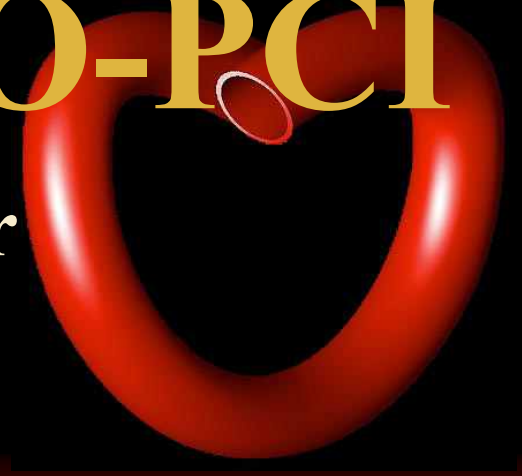
Angioplasty Summit TCTAP 2010

Technical Aspects of Overview in CTO-PCI

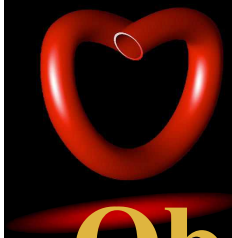


Toyohashi Heart Center

Takahiko Suzuki, M.D

Introduction

- CTO-PCI has been technically and technologically evolved over the past two decades; thereby resulted in the expansion of indications.
- In technical perspective, the development of various techniques including parallel wiring, IVUS guided wiring, as well as retrograde wiring technique was introduced.
- In technological perspective, new guidewires were introduced and significantly improved the success rate of CTO-PCIs.
- The advent of the drug-eluting stent has been improved the long-term patency rate.



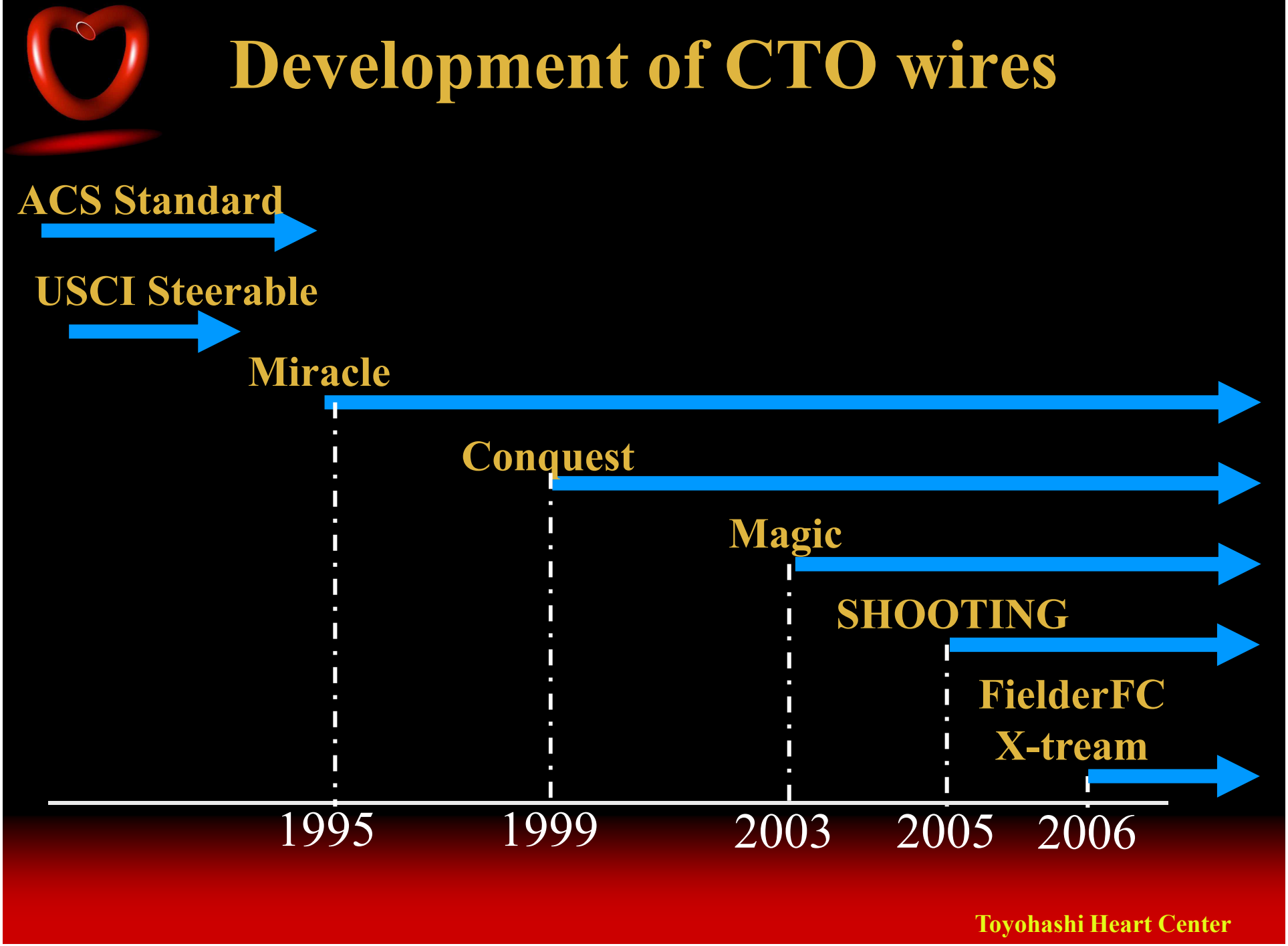
Objective

The aim of this presentation is to introduce current overview CTO-PCI including the operator technique, equipment, and outcomes.

Devices

CTO wires
Microcatheters
Balloon catheters

Development of CTO wires



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1. The superior performance of the device

Current CTO guidewires

Spring coil wire

- Neo's Miracle® (Getz Brothers)
- Neo's Conquest (Getz Brothers)
- AthleteGT Magic® (Japan Life Line)
- Zeon CTO wire® (Zeon Medical)

Hydrophilic coated wire

- Wizard (Nihon Lifeline)
- Fielder bros (Asahi Intec)
- X-treme (Asahi Intec)
- Choice PT® (Boston Scientific)

Neo's Miracle®

The concepts of the wire

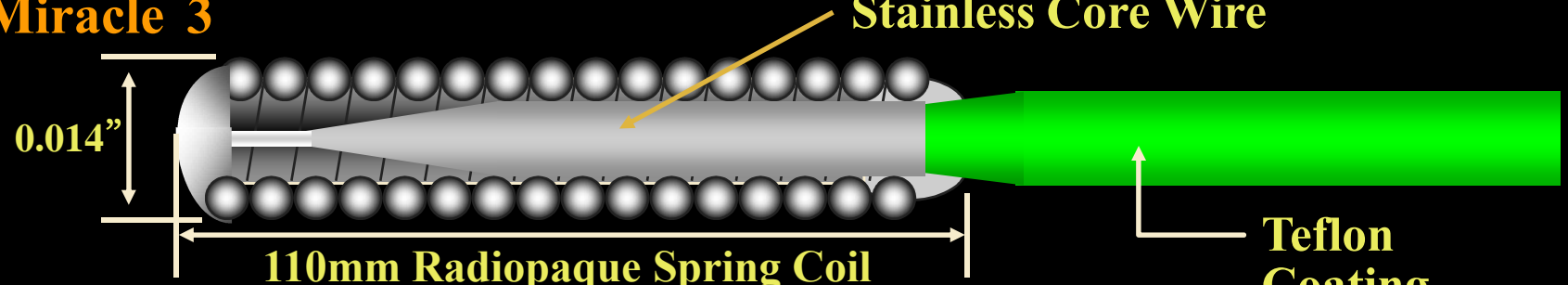
- Thicker Spring Coil
- Thicker Core Wire
- Shorter Length of Spring Coil

→

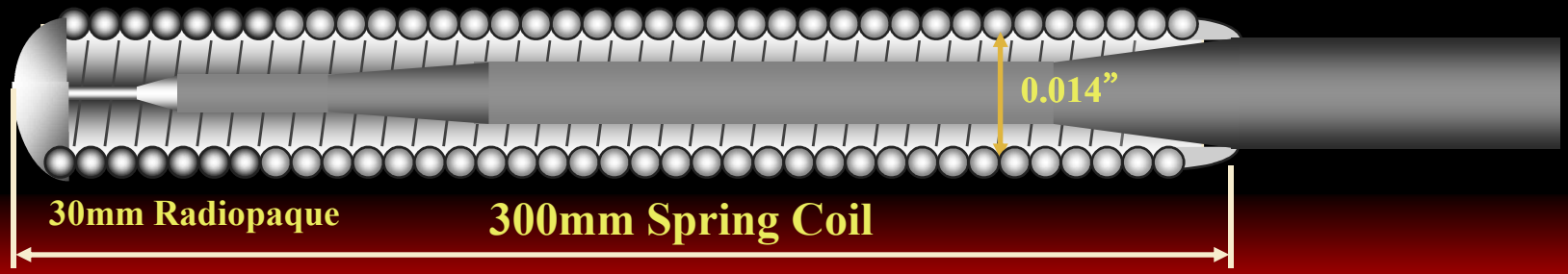
- Better Torque
- Greater Strength
- NoWire Trapping

Variations of Stiffness to Match Lesion Characteristics

✸Miracle 3



✸ACS HI-TORQUE STD.™



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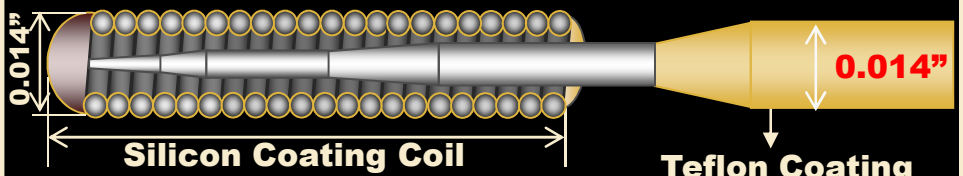
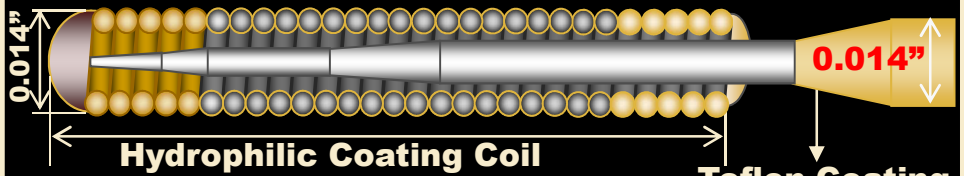
Spring coil wires

Miracle



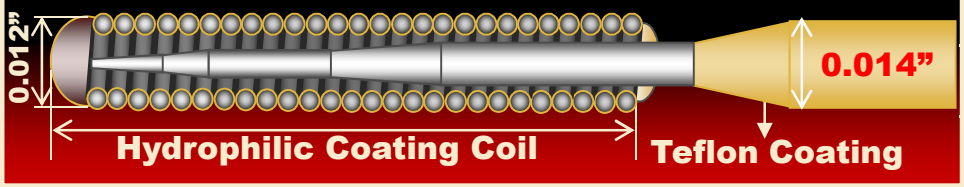
Wire Diameter	Tip Radiopaque
0.014”/ 0.014 ”	11cm Platinum
Tip Stiffness	Coating (Dis./ Prox.)
3.0,4.5,6.0,12.0g	Silicon / Teflon

