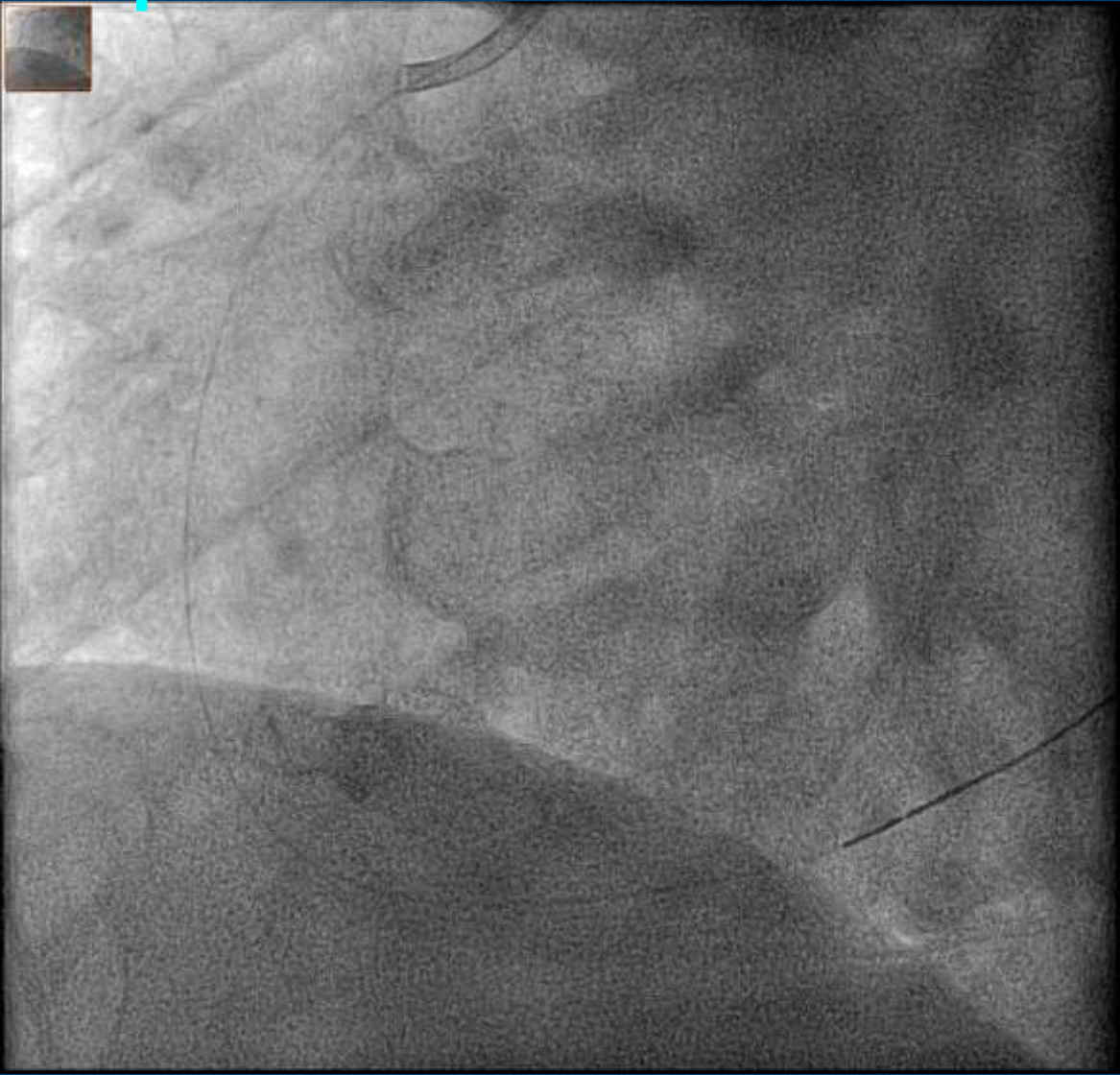
Predilation with Sprinter
2.5x10 mm balloon

