OCT Interpretation

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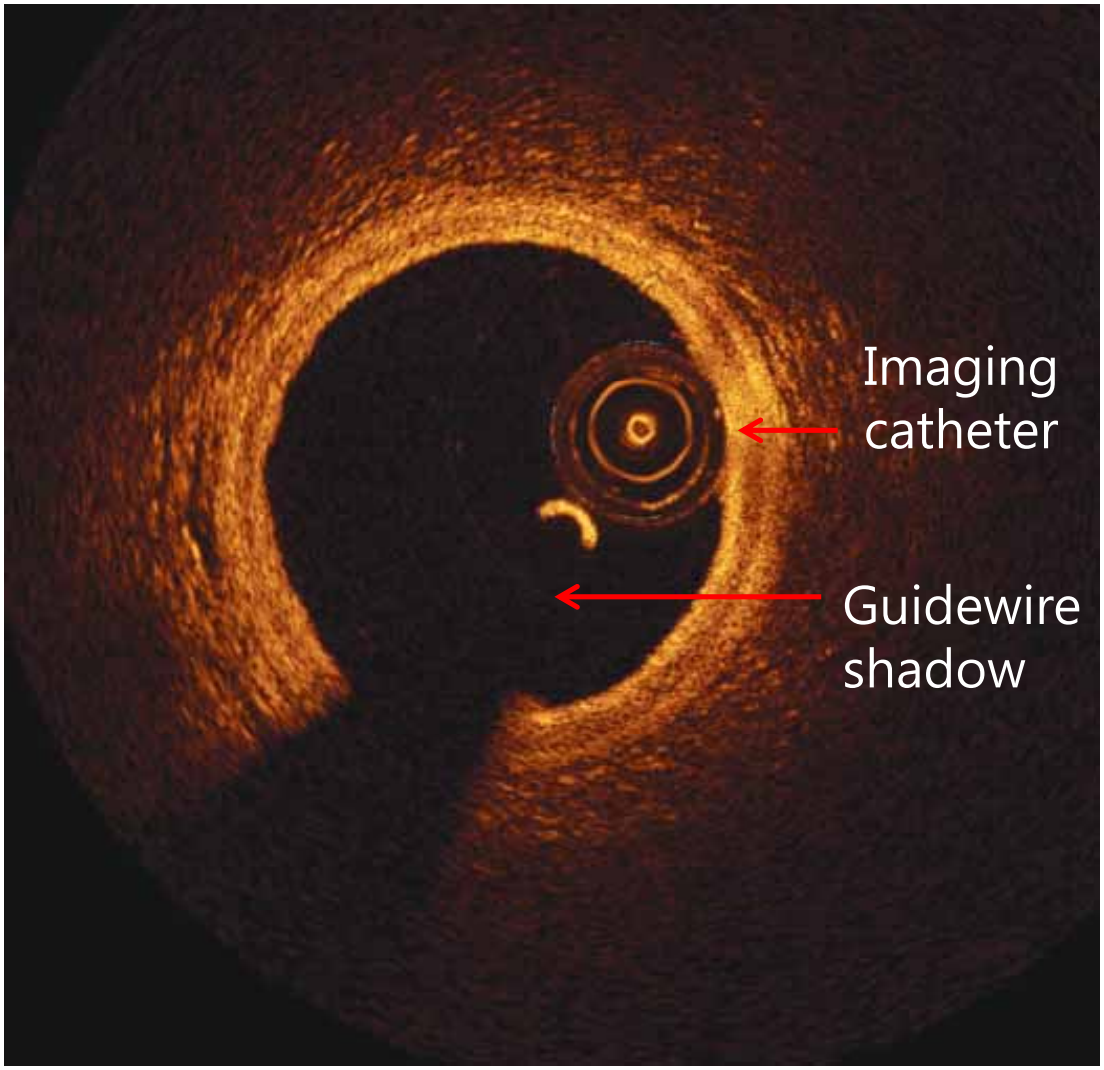
OCT Image Interpretation Terminology

- Backscatter
  - The reflection of light waves off the tissue and back to the Dragonfly catheter
    - High backscatter means a brighter pixel
      - *Also described as a "signal rich" region*
    - Low backscatter means a darker pixel
      - *Also described as a "signal poor" region*
- Attenuation
  - The reduction in intensity of the light waves as they pass through tissue due to absorption or scattering
    - High attenuation means the light cannot penetrate very deep
    - Low attenuation means the light can pass through to allow visualization of deeper tissue

OCT Image Interpretation Terminology

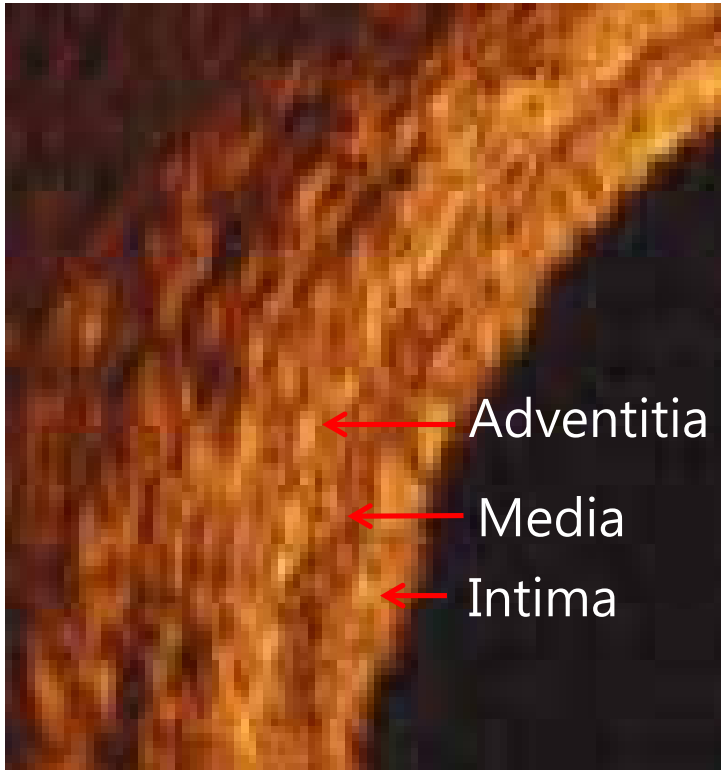
- Composition
  - Homogeneous
    - Uniform in structure
  - Heterogeneous
    - Structure consists of dissimilar elements
- Texture
  - Coarse
  - Fine
- Edge/Border
  - The creation of a border is due to the interface between different tissue types
  - One of the parameters used to differentiate plaque types

Image Orientation



Normal coronary artery

- Uniform silhouette
- 3 layers visible in vessel wall



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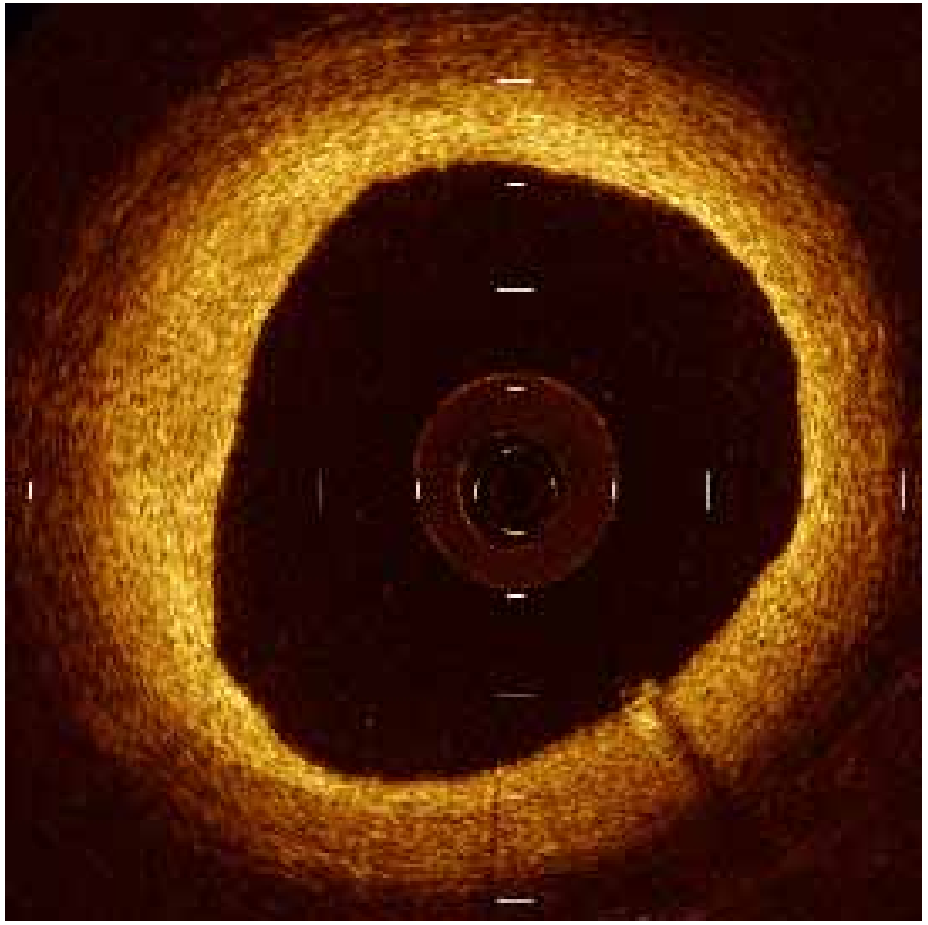
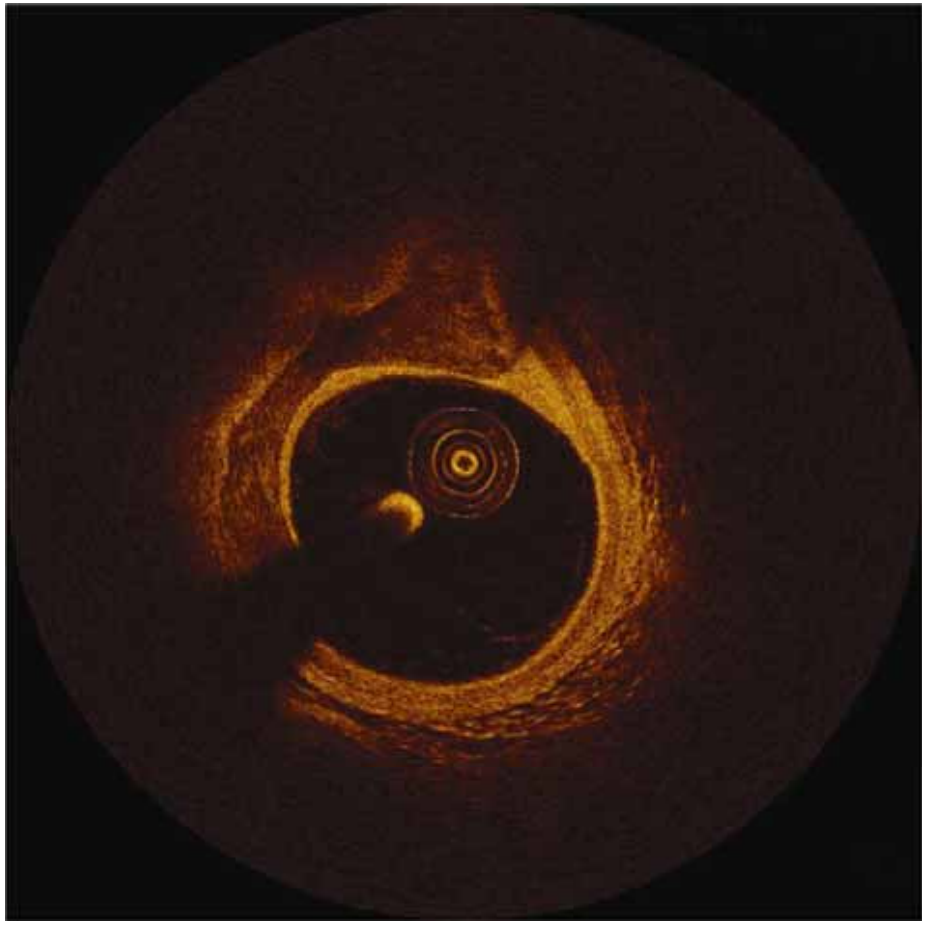
Fibrous Plaque