Magic

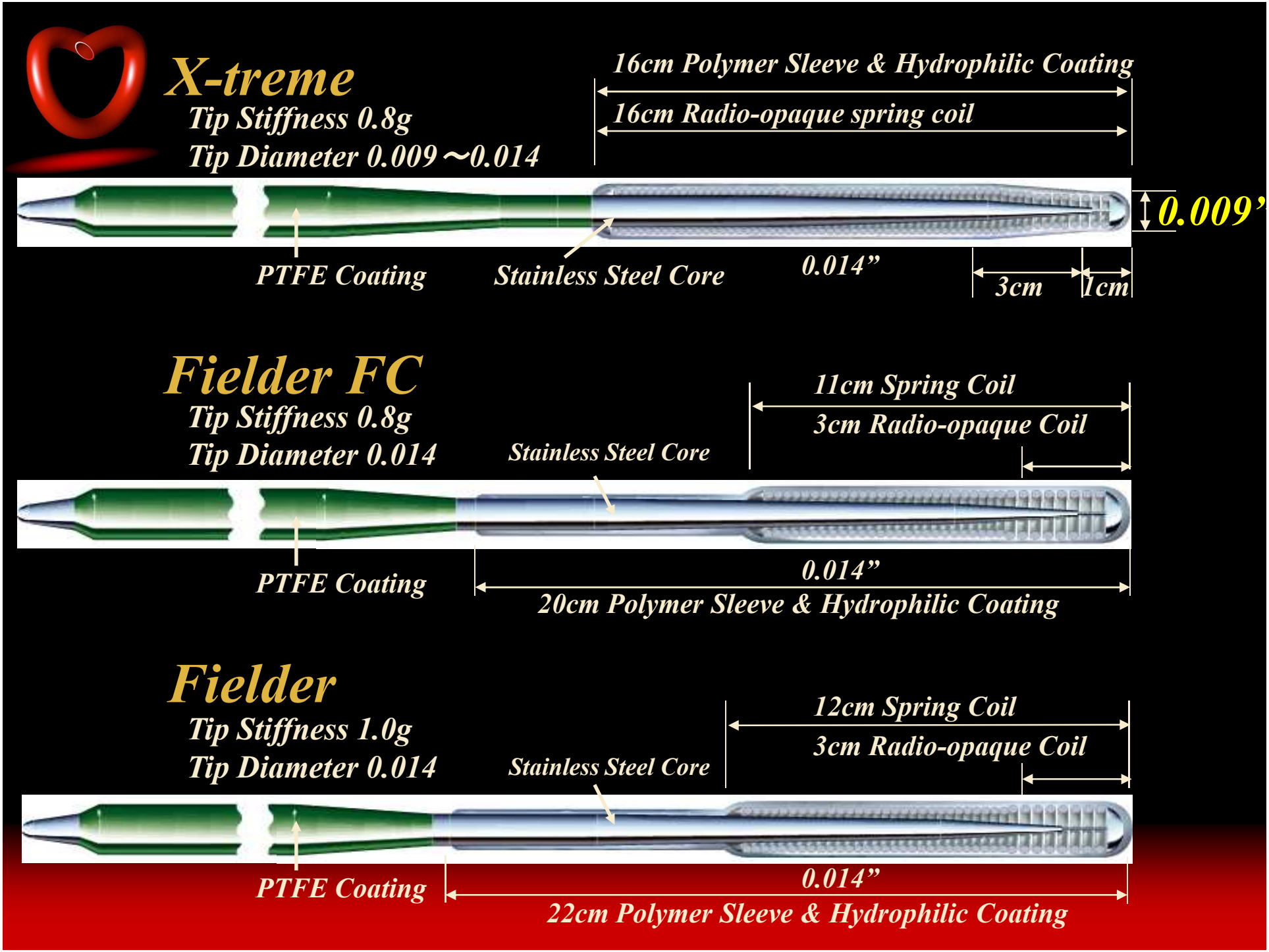


Wire Diameter	Tip Radiopaque
0.014”/ 0.014 ”	2cm Gold Tip
Tip Stiffness	Coating (Dis./ Prox.)
4.5,9.0,18.0g	Hydrophilic / Teflon

ZEON CTO NEW!



Wire Diameter	Tip Radiopaque
0.012” / 0.014 ”	12cm Platinum
Tip Stiffness	Coating (Dis./ Prox.)
4.5,9.0,15.0g	Hydrophilic / Teflon


X-treme
Tip Stiffness 0.8g
Tip Diameter 0.009～0.014
16cm Polymer Sleeve & Hydrophilic Coating
16cm Radio-opaque spring coil
0.009’
PTFE Coating
Stainless Steel Core
0.014”
3cm
1cm
Fielder FC
Tip Stiffness 0.8g
Tip Diameter 0.014
Stainless Steel Core
11cm Spring Coil
3cm Radio-opaque Coil
PTFE Coating
0.014”
20cm Polymer Sleeve & Hydrophilic Coating
Fielder
Tip Stiffness 1.0g
Tip Diameter 0.014
Stainless Steel Core
12cm Spring Coil
3cm Radio-opaque Coil
PTFE Coating
0.014”
22cm Polymer Sleeve & Hydrophilic Coating

Wizard Basic Information

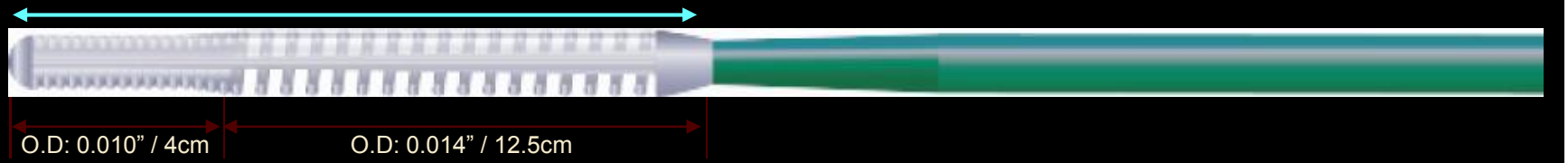
Specification

PTCA GUIDE WIRE ATHLETE Wizard 1

1g

PTCA GUIDE WIRE ATHLETE Wizard 3

3g



Model	Tip Stiffness	Radiopaque	Coating	全長
WIZARD 1	**1g**	**16.5cm**	**17cm Hydrophilic**	**178cm**
WIZARD 3	**3g**	**16.5cm**	**17cm Hydrophilic**	**178cm**

Microcatheters

Microcatheters

Transit 2 (Cordis)

Excelsior (Boston Scientific)

Good Master (Goodman)

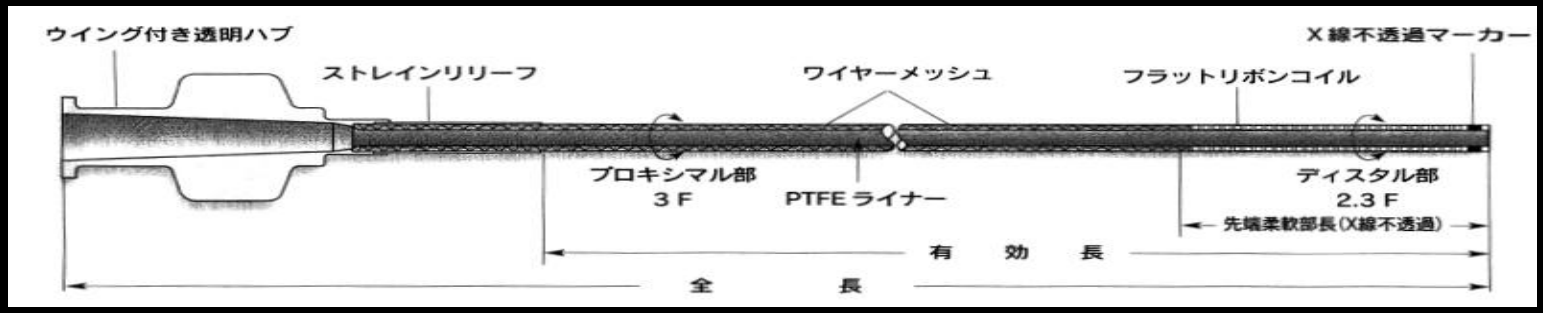
Finecross MG (Terumo)

Ichibanyari (Kaneka)

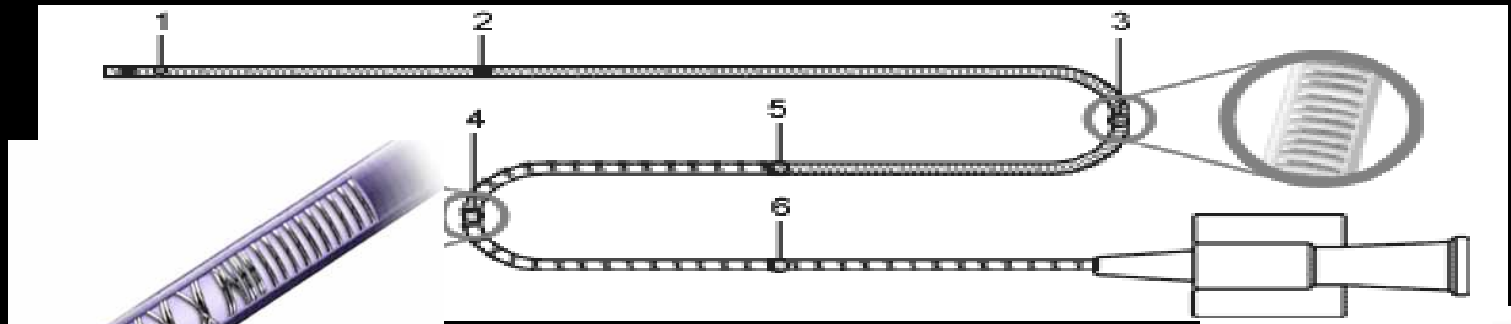
Tornus (Asahi Intec)

Corsair (Asahi Intec)

Micro catheters

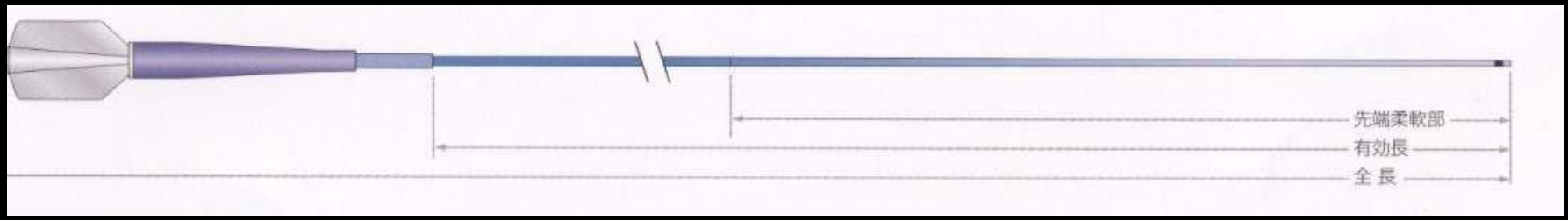


Transit 2 (Cordis)

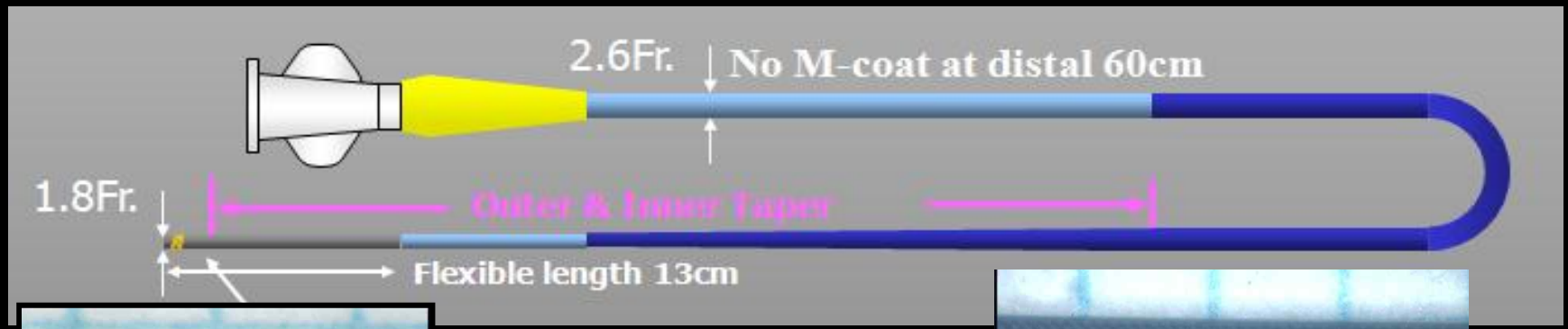


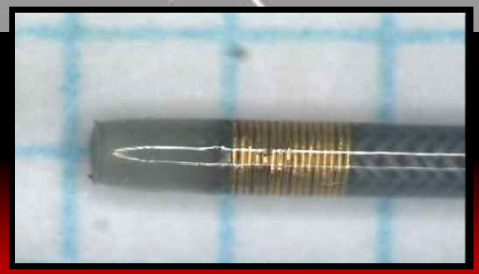
Excelsior (Boston Scientific)

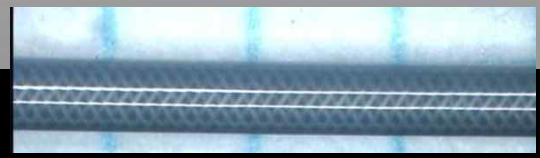
Micro catheters



Good Master (Goodman)