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Case Example



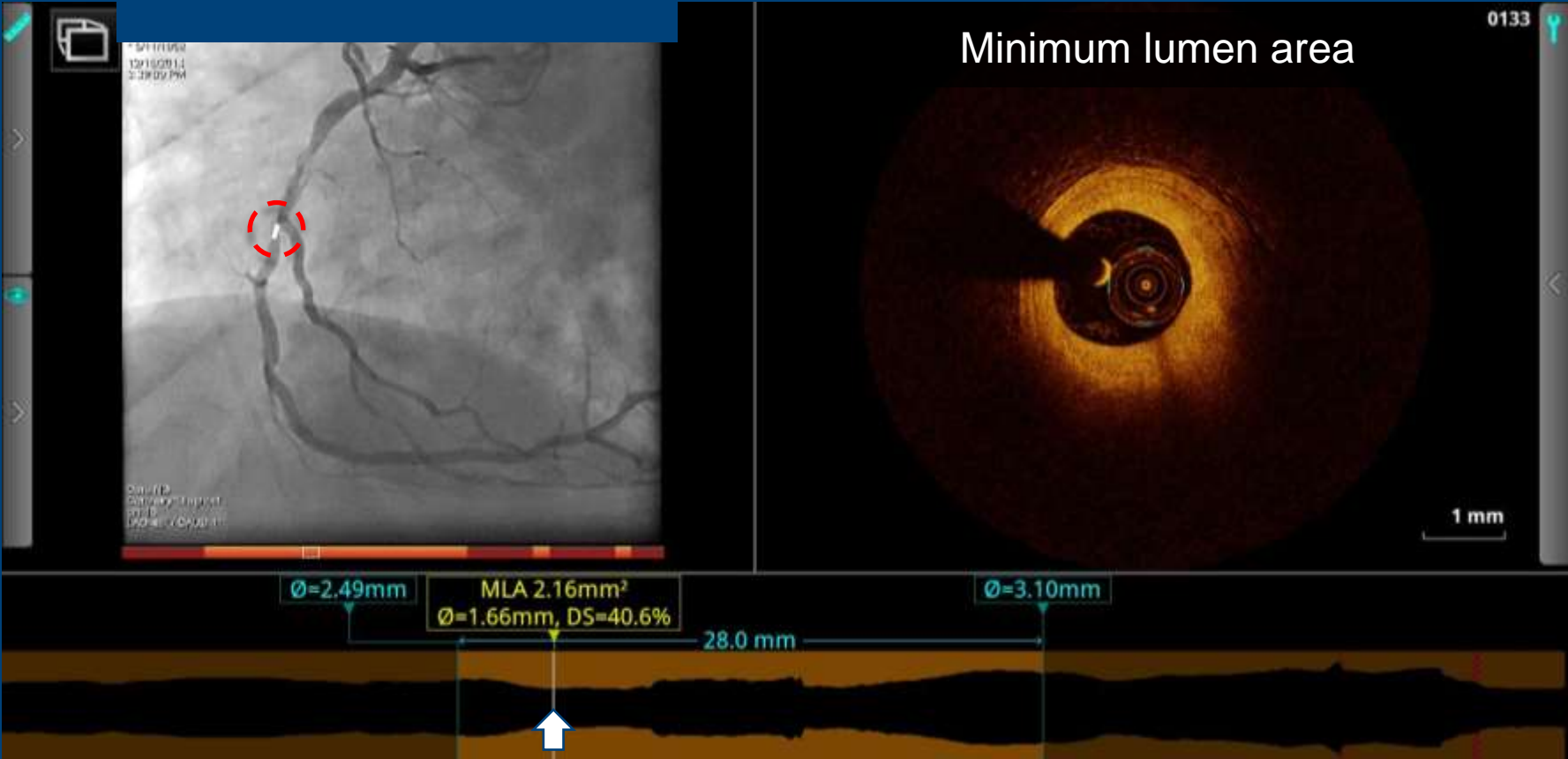
Pre-intervention