- Homogeneous
- High backscatter
  - signal rich
  - brighter pixel
- Low attenuation
  - deeper tissue can be visua lized



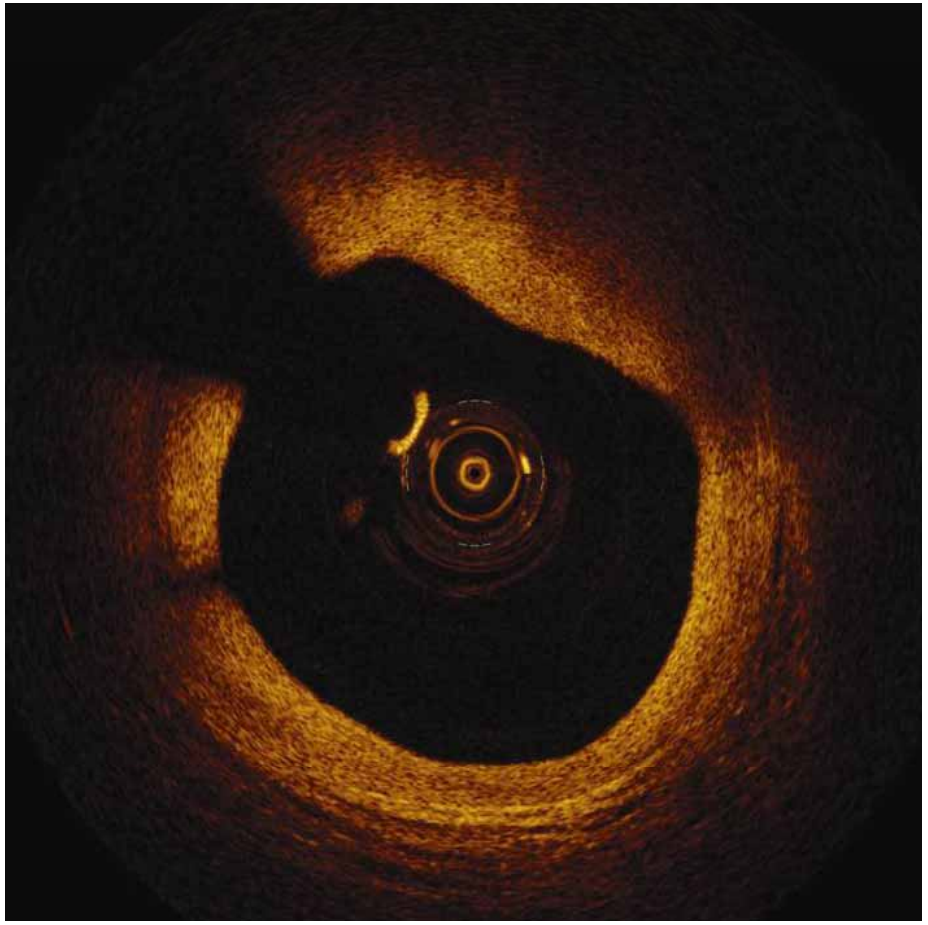
Calcified Plaque

- Sharp edges
- Heterogeneous
- Low backscatter
  - signal poor
- Low attenuation
  - deeper tissue can be visualized

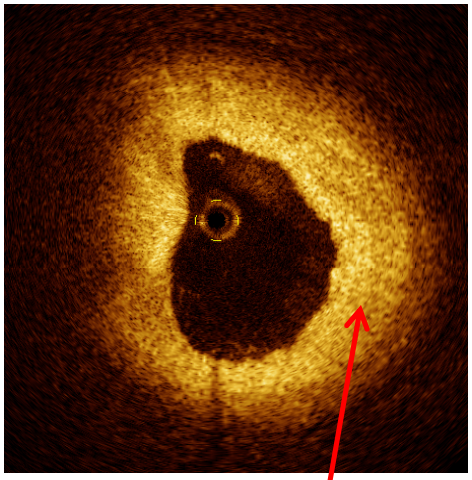


Lipid Plaque

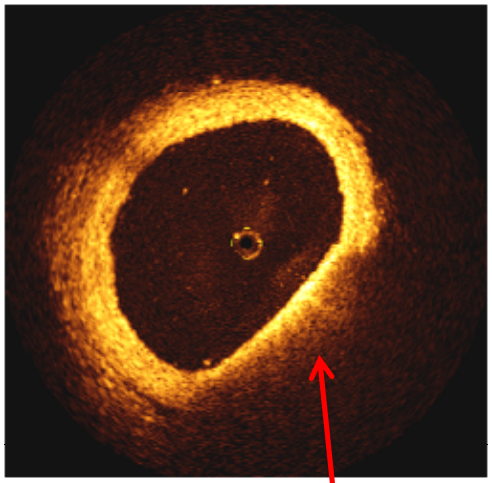
- High attenuation
  - low tissue penetration
- Diffuse shadowy edges
- High backscatter on surface
- Low backscatter deeper