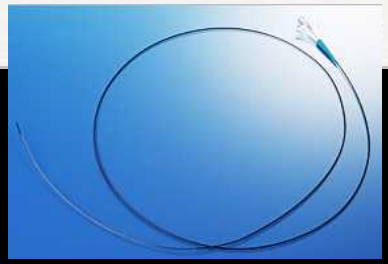




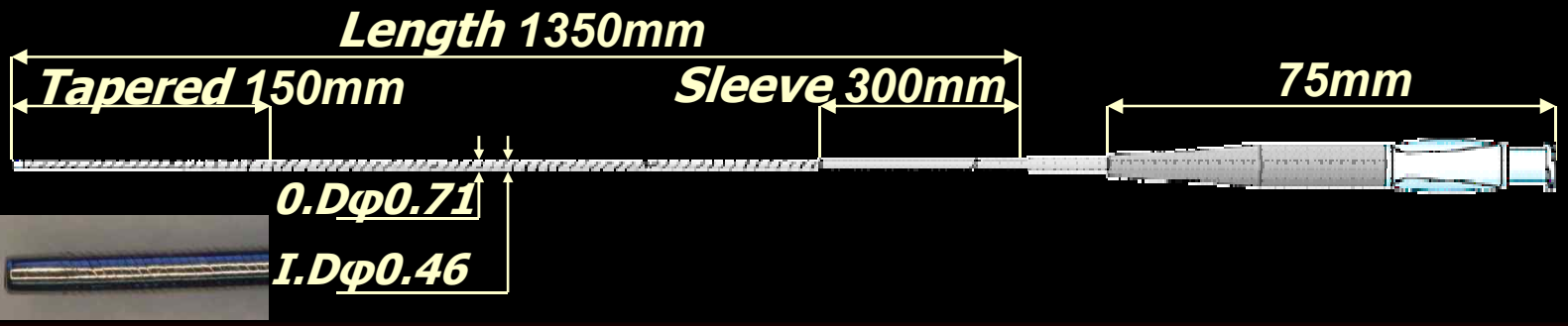


Finecross MG (Terumo)

Micro catheters

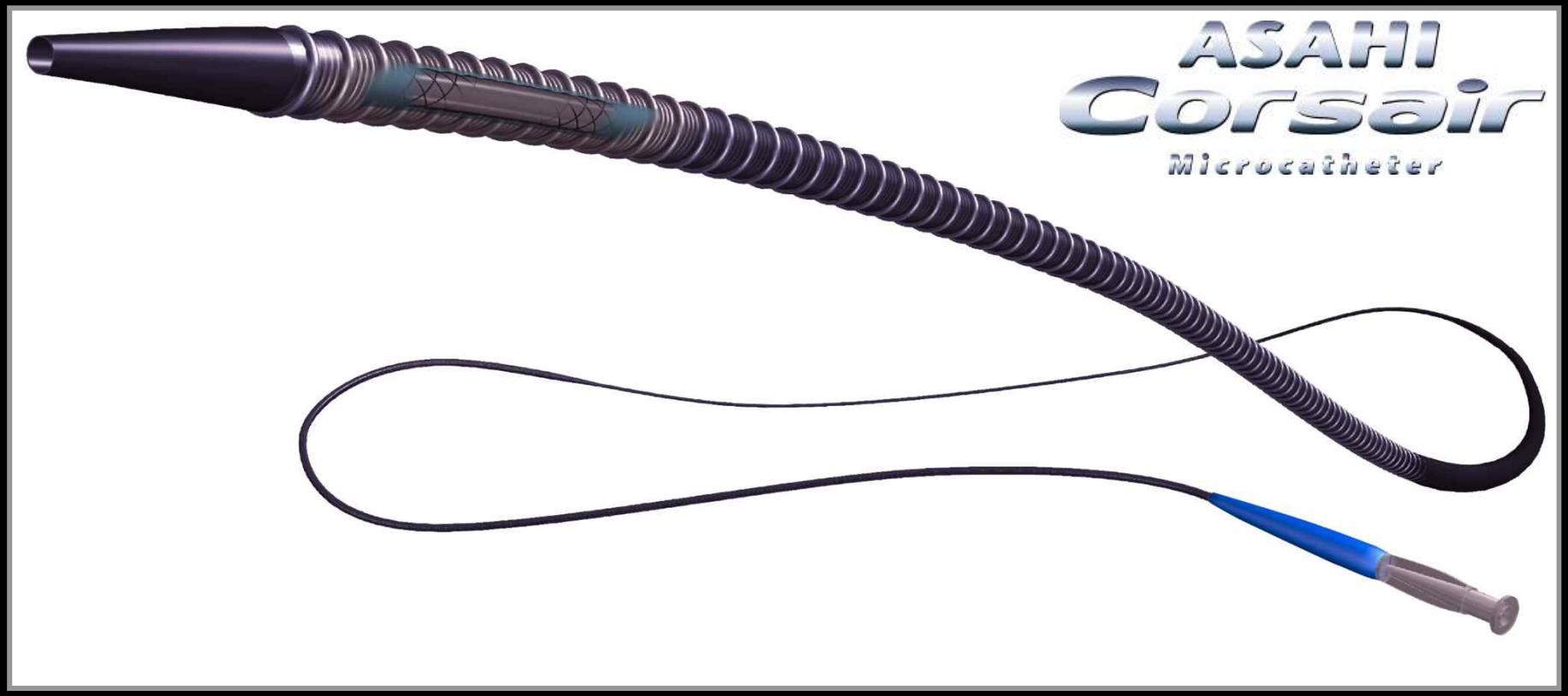


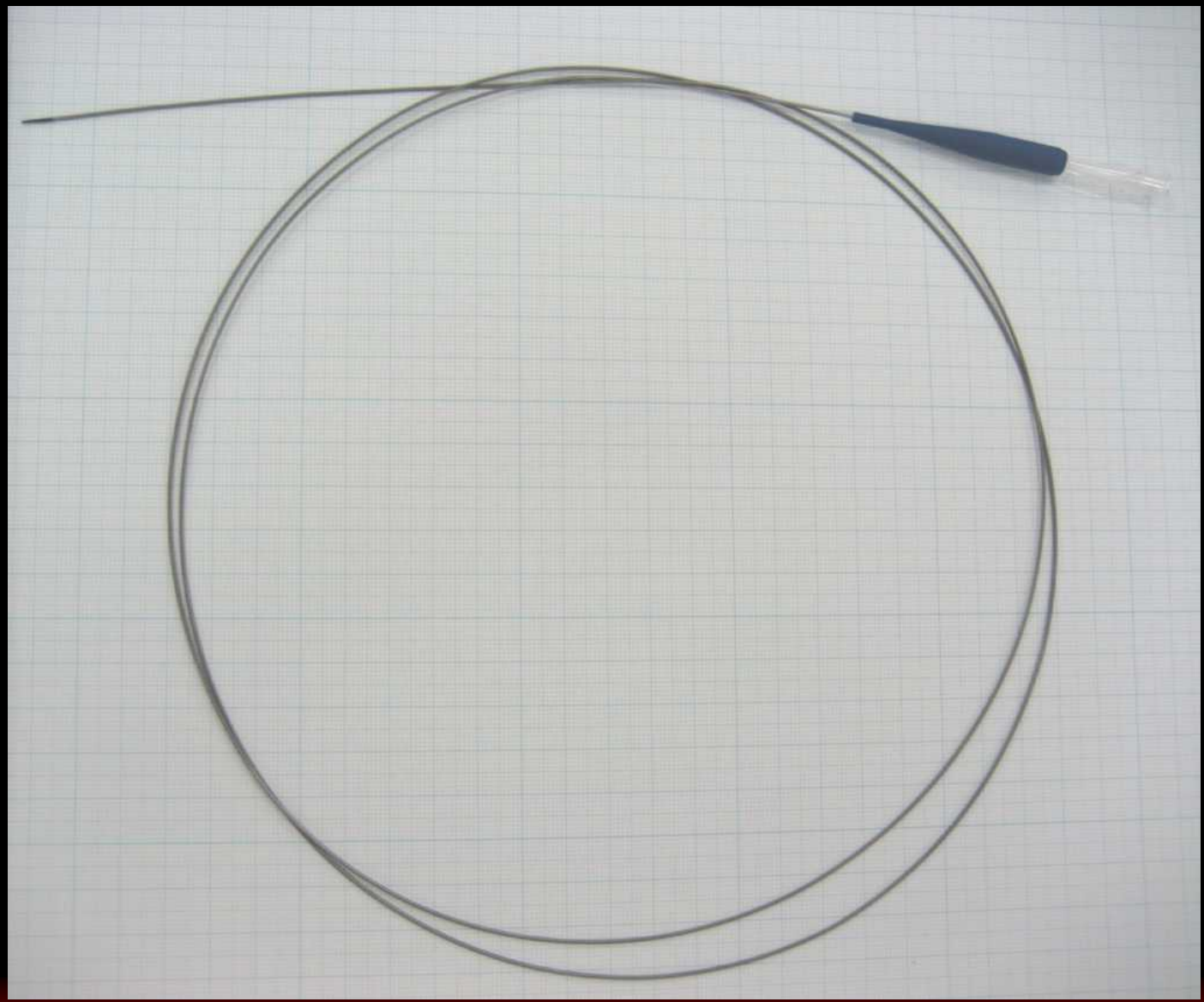
Ichibanyari (Kaneka)



Tornus (Asahi Intecc)

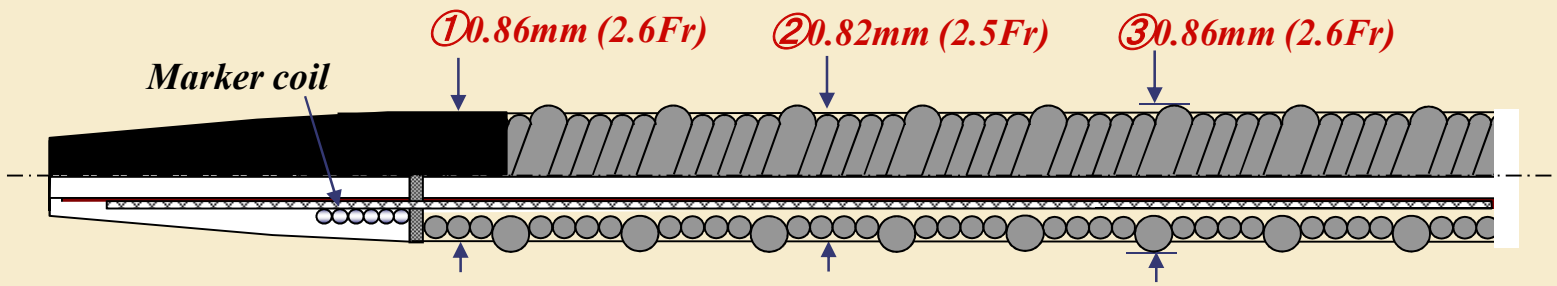
Channel Dilator
Corsair





Basic structure is same as Tornus device.