Post-intervention

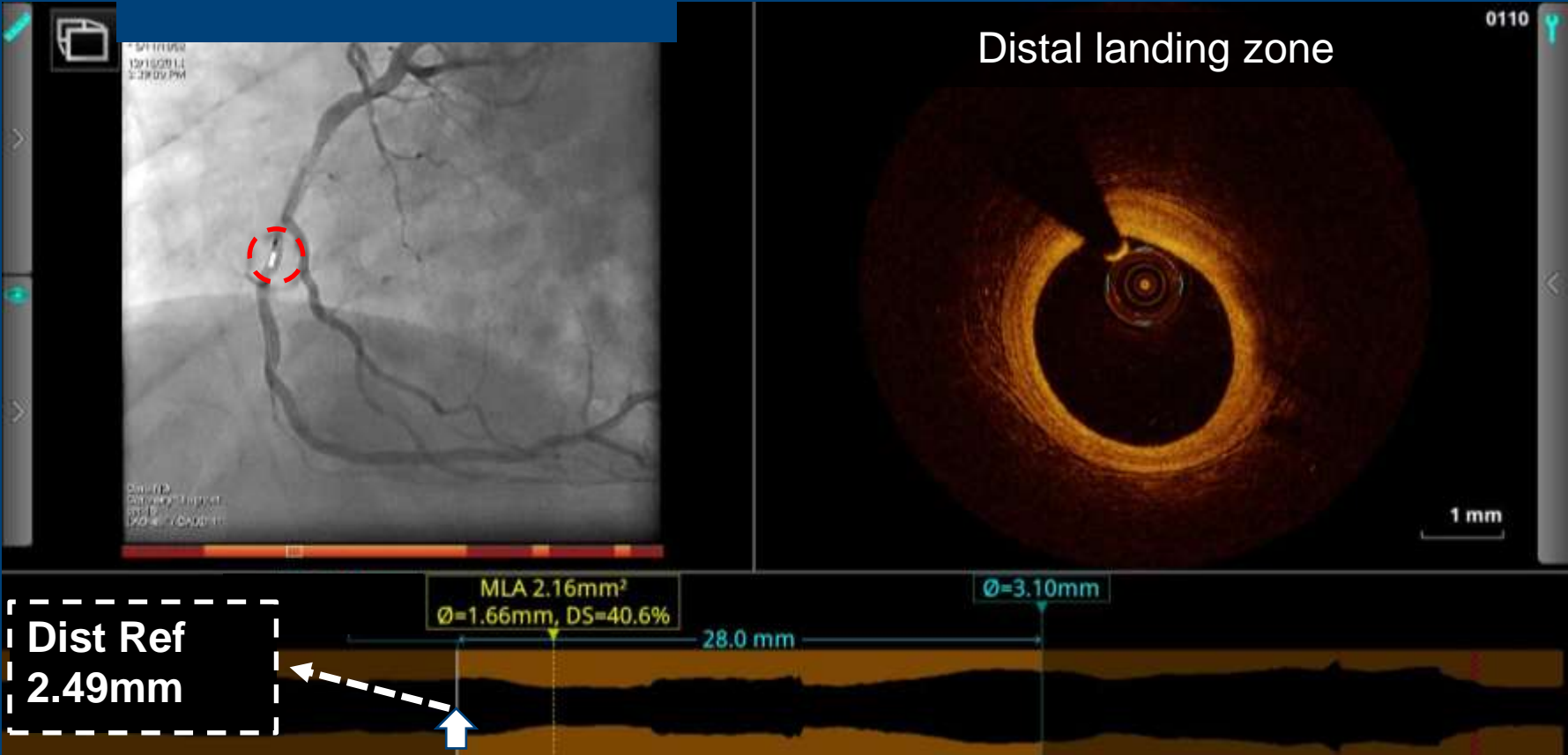
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Case Example