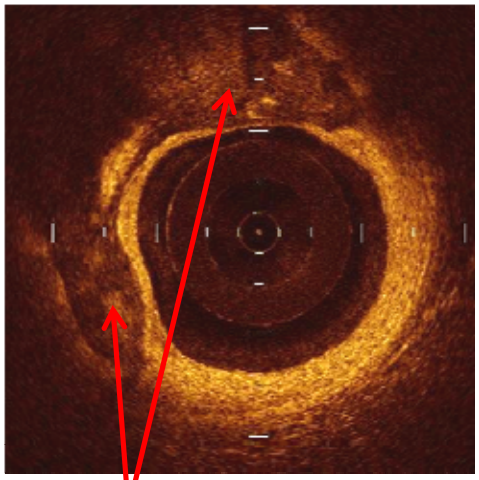
Plaque Types



Fibrous



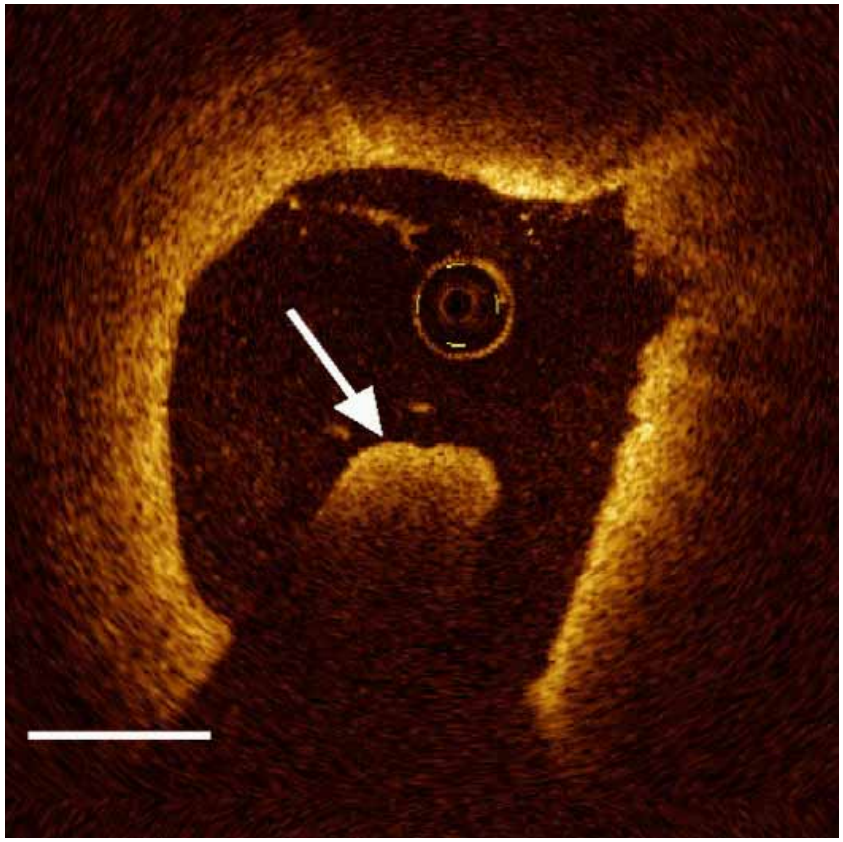
Lipid

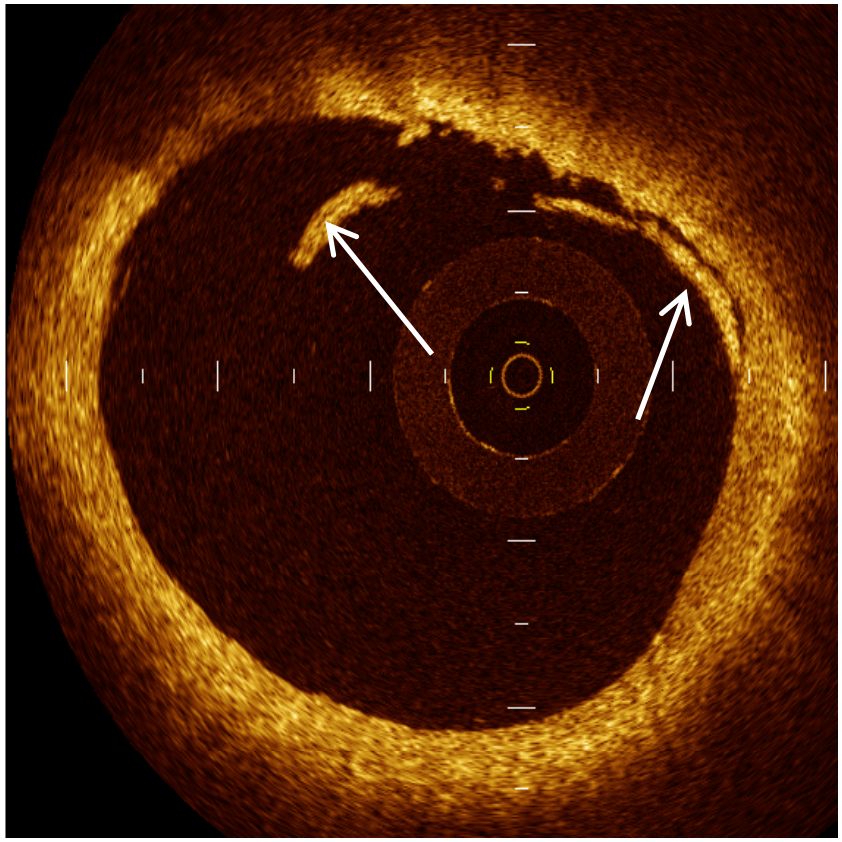


Calcium

Fibrous	Bright pixels	Finely textured	Deep penetration	Homogeneous
Lipid	Dark pixels	Diffuse edge	Low penetration	Homogeneous
Calcium	Dark pixels	Sharp edge	Deep penetration	Heterogeneous

Thrombus – Red & White





Red thrombus

White thrombus

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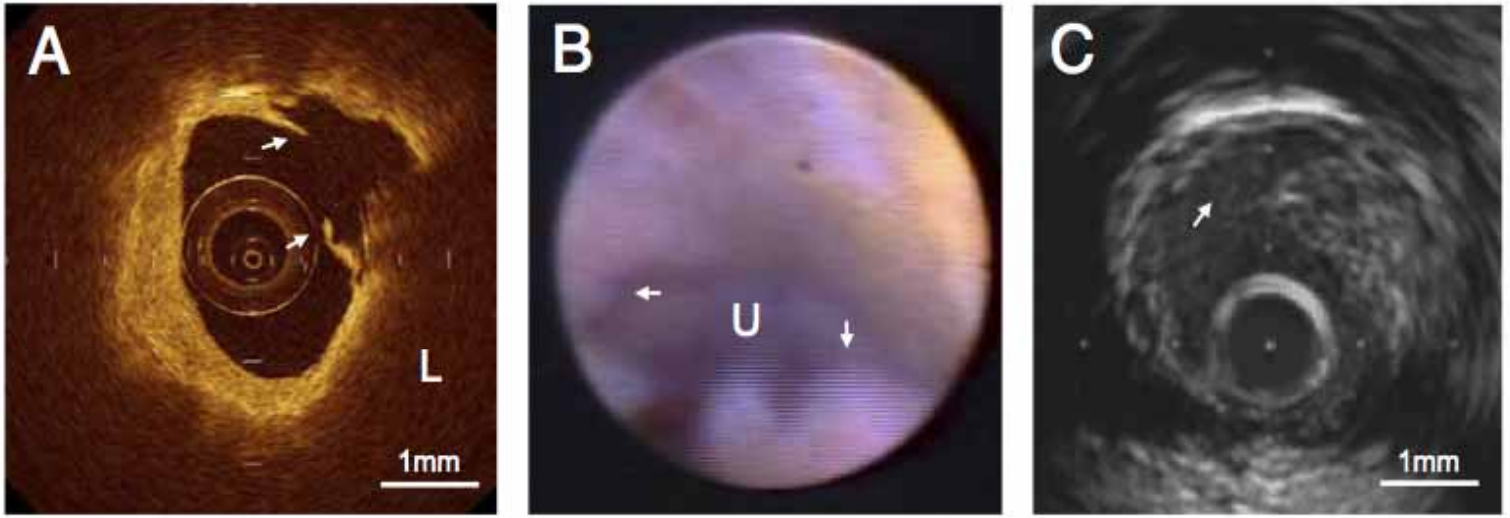
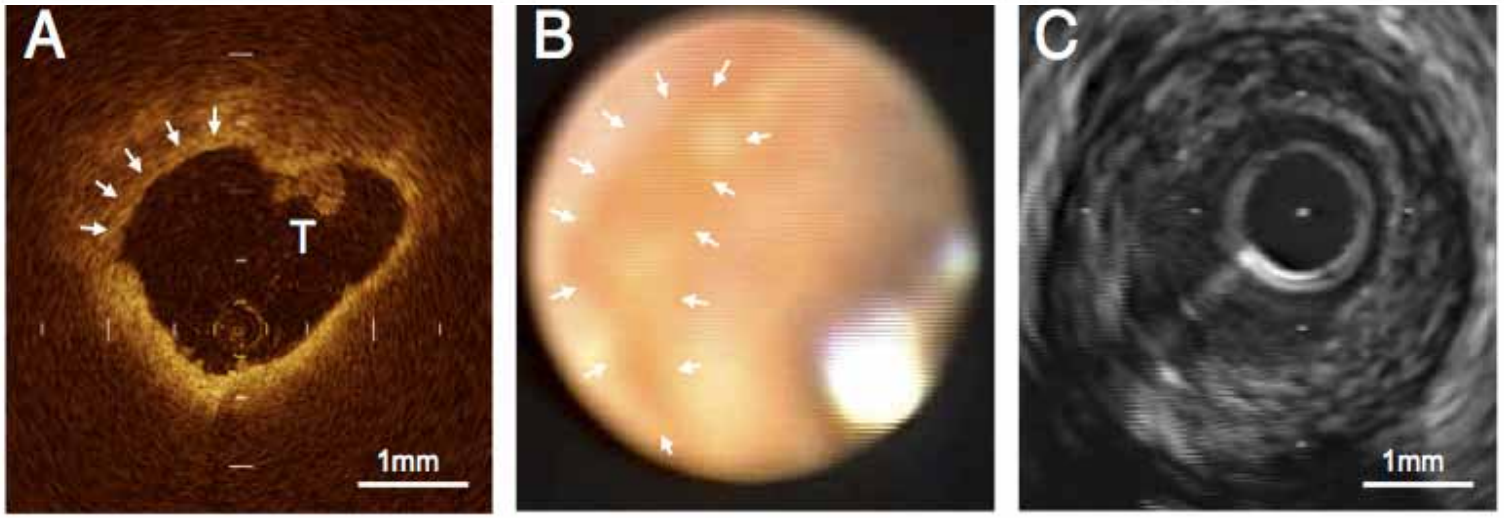
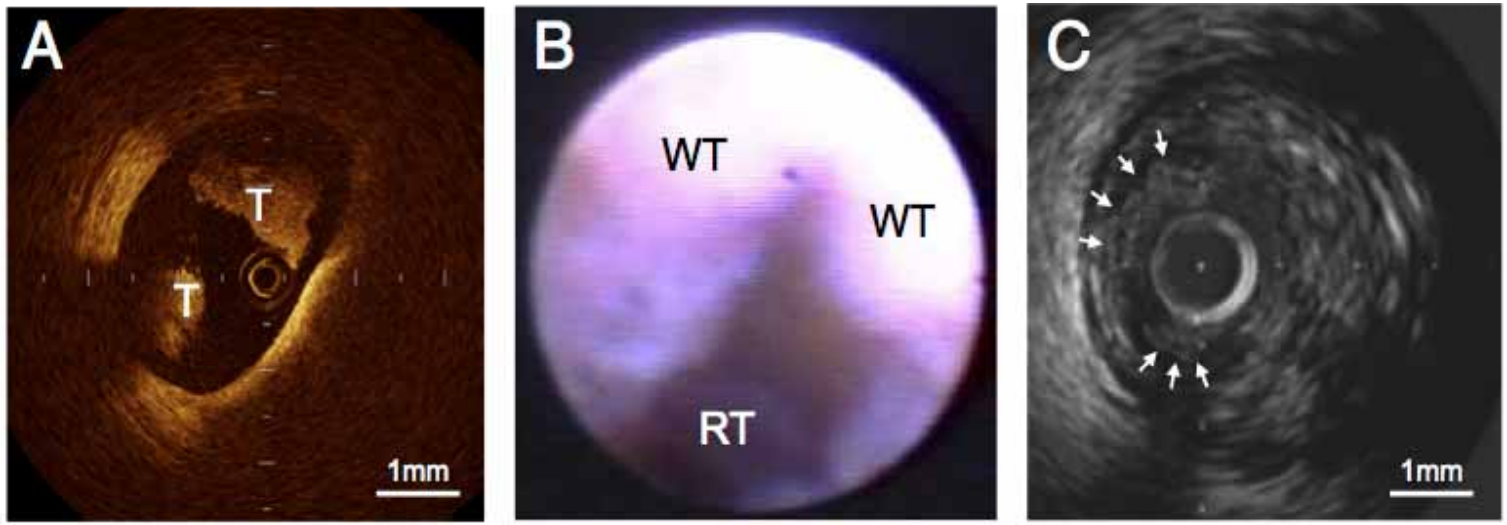
Plaque Rupture