Corsair



- *Tapered Soft Tip*
- *20cm Screw Head Structure*
- *Hydrophilic Polymer Coating*
- *PTFE Inner Layer*

ASAHI Corsair Microcatheter

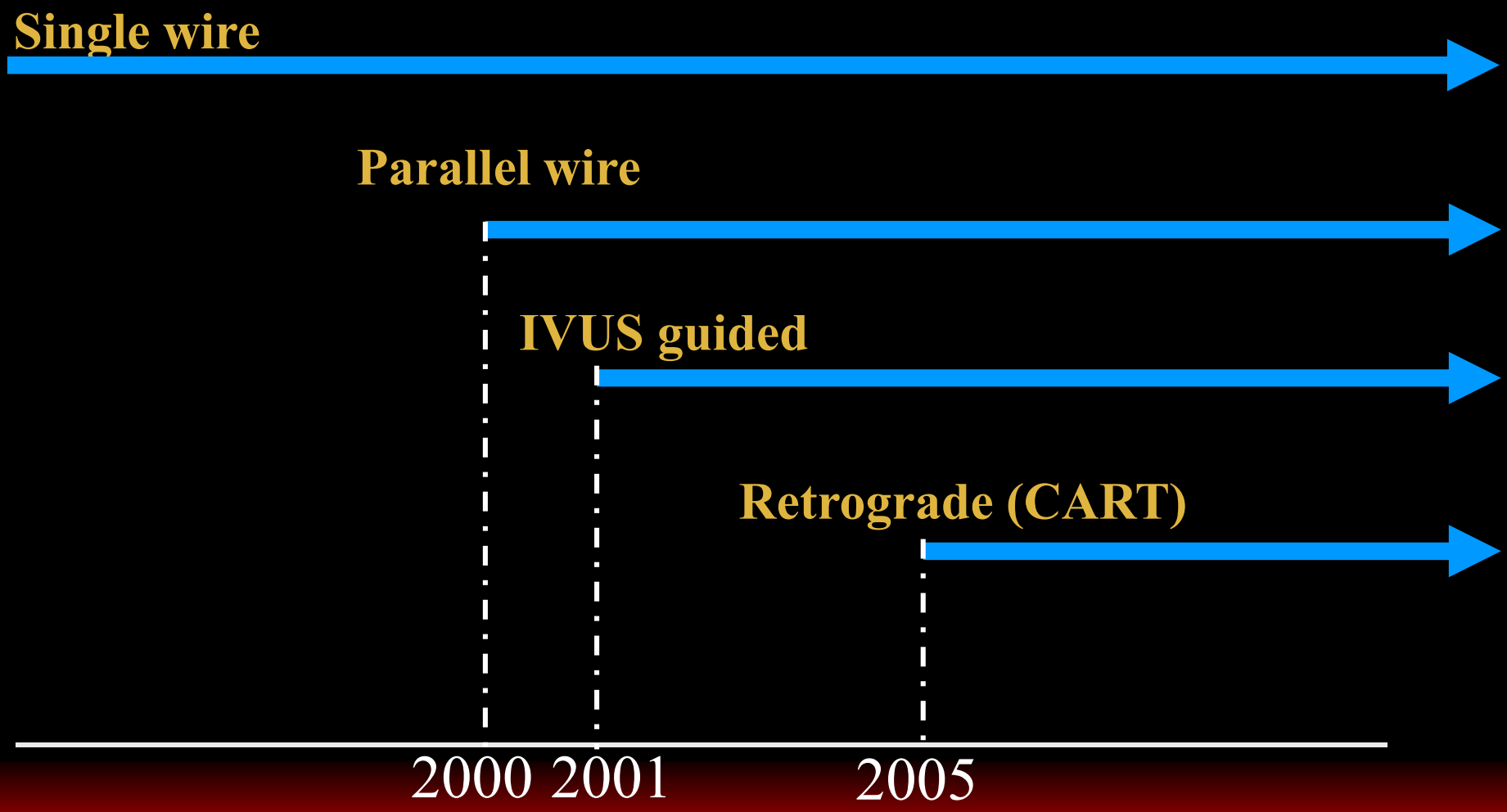
Balloon Catheters

Balloon Catheters for CTO-PCIs

Operator Techniques

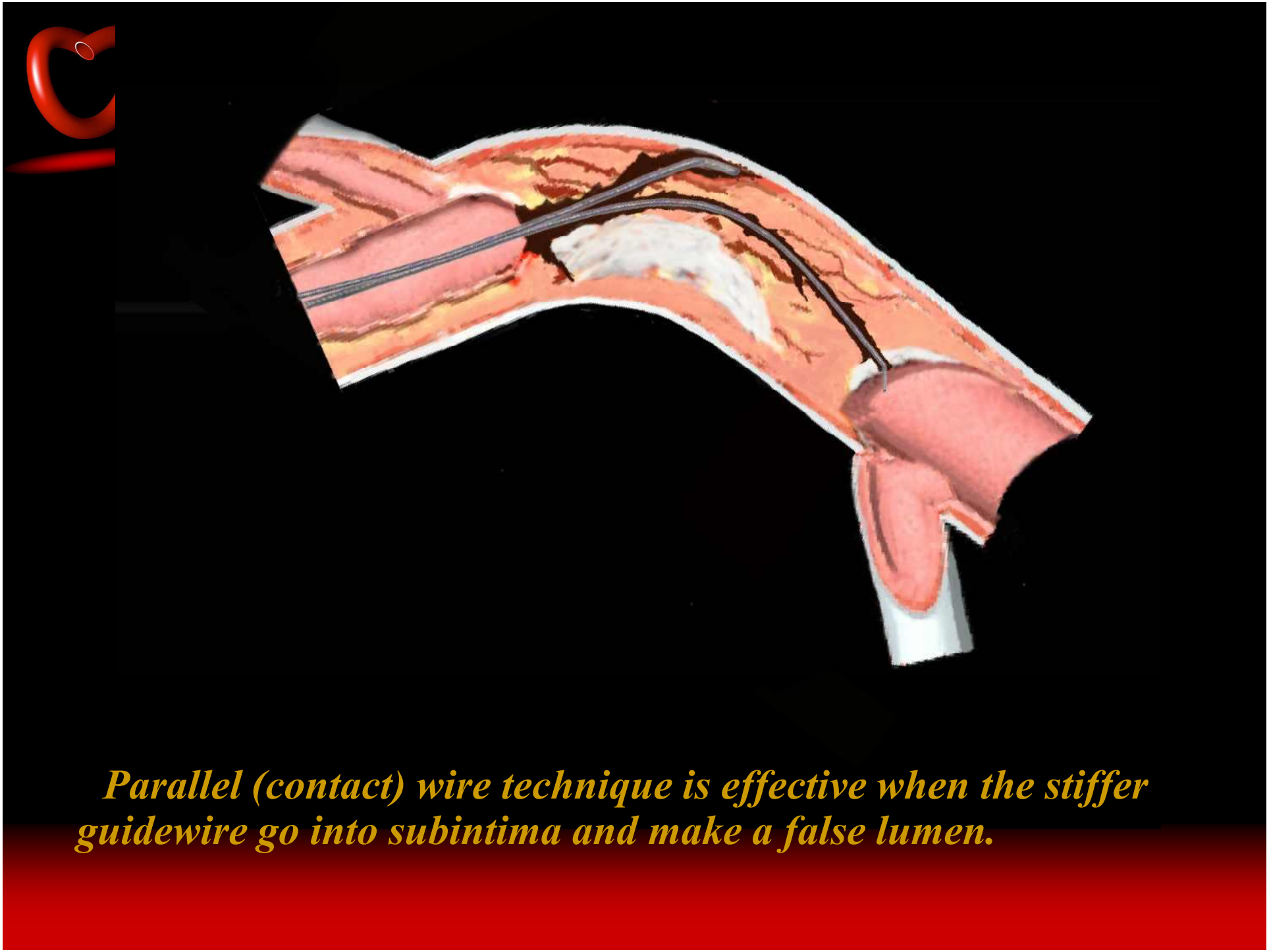
Single technique
Parallel wiring technique
IVUS guide wiring technique
Retrograde wiring technique

Development of CTO Techniques



Advanced CTO technique-1

Parallel Wire (Contact wire Technique)



Parallel (contact) wire technique is effective when the stiffer guidewire go into subintima and make a false lumen.

CCT 2010

CCT 2010 Live Case Demonstration

Toyohashi Heart Center

Case 19 T *70's. male*

Target Lesion:* *mid LAD (CTO)

Diagnosis: OMI, AP

Prior intervention:

'09.12.15 STENT (ost RCA AMI) Cypher
STENT (prox. RCA) TAXUS

Coronary risk factor:

HT, Current smoking

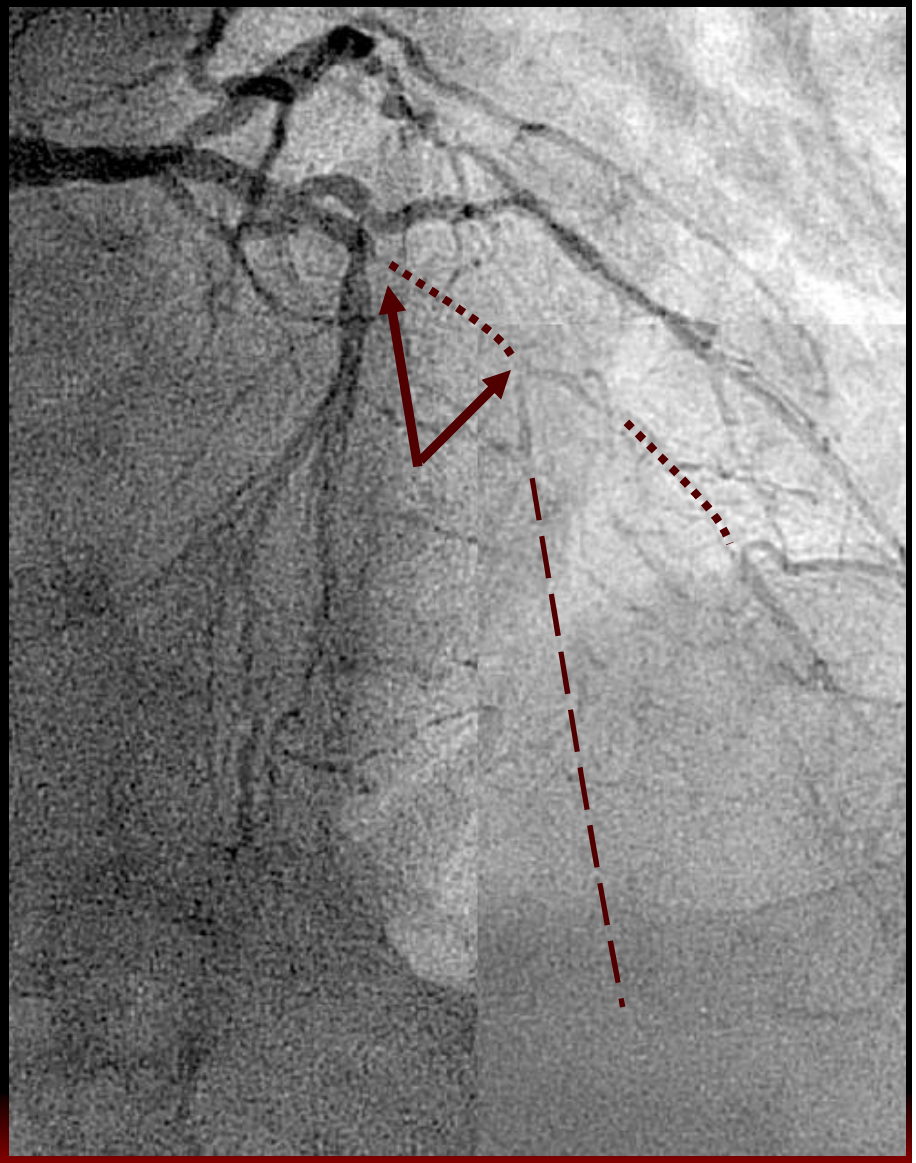
EuroSCORE: 5

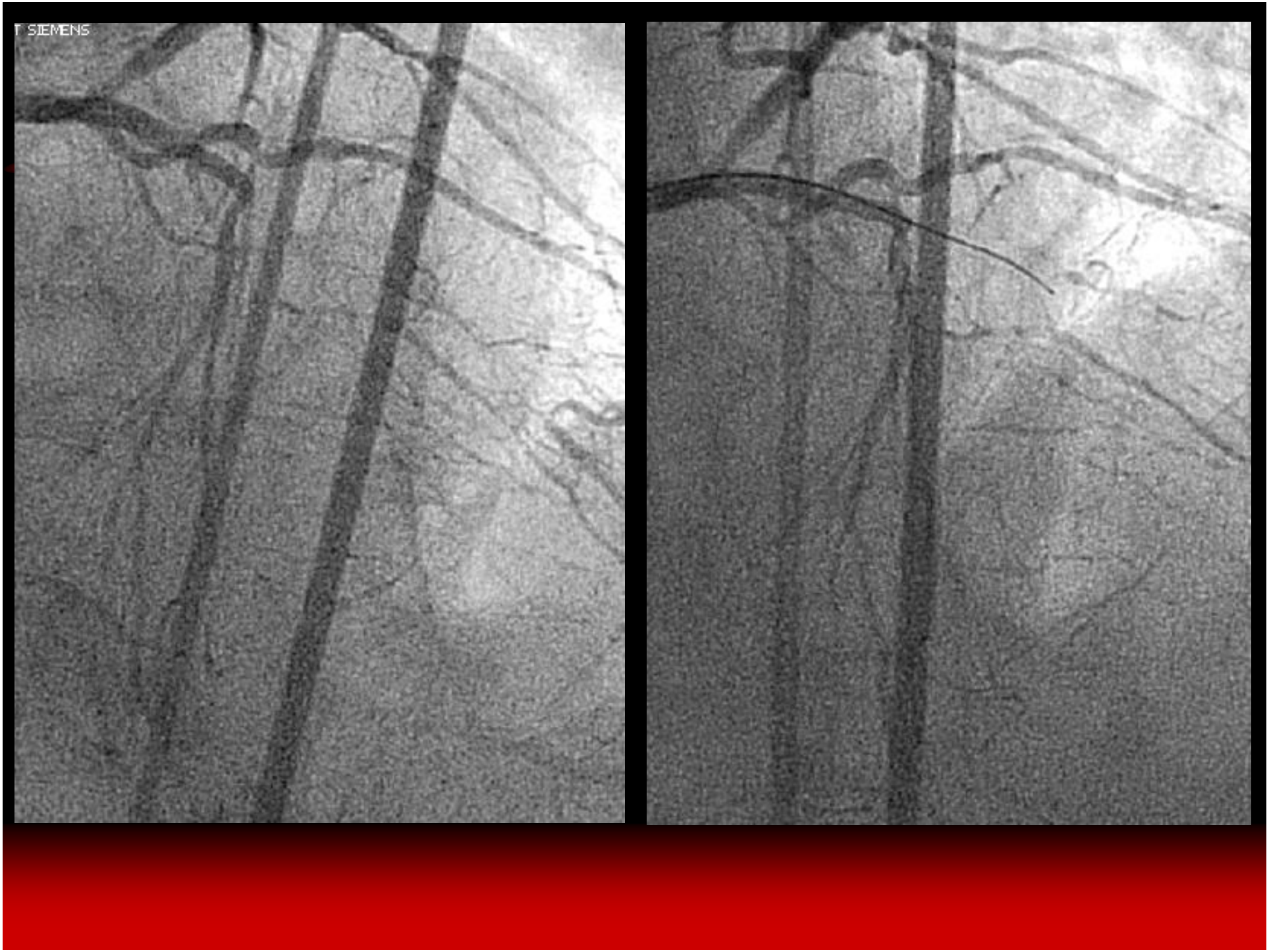
SYNTAX Score: 36

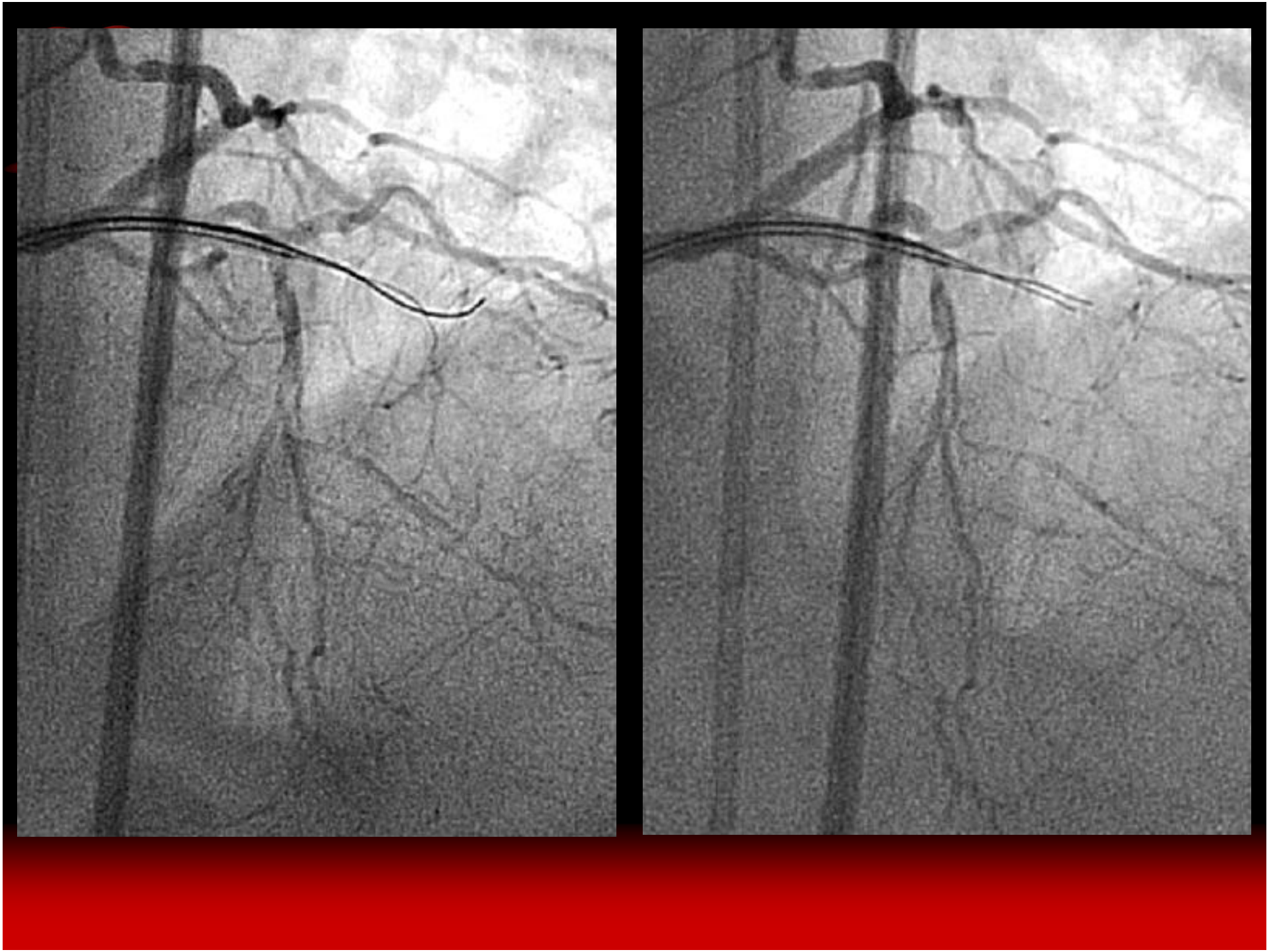
Final CAG findings: '09.12.15

LVEF: 46%

CAG: mid LAD 100%, LM 50%,
prox. LCX 75%, mid LCX 90%,
prox RCA 90%(AMI)-> 0%(Cypher+TAXUS)

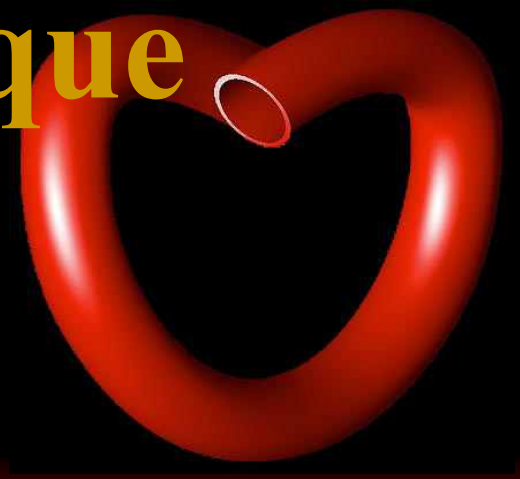



SIEMENS



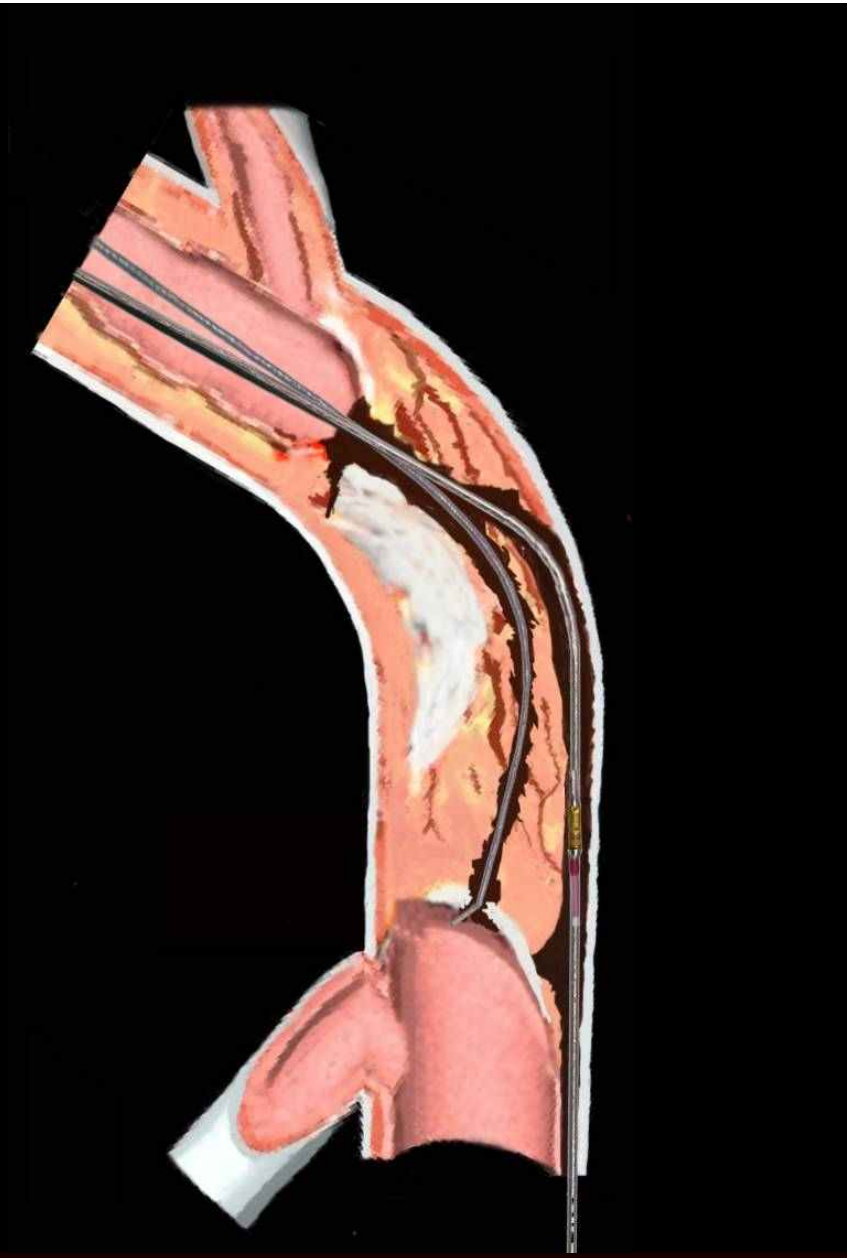
Advanced CTO technique-2

IVUS Guided Wiring Crossing Technique



How to IVUS Guide Wire Crossing Technique

1. *Advance the guidewire into the subintimal space*
2. *Subintimal space is enlarged with a 1.5mm balloon catheter along with the guidewire*
3. *IVUS catheter is advanced into the subintimal space. Stiff guidewire is advanced into the true lumen.*
4. *Wire manipulation under IVUS imaging*