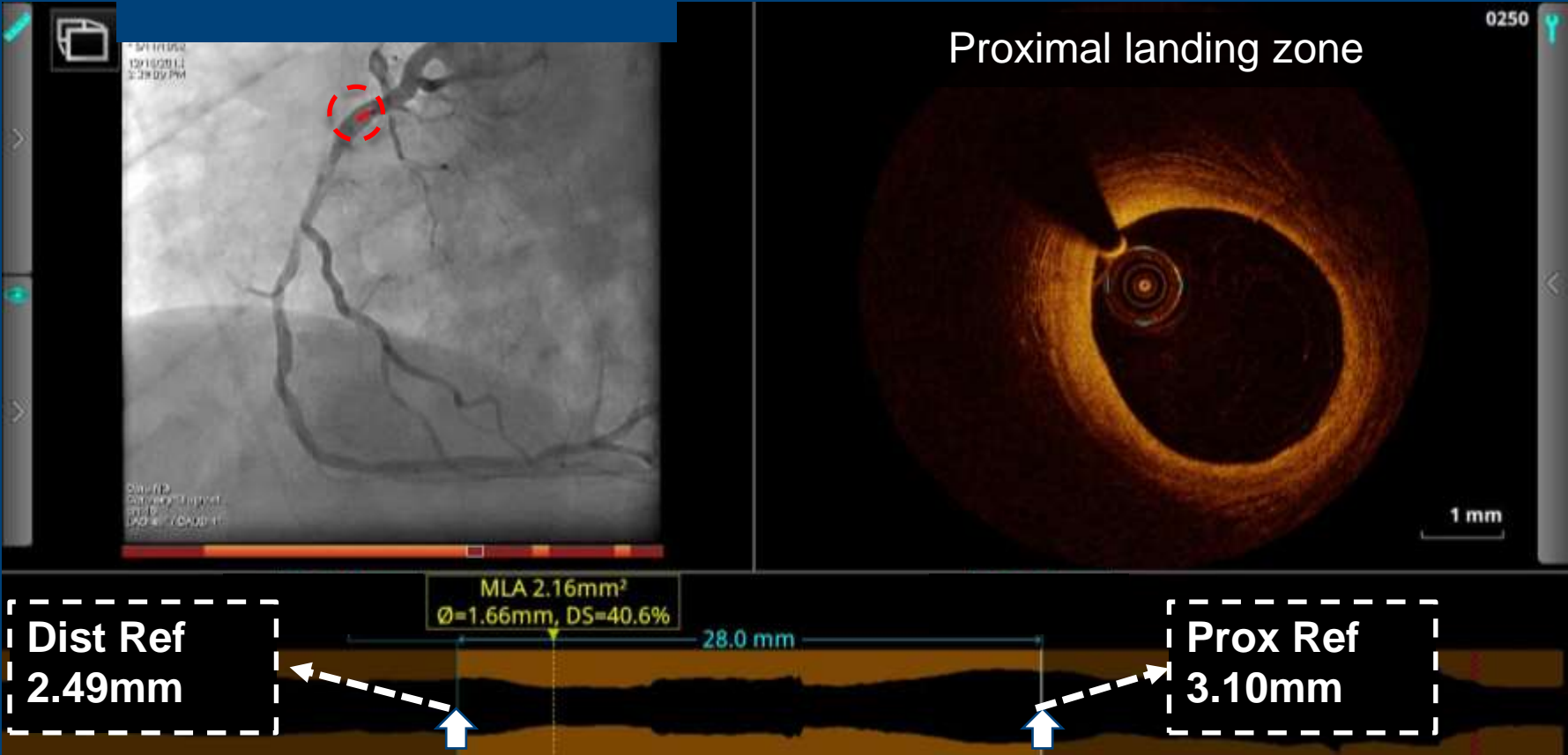
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Case Example