Plaque Erosion



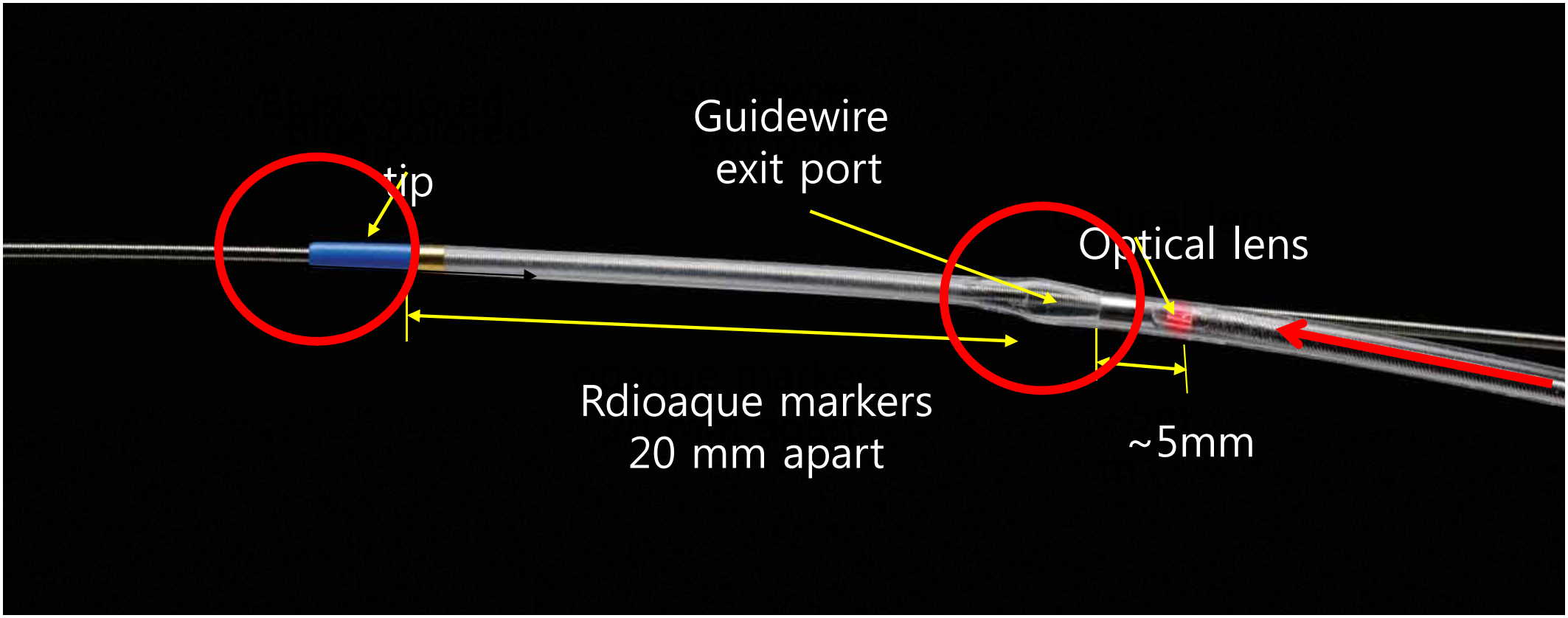
Thrombi



Obtaining Clear Images

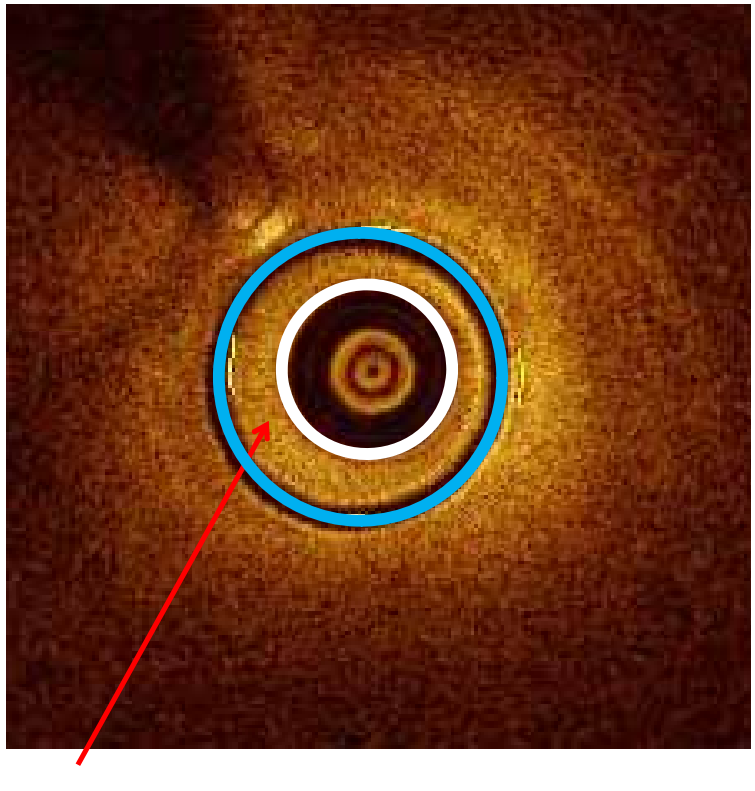
- 1. Guiding catheter
- 2. Contrast
- 3. Flushing the OCT Catheter
- 4. Auto Injector(Manual pullback)

Dragonfly Catheter

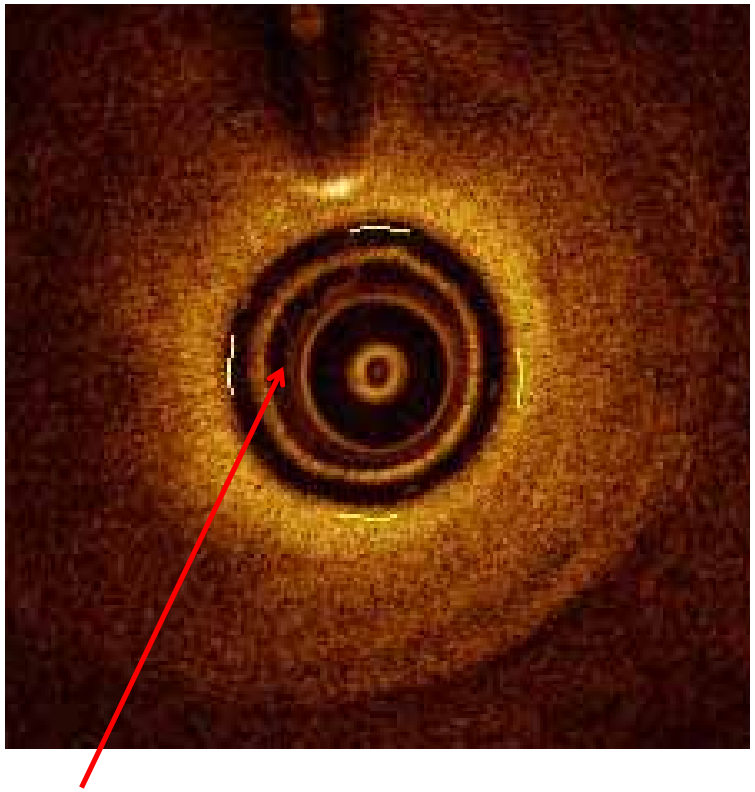


Obtaining Clear Images

Blood in Dragonfly Imaging catheter lumen



Blood in catheter lumen



Catheter lumen purged of blood.