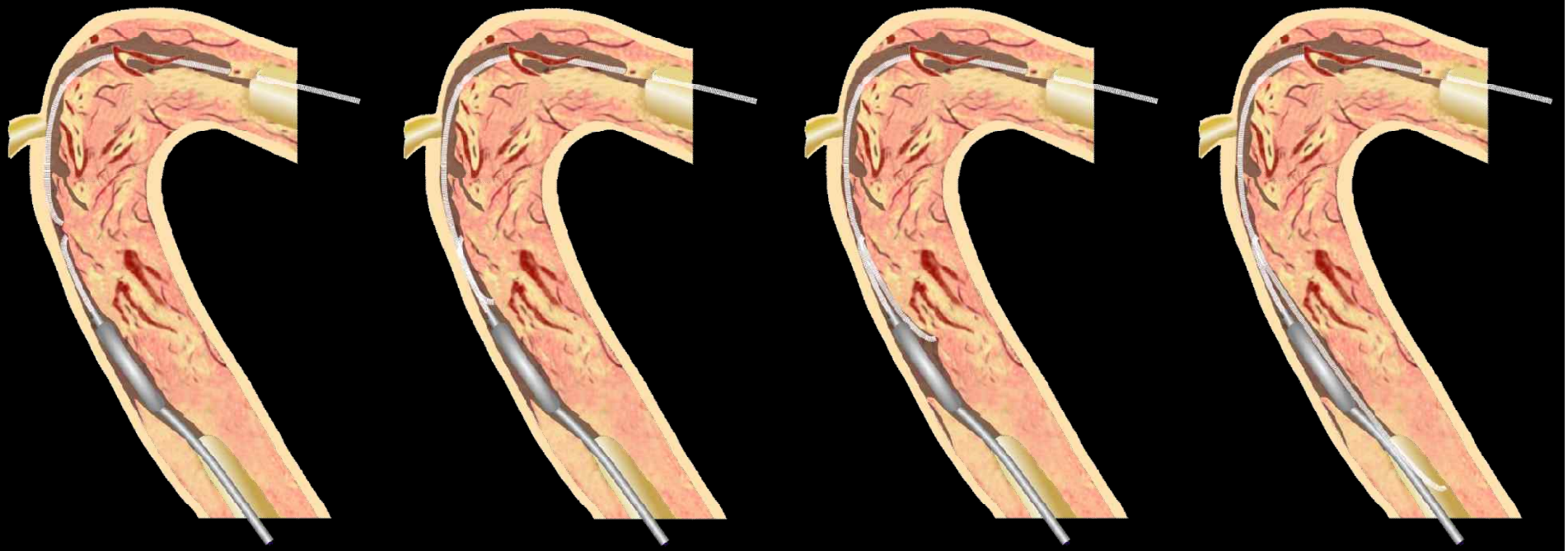


Advanced CTO technique-3

Retrograde Technique

Concept of CART™ technique

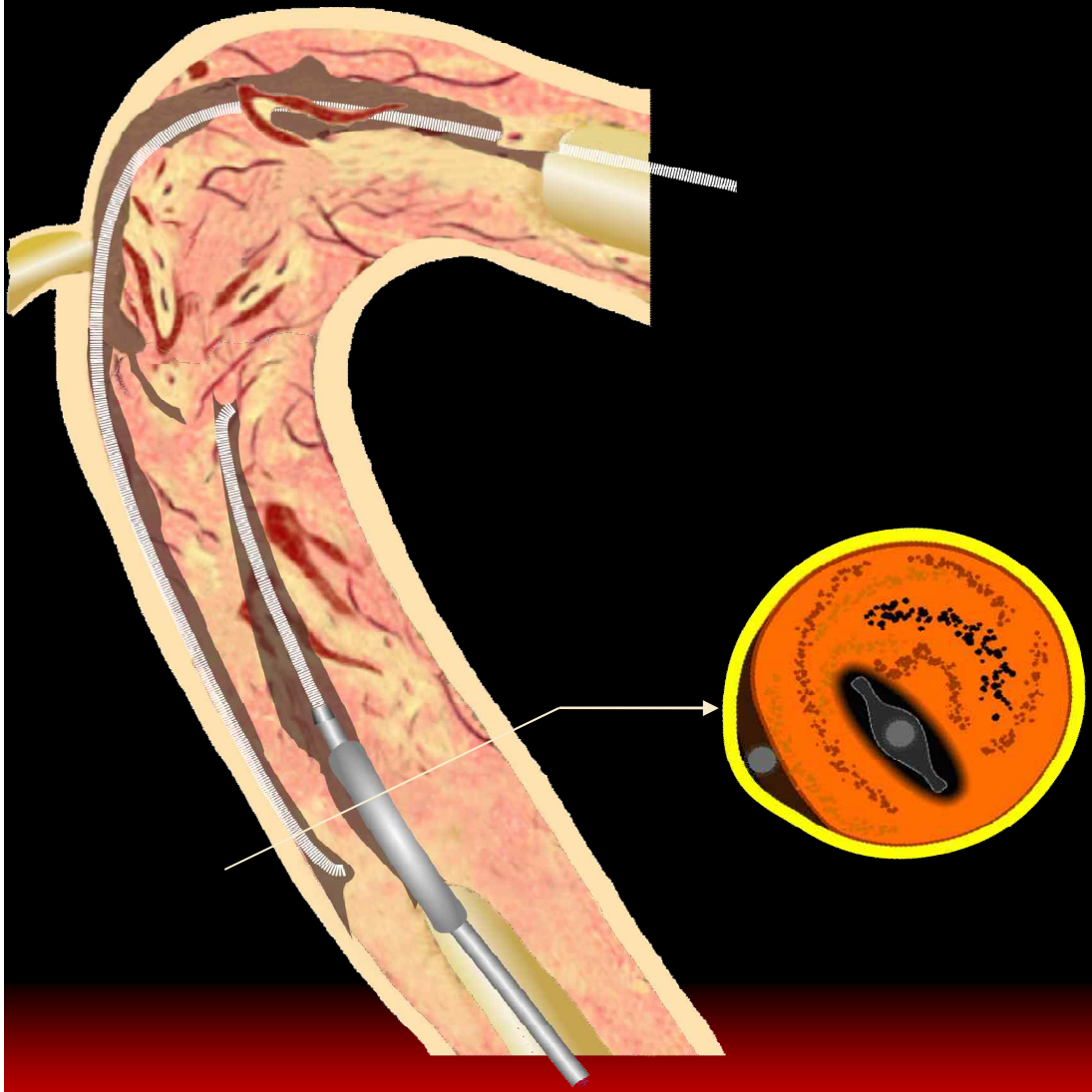
(Controlled Antegrade and Retrograde subintimal Tracking)



- **make connection between antegrade and retrograde subintimal space utilizing behavior of subintimal dissection.**
- **antegrade wire automatically gets into distal true lumen.**

Bilateral Approach for CTO lesion

What is the major limitation of primitive CART?



- Retrograde wire usually gets into plaque, not into subintima at proximal part of distal CTO end so that retrograde balloon is inflated at intra-plaque.
- If antegrade wire is advanced into subintima at the site of retrograde balloon dilation, it is difficult to direct the antegrade wire to the true distal lumen, similar to a difficult situation in the antegrade approach.