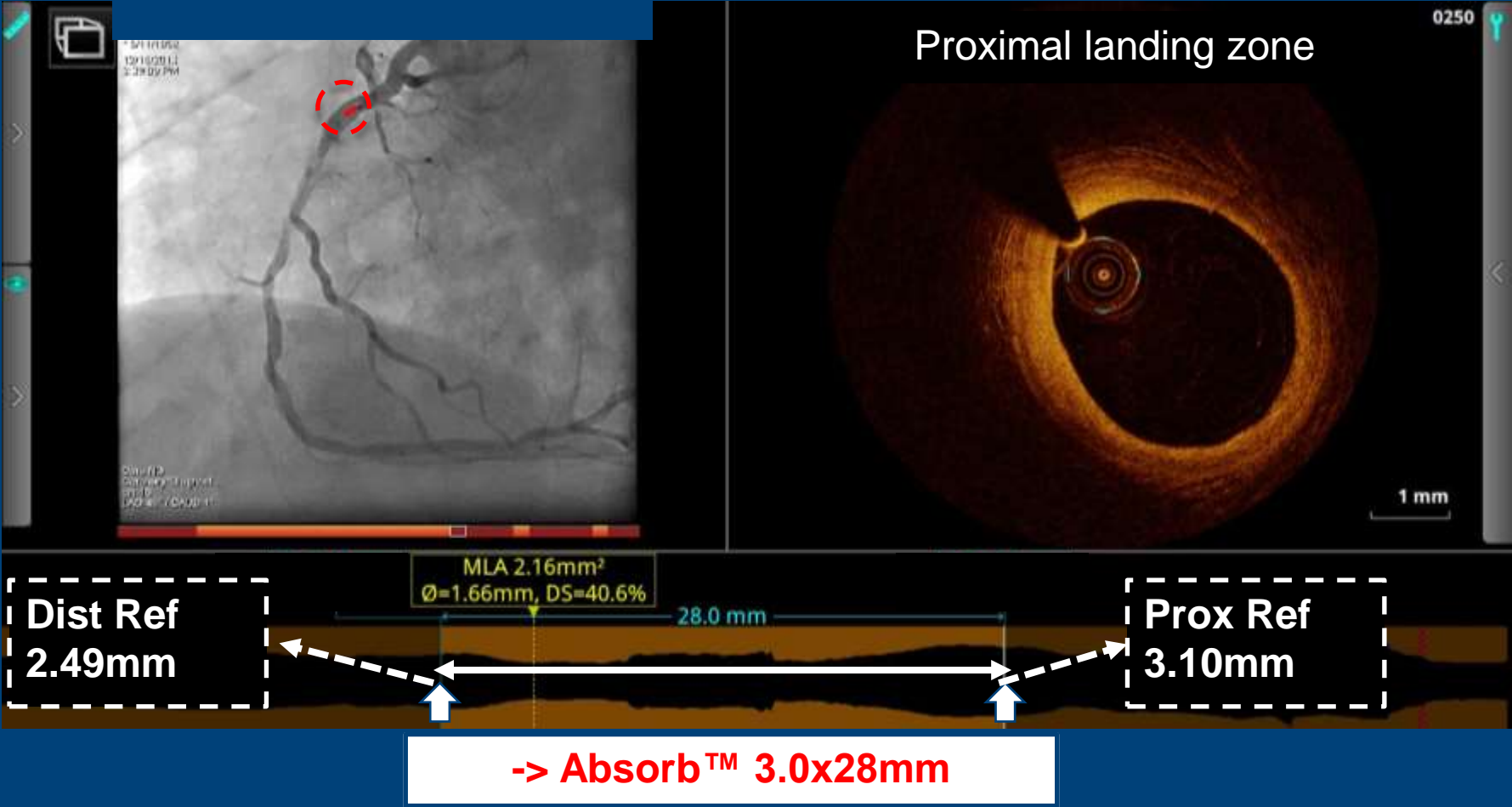
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Case Example