▶Injector Parameters

- **100% contrast only**
- 3ml/sec to 4 ml/sec → **4~5ml/sec**
- 12 ml to 16ml bolus
  - 12ml or **20ml** Control Syringe is recommended
- If using a power injector:
  - **Pressure limit: 300 psi**
  - 0.0 sec rise time

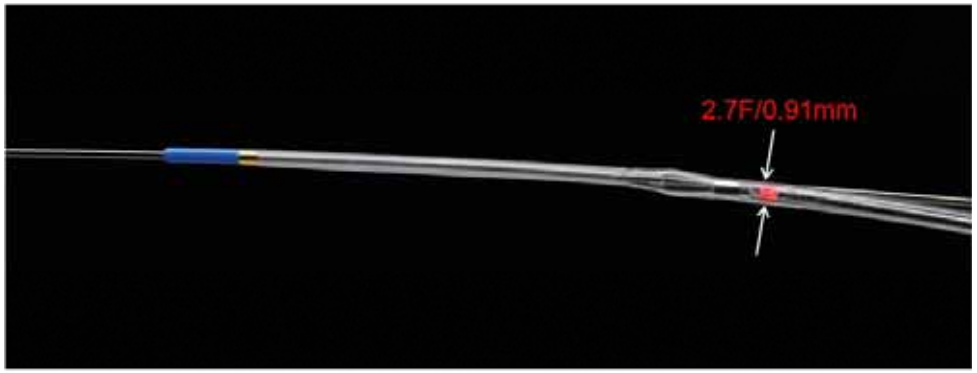
Procedures and Applications of OCT

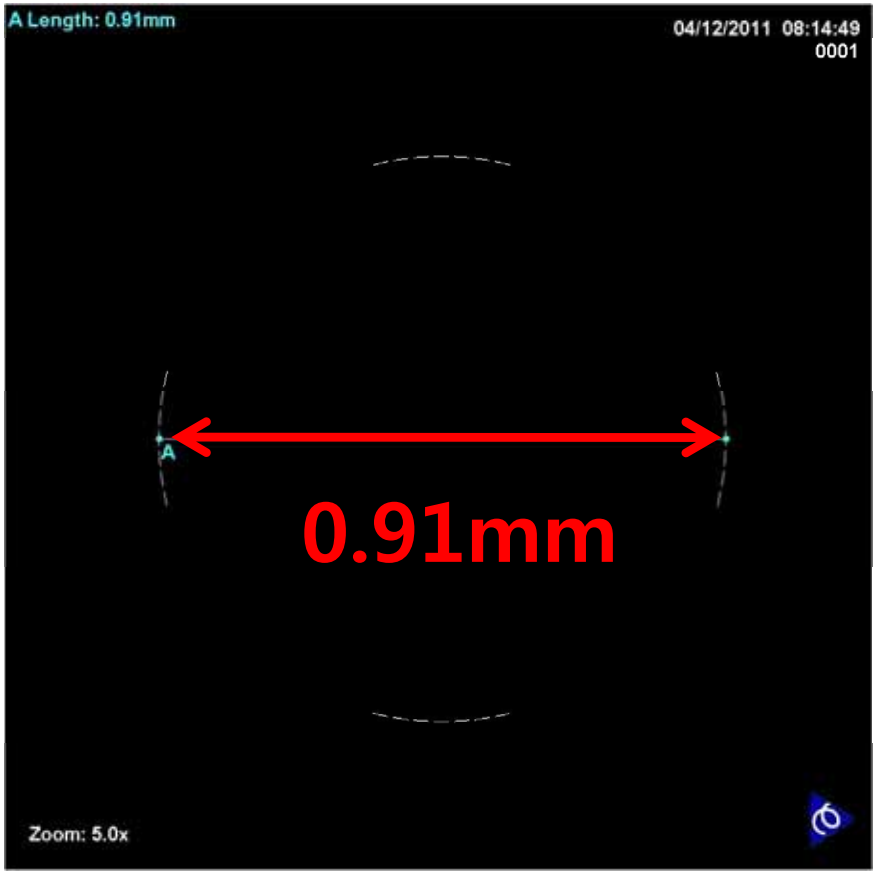
- Pre-PCI and Lesion Assessment

- Tissue differentiation
- Lumen morphology
- Potential culprit lesion
- Measurement of reference segments
- MLA/MLD measurement and identification

Calibration Adjustment Review

The distal (imaging) portion of the Dragon fly sheath is 2.7F or 0.91mm in diameter





The calibration tick marks (fiducials) measure 2.7F or 0.91mm across

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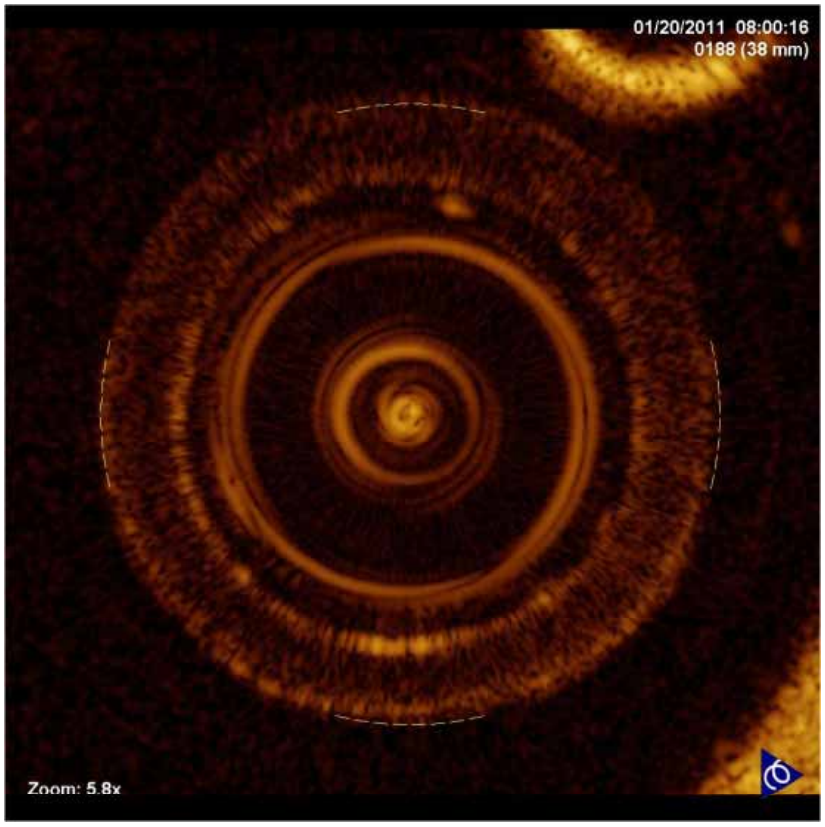
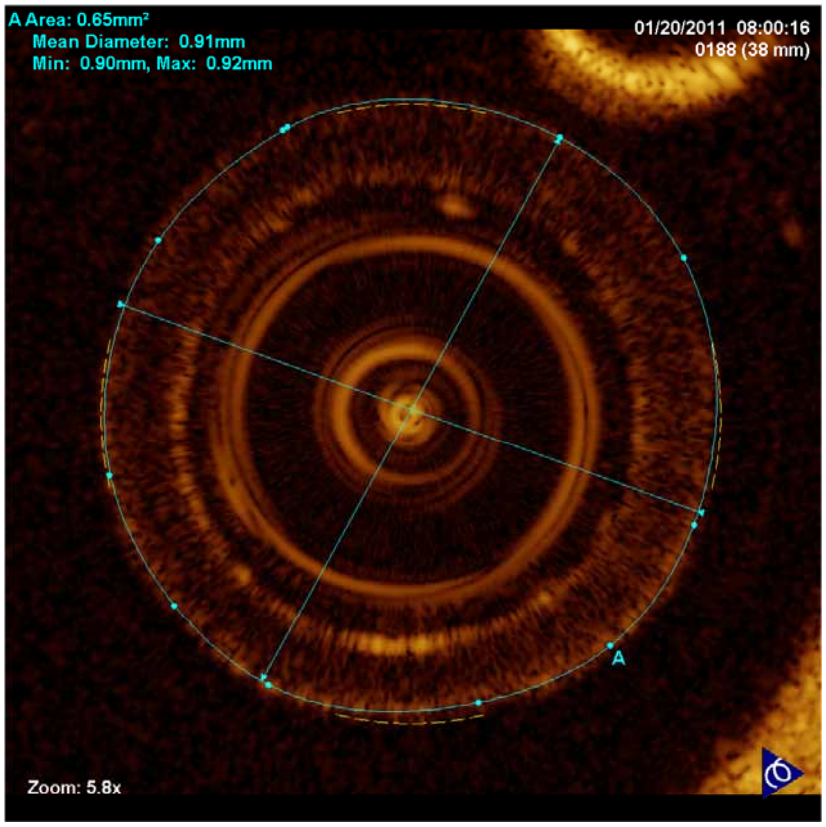
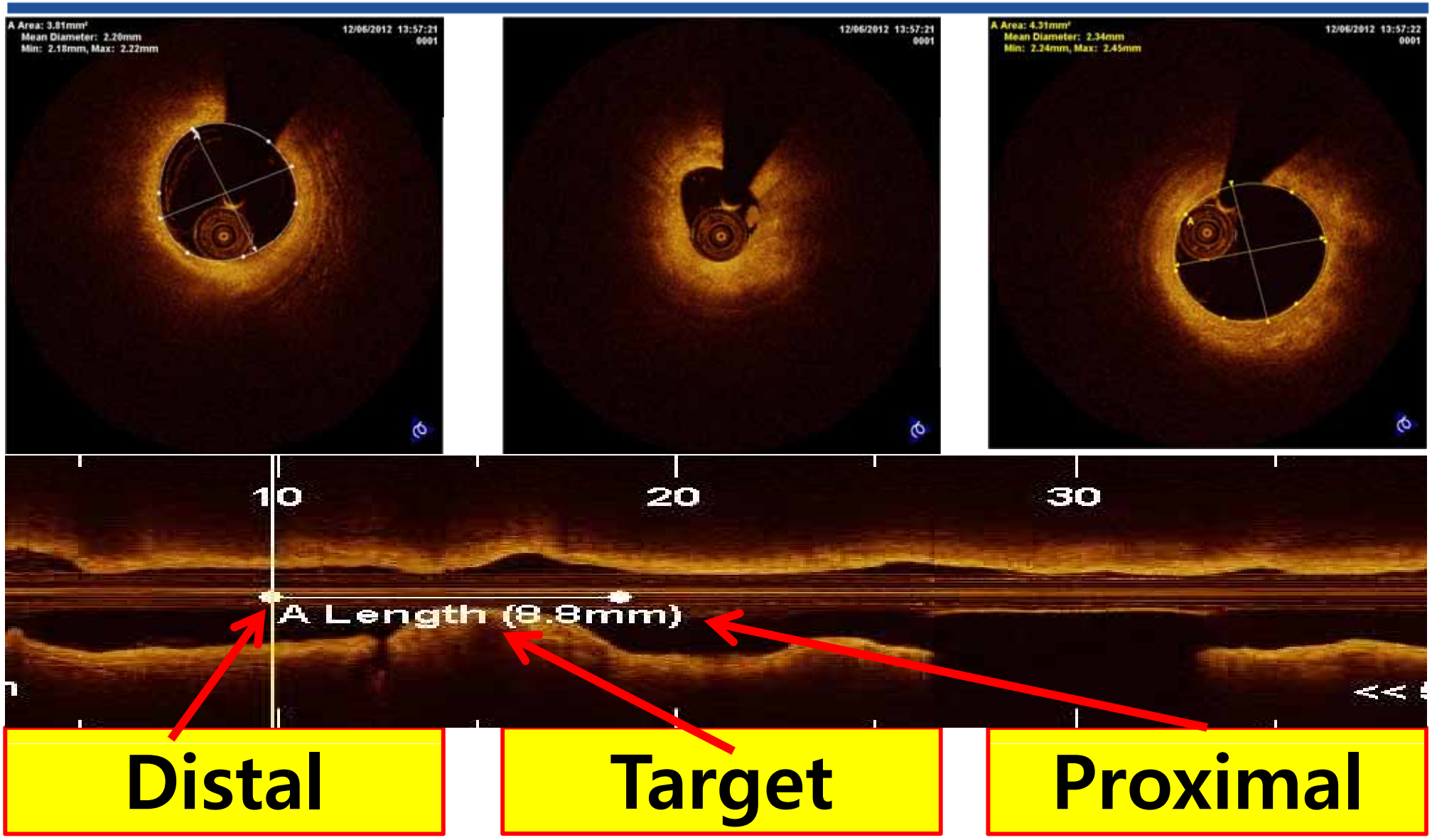
Confirm the Calibration