PCI-CTO

Toyohashi Experience

～2009

Doctors in THC

院長
鈴木 孝彦

研究所長
加藤 修

循環器内科部長
朝倉 靖

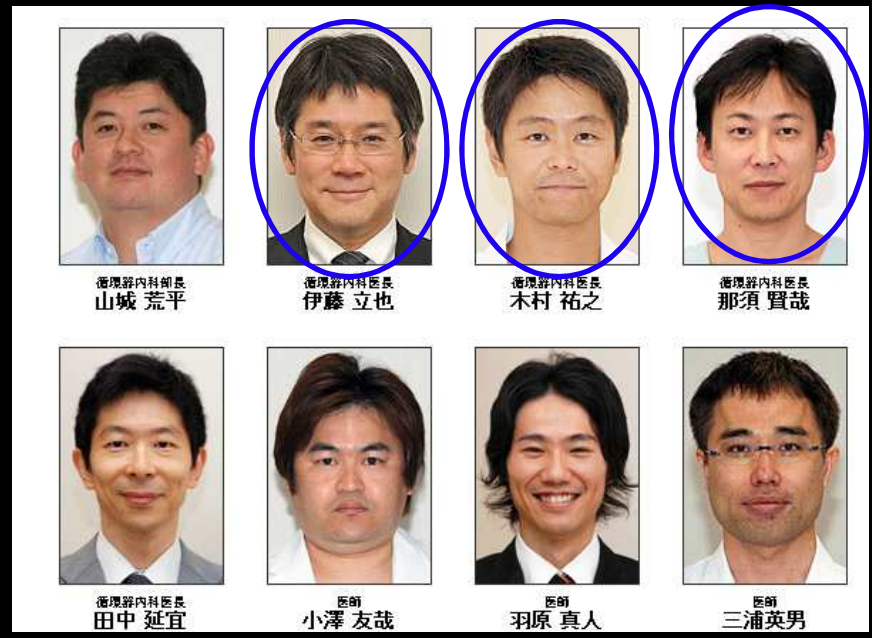
循環器内科部長
寺島 充康

循環器内科部長
朝倉 恵子

循環器内科部長
土金 悦夫

循環器内科部長
江原 真理子

循環器内科部長
木下 順久



循環器内科部長
山城 荒平

循環器内科医長
伊藤 立也

循環器内科医長
木村 祐之

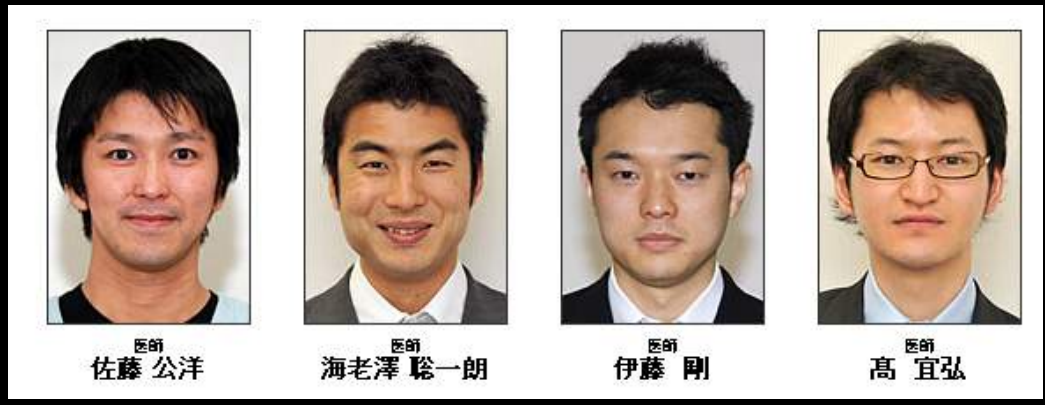
循環器内科医長
那須 賢哉

循環器内科医長
田中 延宜

医師
小澤 友哉

医師
羽原 真人

医師
三浦英男



医師
佐藤 公洋

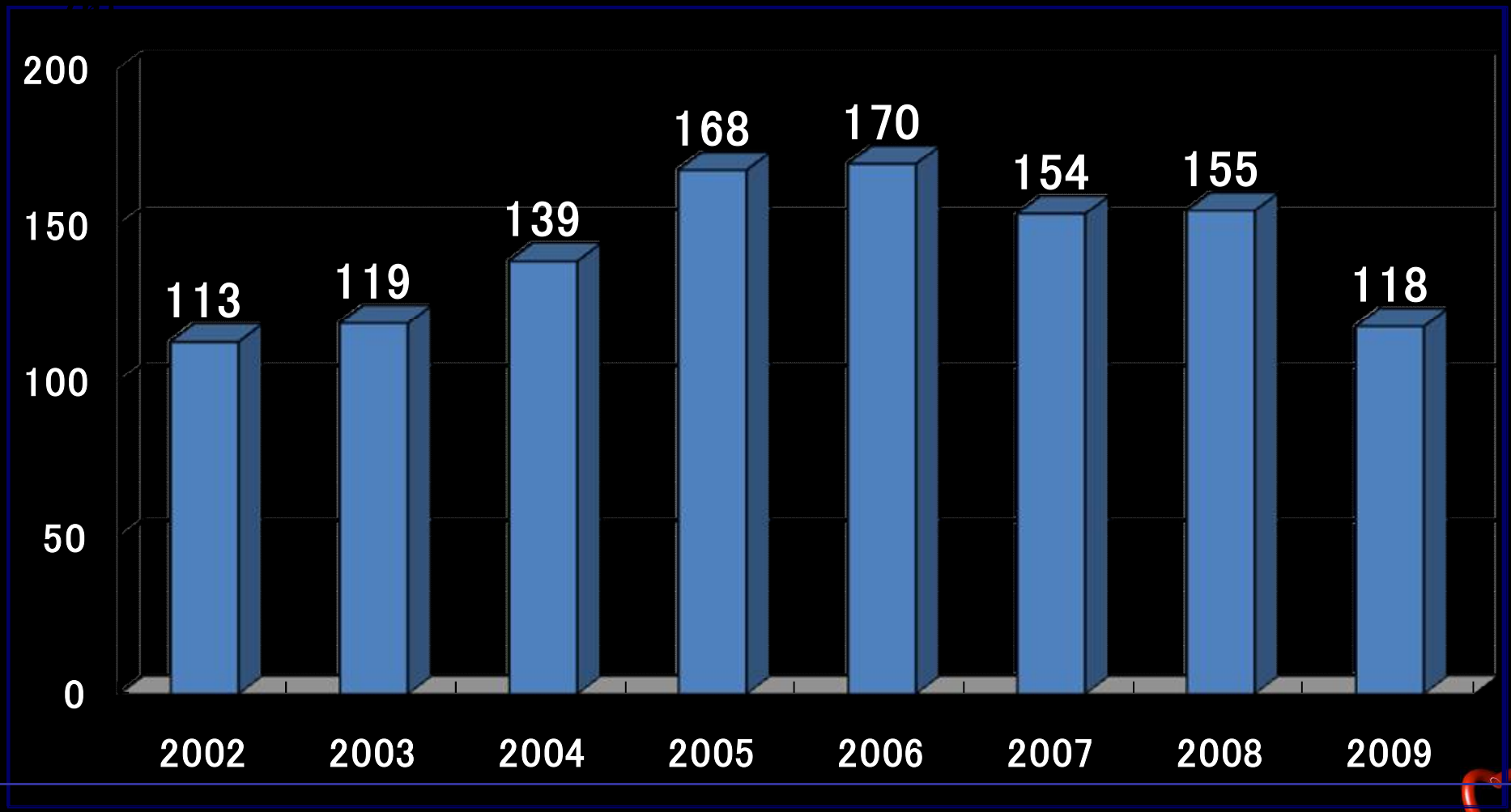
医師
海老澤 聡一朗

医師
伊藤 剛

医師
髙 宜弘

Number of CTO-PCI

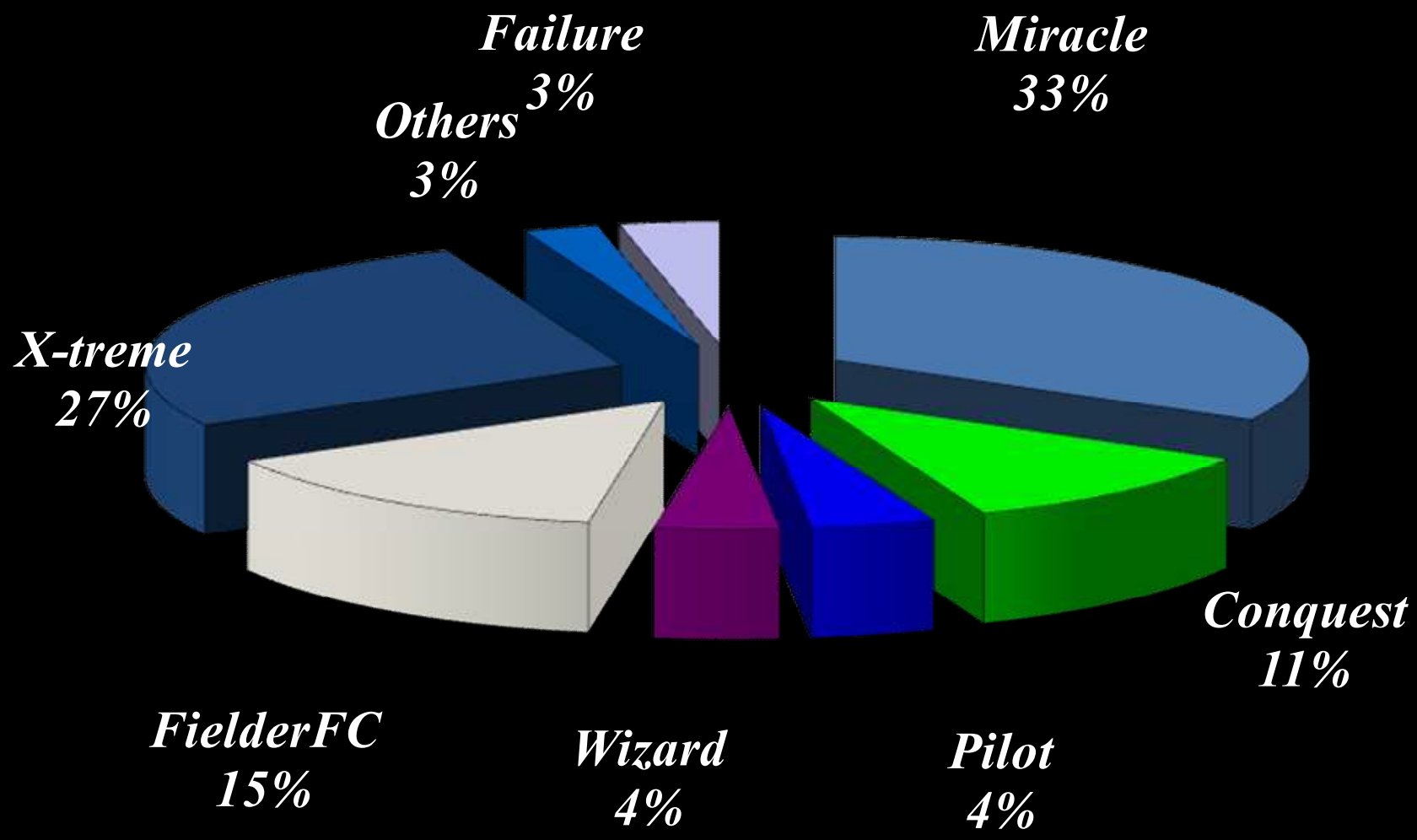
N=1136



Lesion Characteristics ('99-'09, n=1577)

Target vessel		
RCA	***621***	***(39.4%)***
LAD	***473***	***(30.1%)***
LCX	***334***	***(21.2%)***
LMT	***8***	***(0.5%)***
Branch	***138***	***(8.8%)***
Bypass graft	***2***	***(0.13%)***
Prior PCI	***424***	***(26.9%)***
In-stent occlusion	***171***	***(10.8%)***
Bending>45°	***194***	***(12.3%)***
Calcified lesion	***555***	***(35.2%)***
Significant side branch	***231***	***(14.6%)***

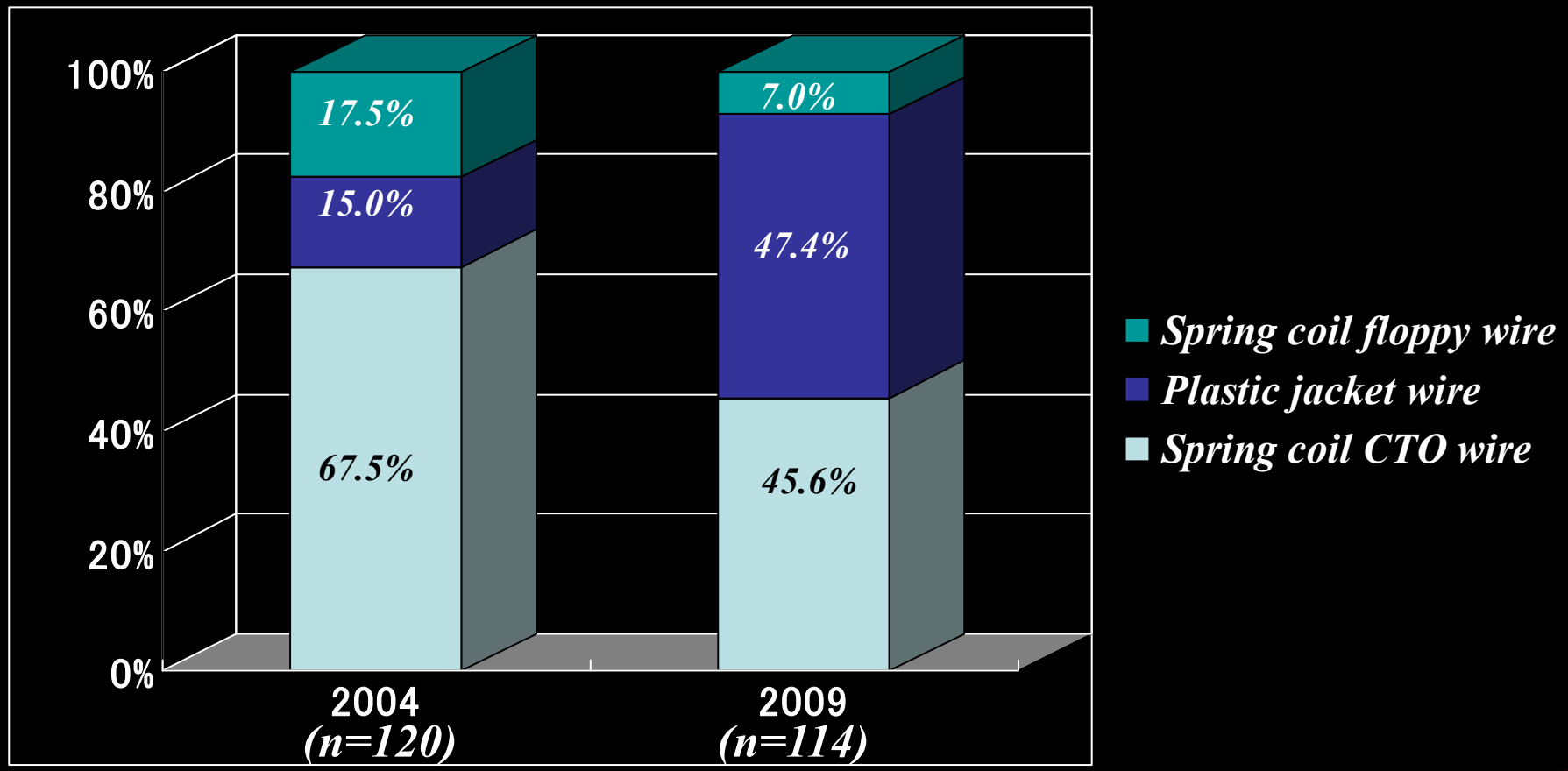
Crossing Guide Wire (2009, n=118)



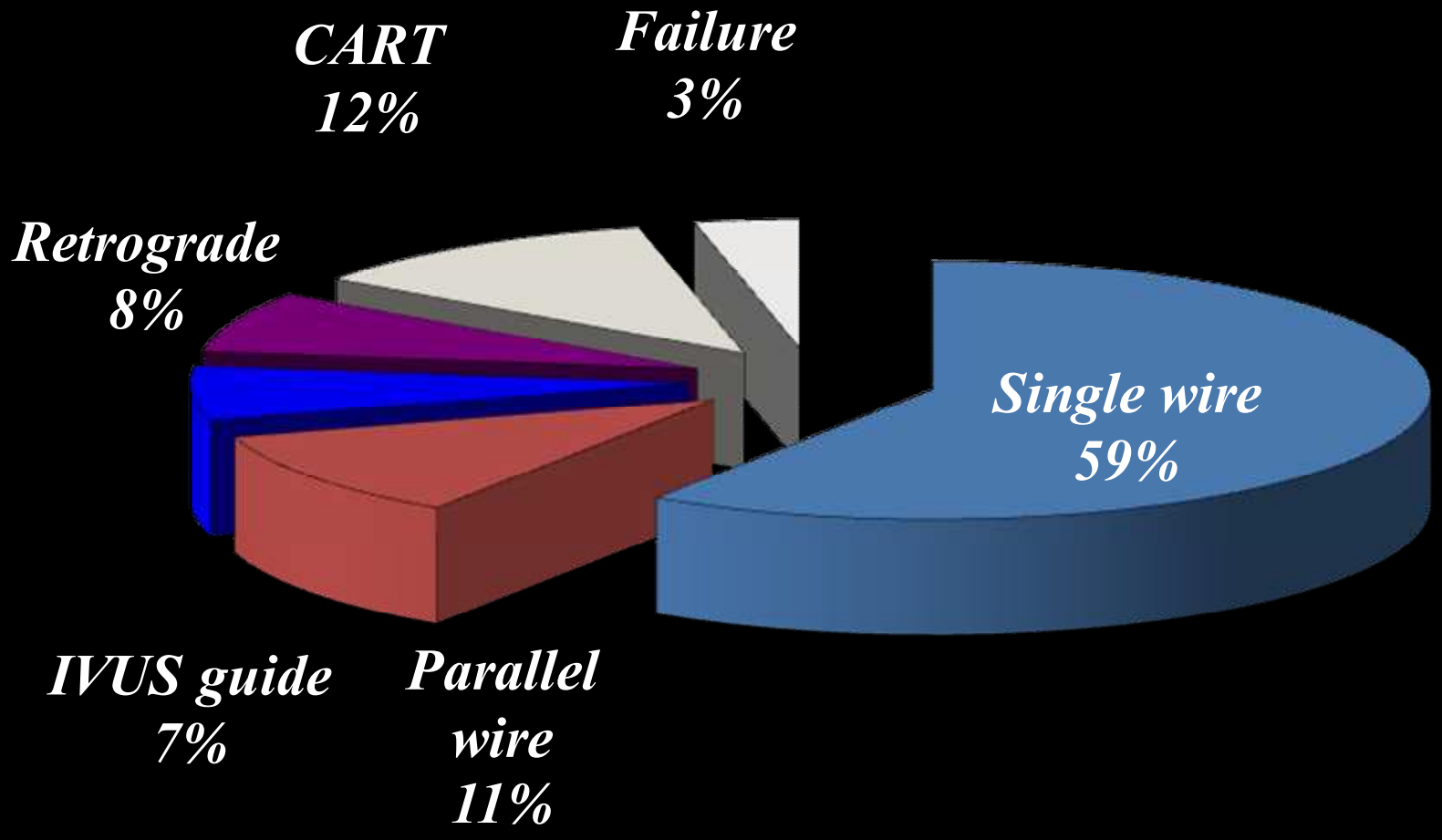
Toyohashi experience

CTO-PCI ('04 vs. '09)