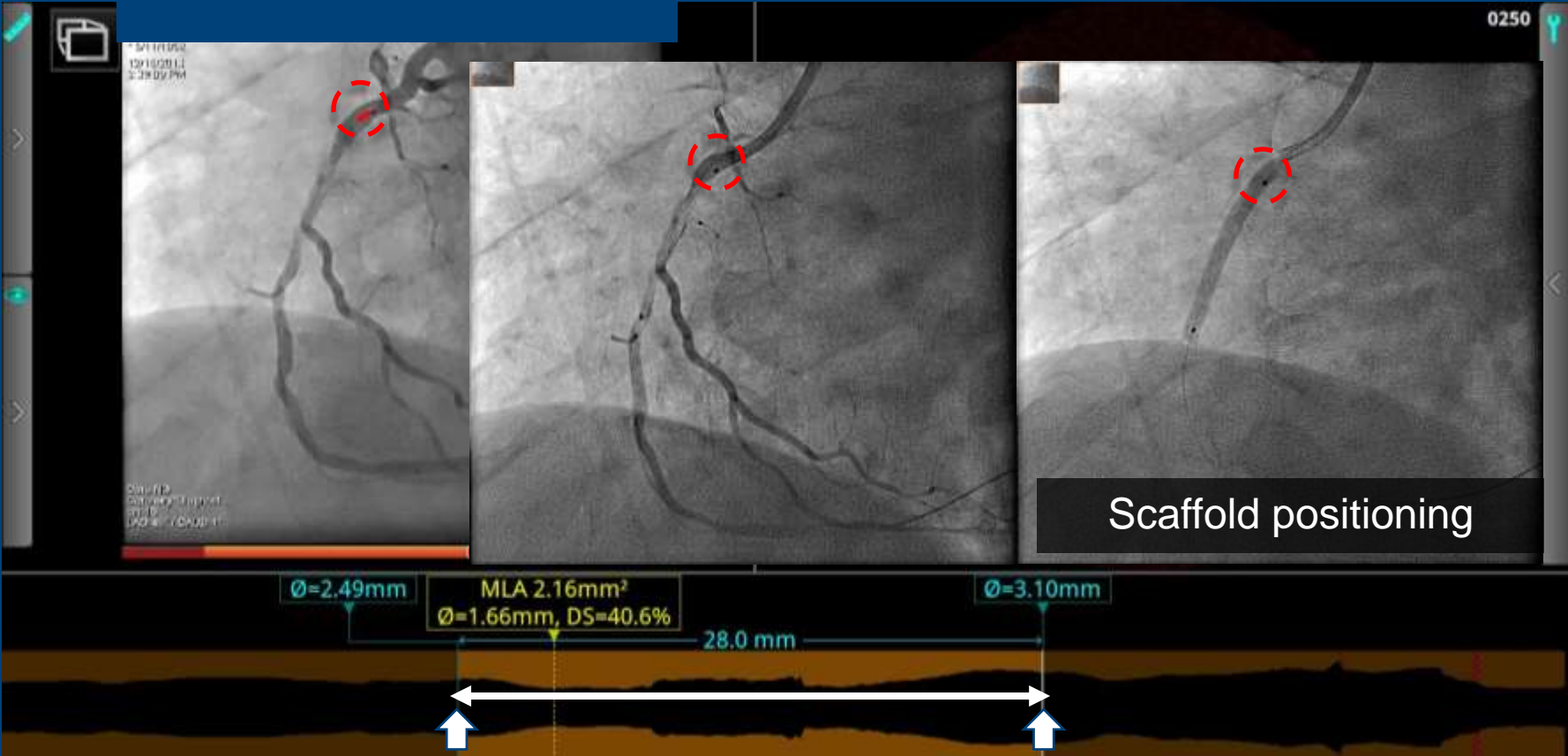
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Case Example