▶ Measurement of reference segments



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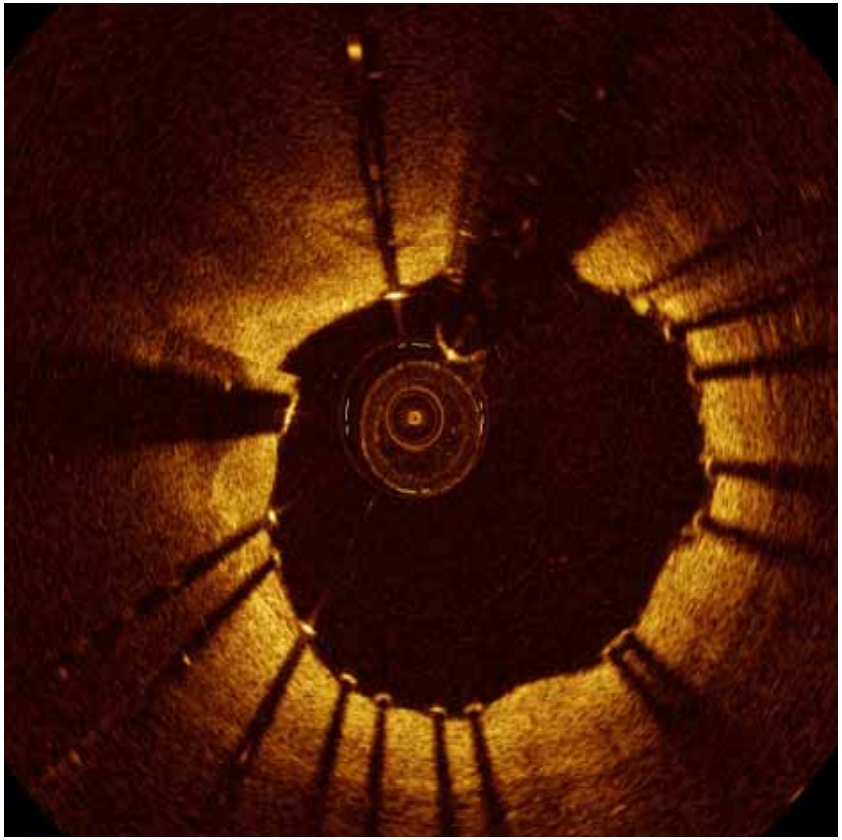
Procedures and Applications of OCT

- Post stent

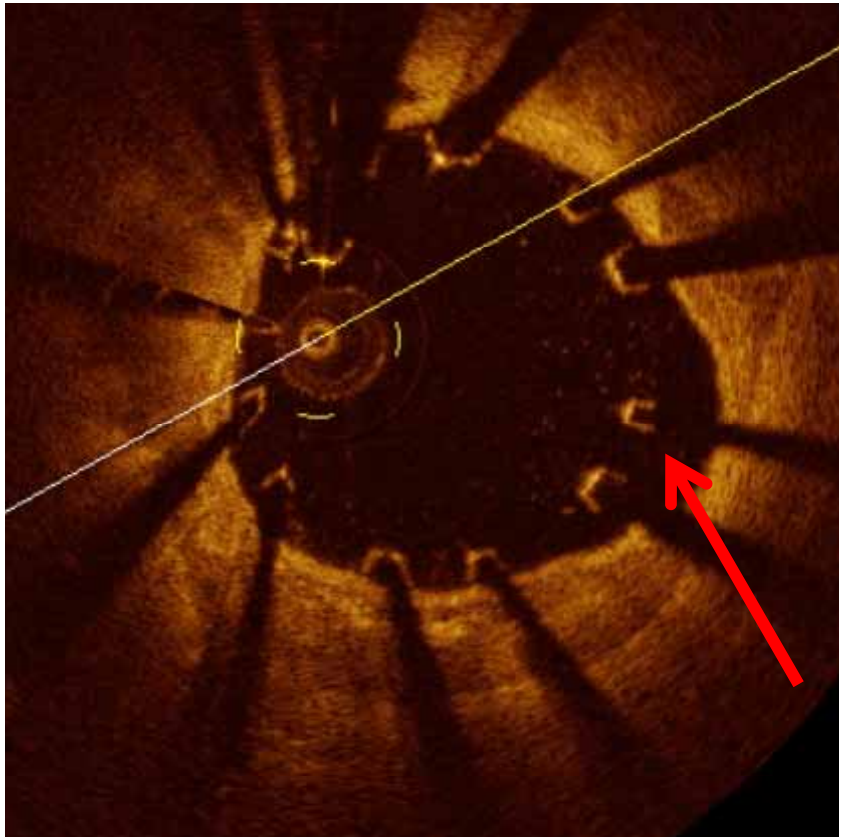
- Lesion coverage and deployment mapping
- Underexpansion and apposition
- Lumen optimization
- Identification of sub-optimal stent results

▶Well & Mal Apposed stent

Well Apposed stent



Malapposed stent

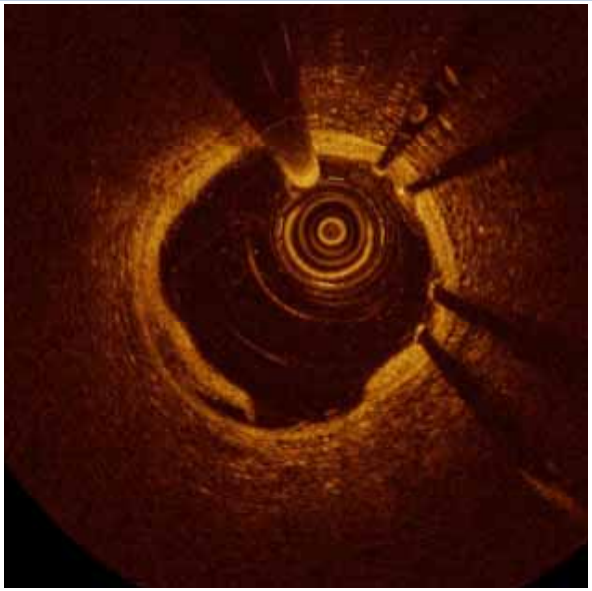


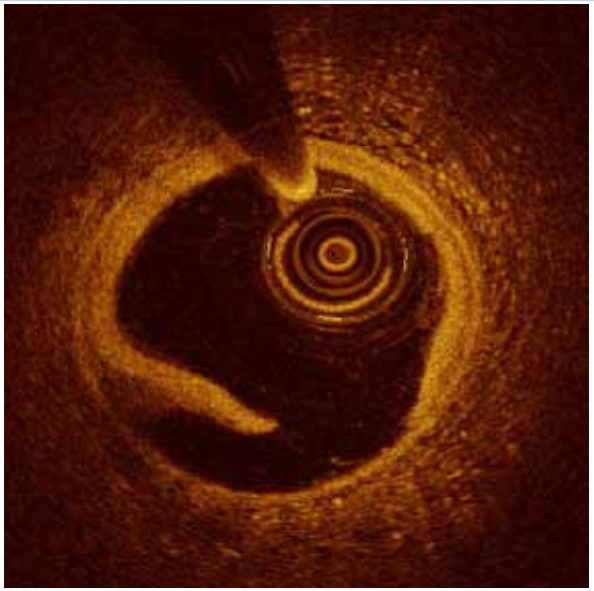
Malapposition 기준

	Apposed		Malapposed
	Embedded	Protruding	**Malapposed**
Cypher	<80μm	80-160μm	**≥160μm**
Taxus (=Nobori,Biomatrix)	<65μm	65-130μm	**≥130μm**
Endeavor	<55μm	55-110μm	**≥110μm**
Xience,promus			**≥100μm**

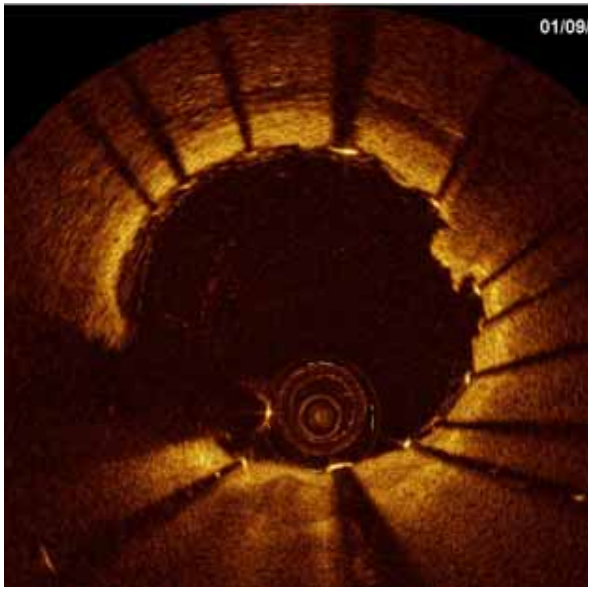
유럽중재술학회 기준

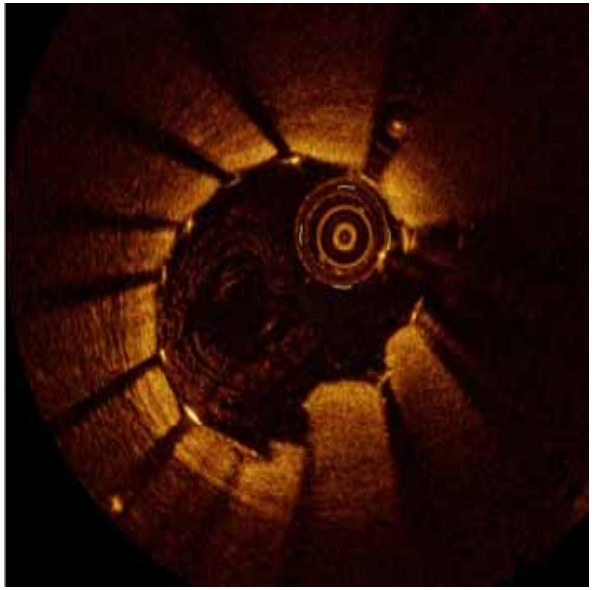
Dissection & Tissue prolapse





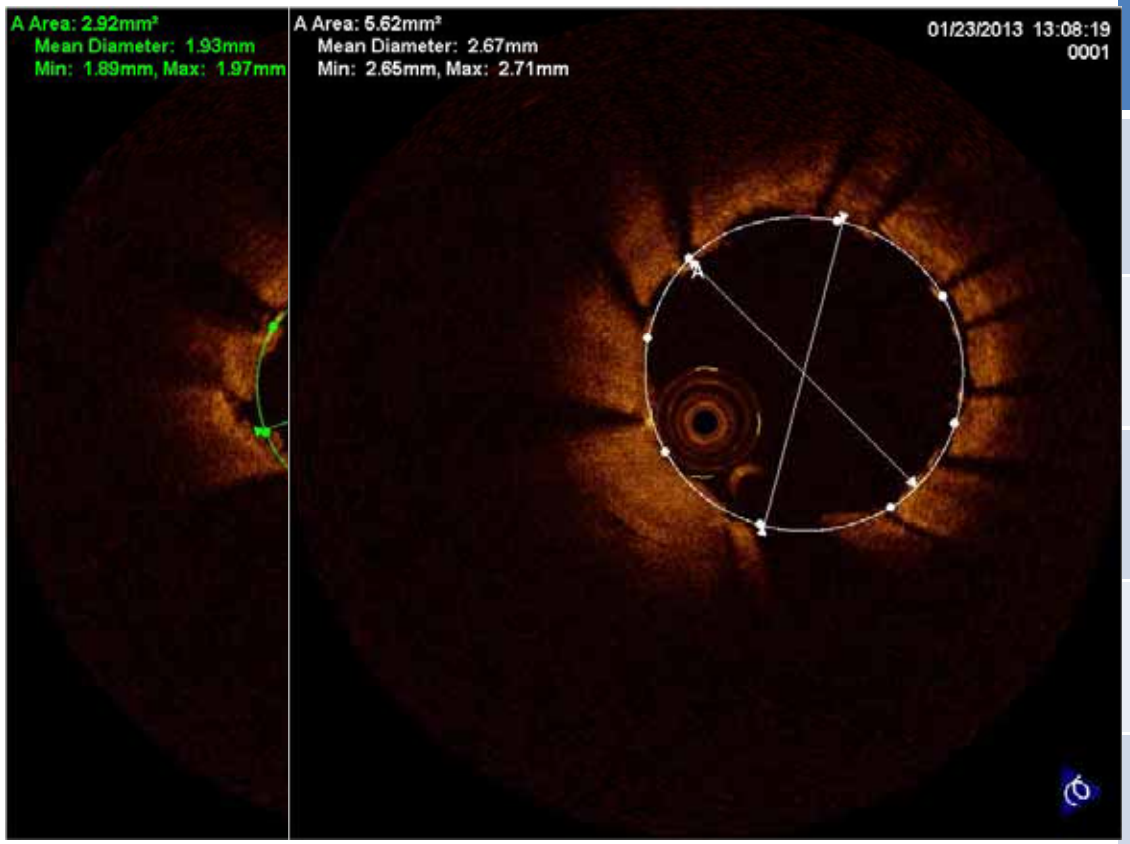
Edge Dissection





Tissue prolapse

Minimal Stent Area(underexpansion)



2.75*14

Stent Diameter	면적(πr²)
2.5mm	4.9mm²
2.75mm	5.89mm²
3.0mm	7.06mm²
3.5mm	9.61mm²
4.0mm	12.56mm²
4.5mm	15.89mm²

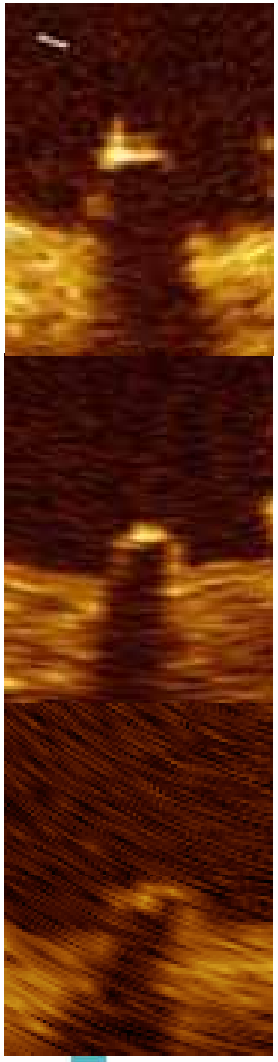
Procedures and Applications of OCT

- Stent Follow-up

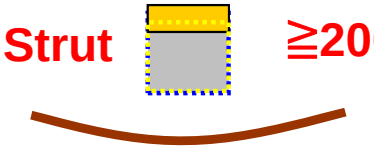
- Restenosis measurements
- Tissue coverage assessment
- Lesion progression
- Neovascularization
- Thrombus

Stent Strut Coverage Patterns

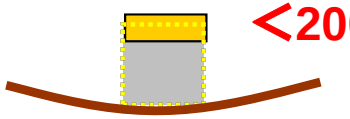
UNCOVERED



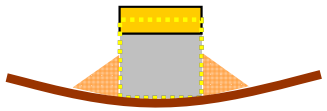
Incomplete Apposition



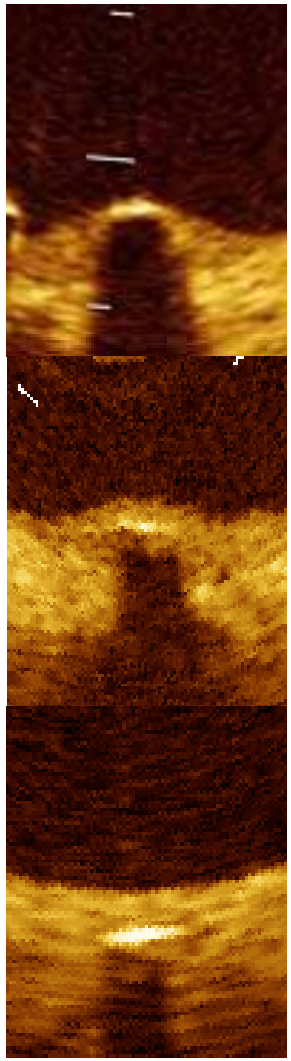
Complete Stent Apposition



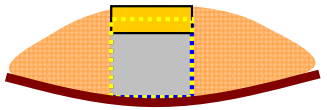
Complete Stent Apposition with irregularity