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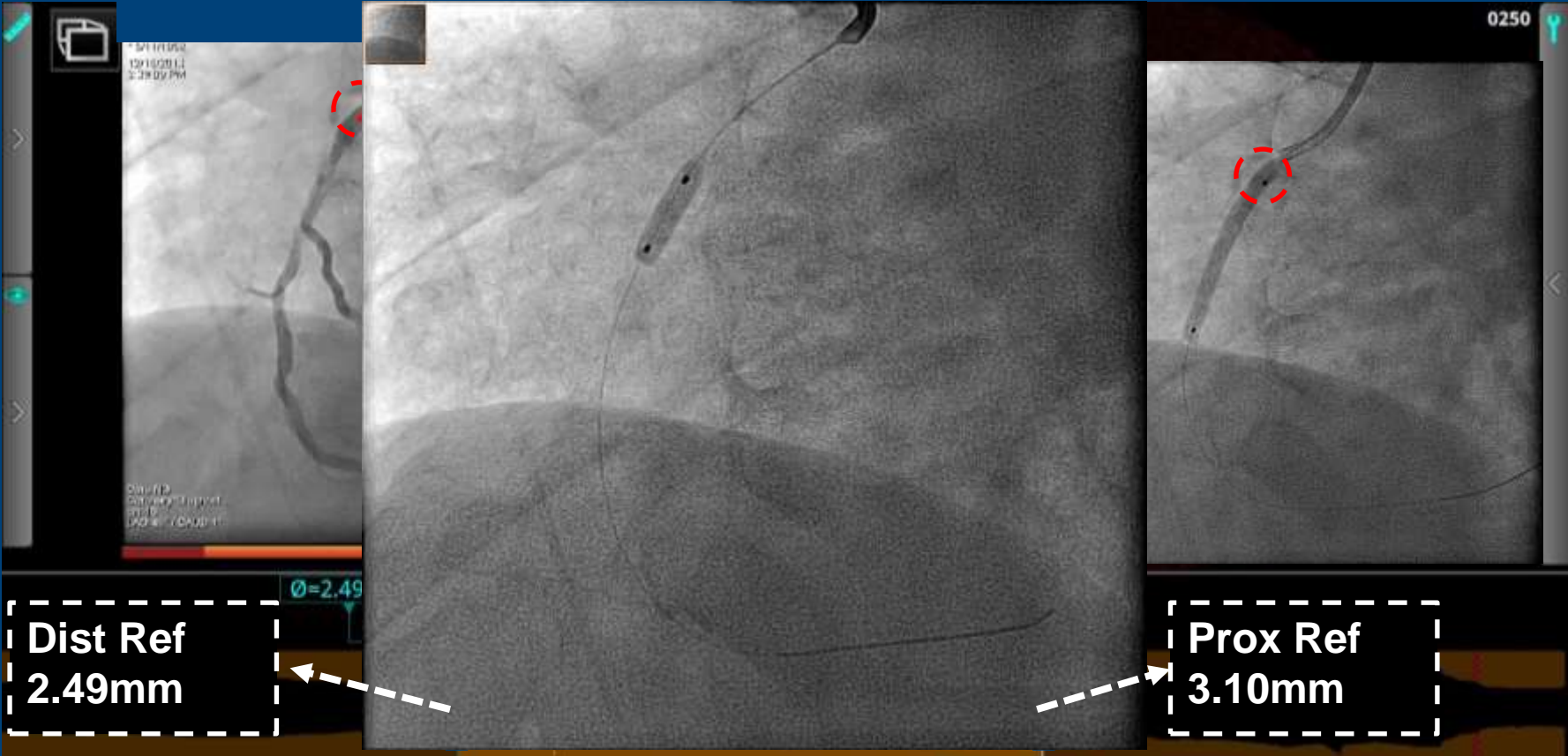
Case Example