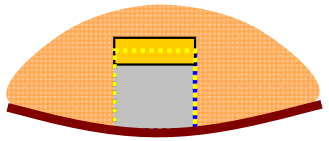
COVERED



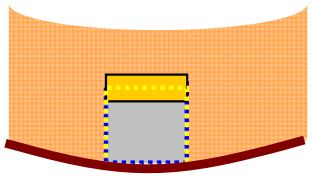
Rhombus



Rhombus with Cover



Full Cover



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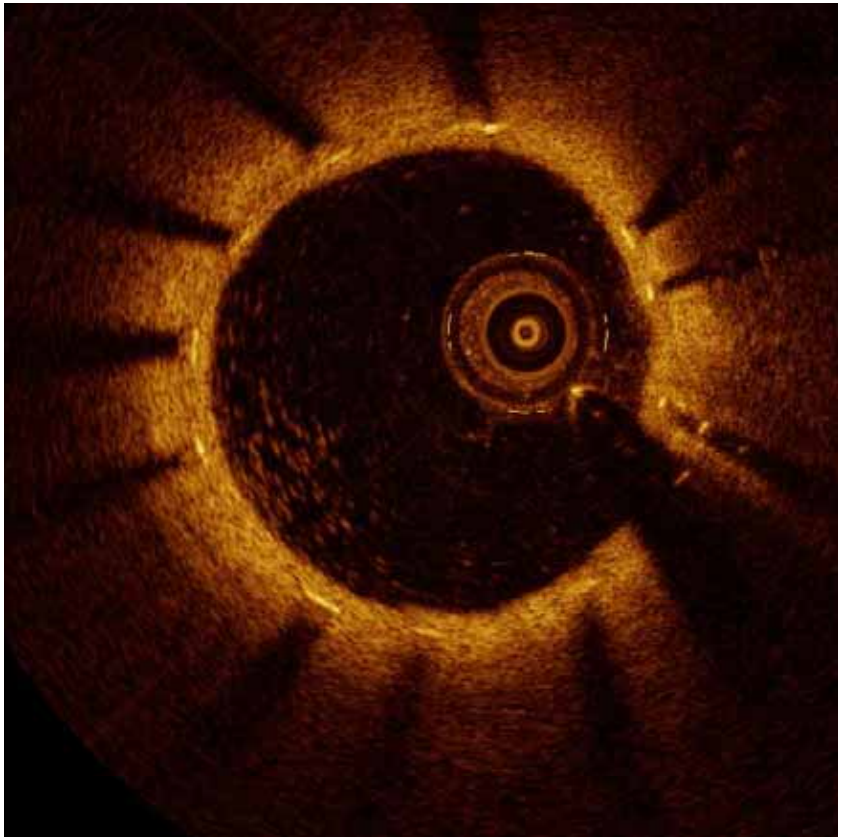
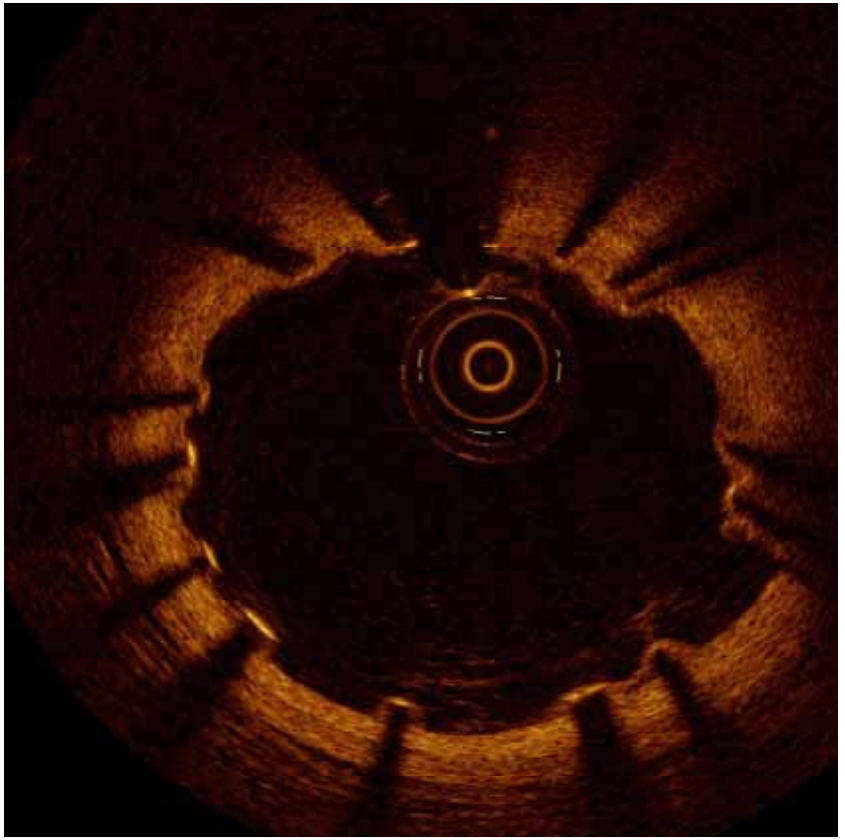
Dr. Suzuki, Toyohashi Heart Center

Coverd & Uncoverd Stent

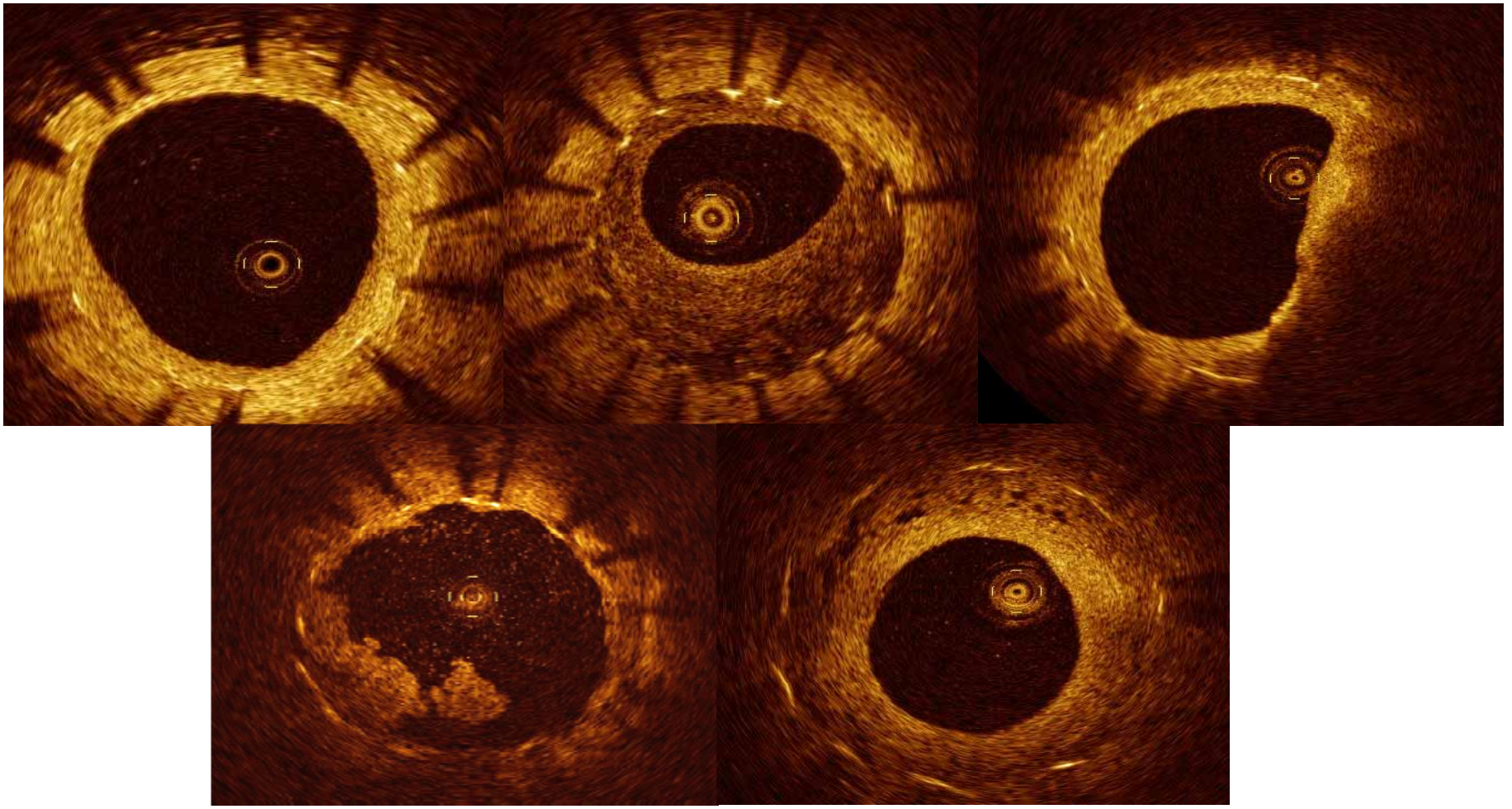
Coverd stent



Uncoverd stent



Qualitative neointimal Evaluation



(A) Homogeneous , (B) heterogeneous , (C) TCFA-like neointima (arrows) and lipid laden neointima (a rrowheads), (D) intracoronary thrombi (arrow), (E) neovascularization (arrows).

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Conclusion

- Advantage of OCT

- Highest resolution in all in vivo imaging technology

But, Always.....
Be careful..!!!!!

- Plaque morphology