-> Absorb™ 3.0x28mm

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Case Example



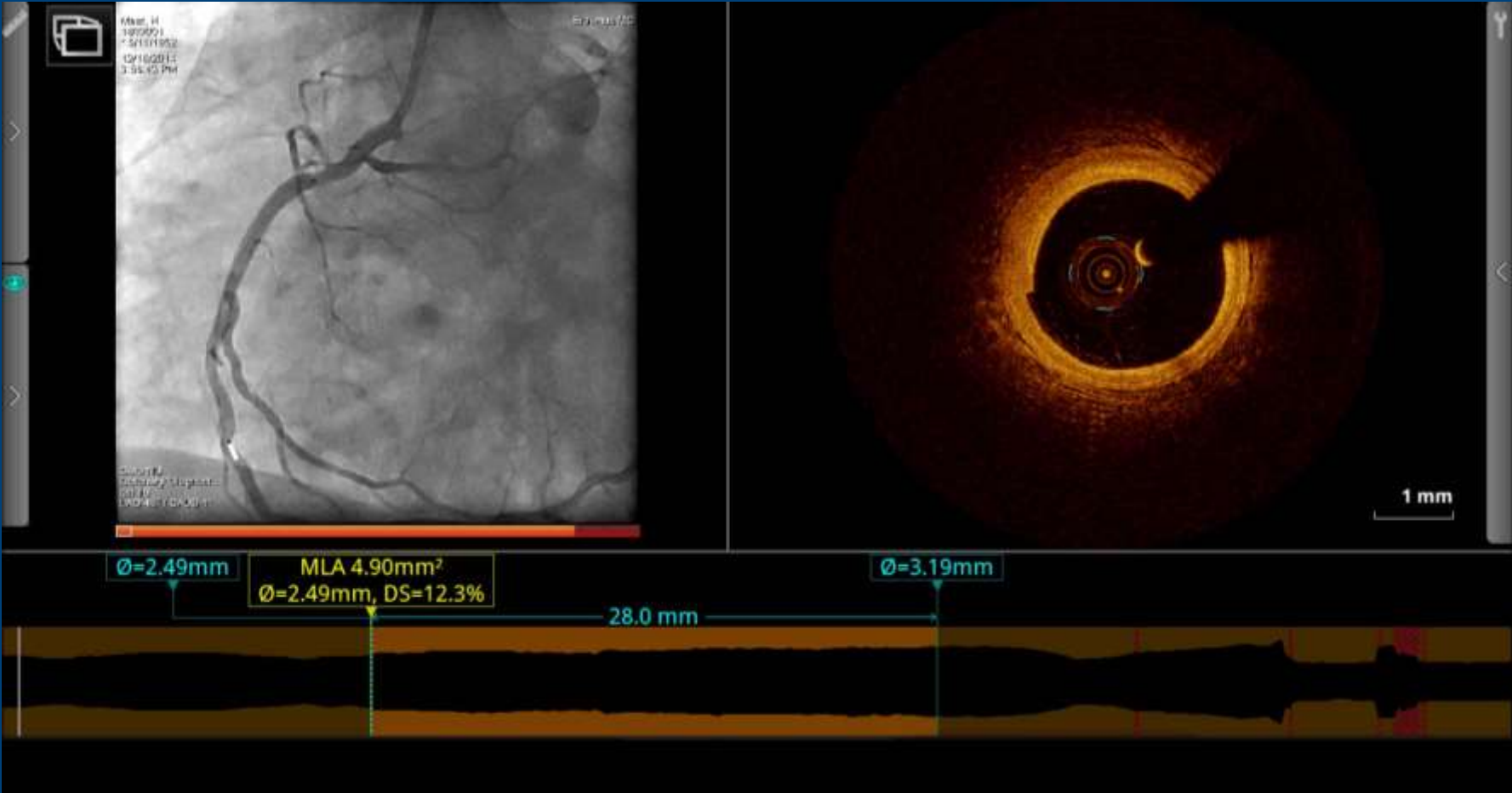
Dist Ref
2.49mm

Prox Ref
3.10mm

Tapering

OCT To Guide BVS Implantation

Case Example



OCT To Guide BVS Implantation



Allows

- ✓ to overcome intrinsic limitations of angiography.



Guidance of
Implantation
Procedure

Insights in
Failure/
Thrombosis