Crossed guide wires



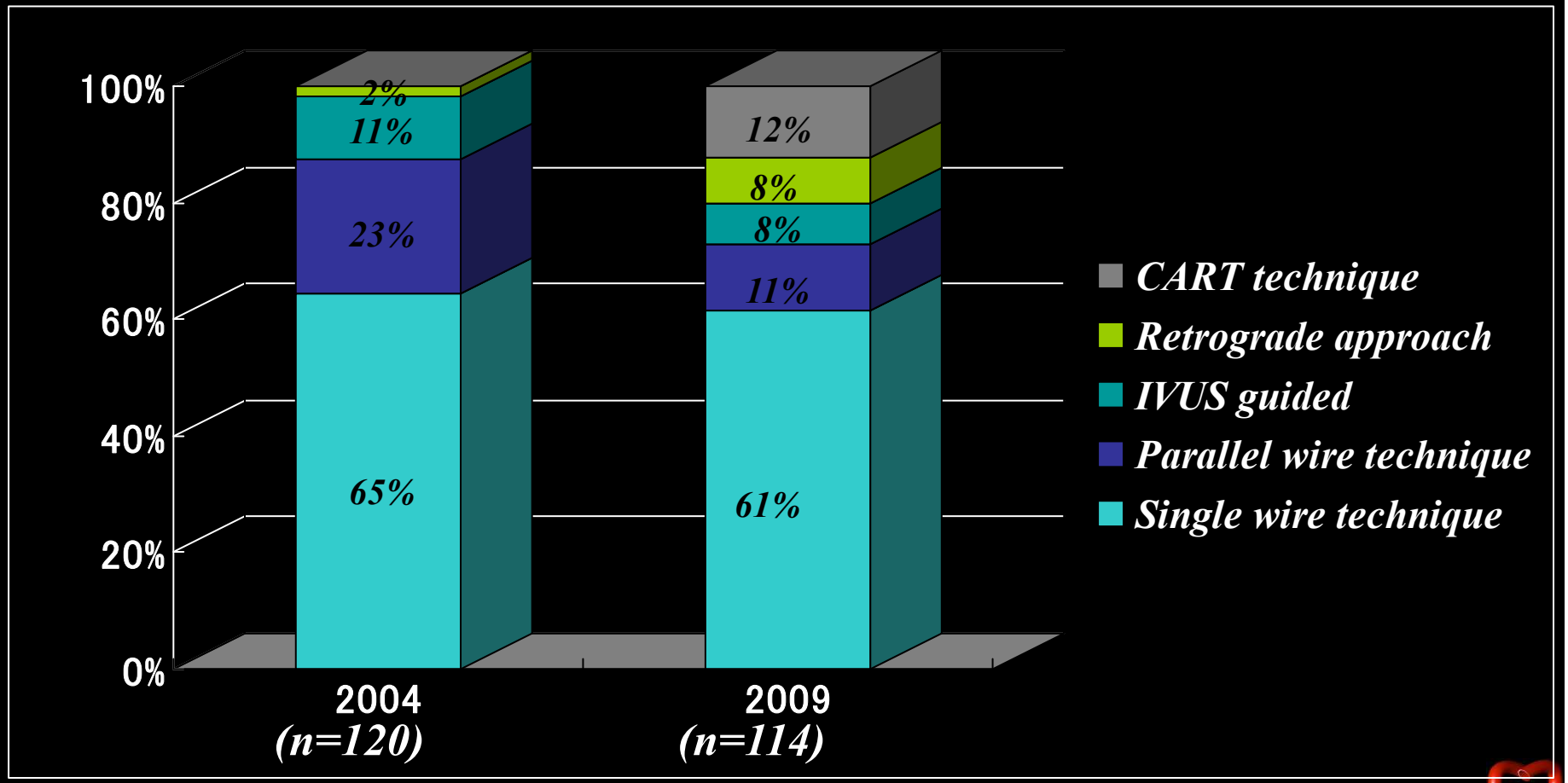
Crossing Techniques (2009, n=118)



Toyohashi experience

CTO-PCI ('04 vs. '09)

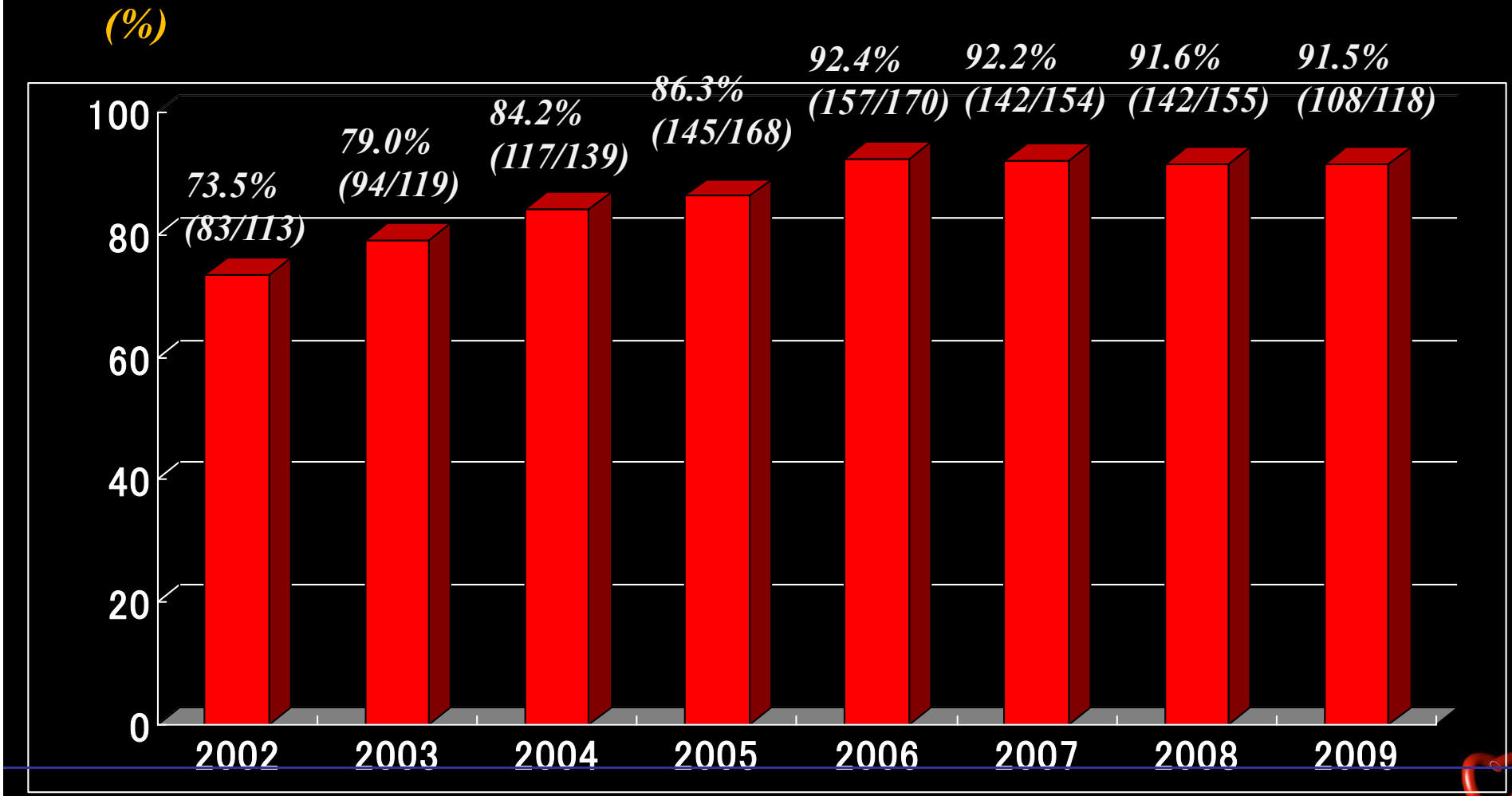
Successful guide wire technique by year



Toyohashi Heart Center

Initial Success Rate

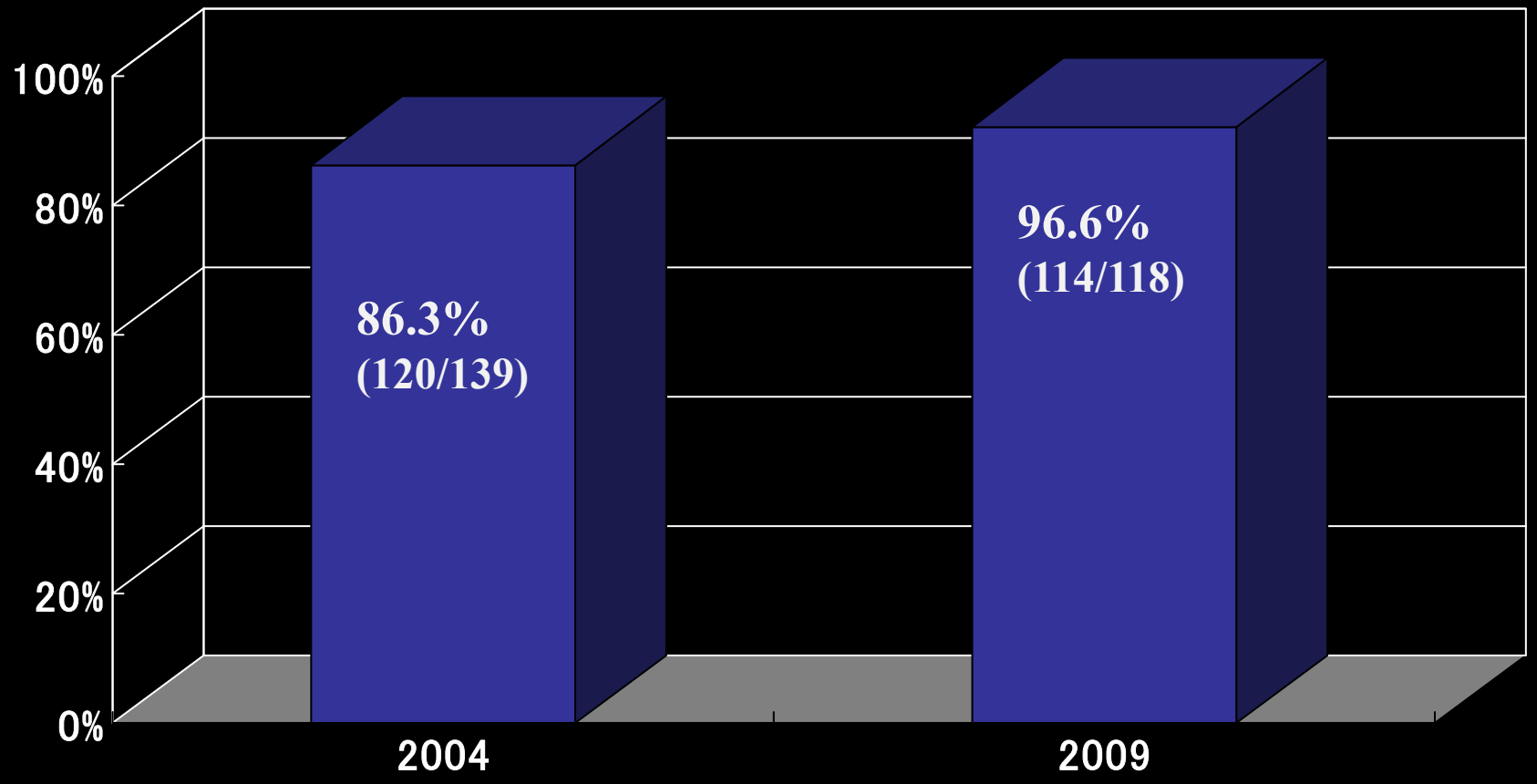
86.9% (988/1136)



Toyohashi experience

CTO-PCI ('04 vs. '09)

Success rate of guide wire crossing



Toyohashi Heart Center

Complications

Major complications	
– Death in hospital	8 (0.5%)
– Emergency CABG	4 (0.3%)
– Q-MI	5 (0.3%)
Minor complications	
– Cardiac tamponade	14 (0.9%)
– Aortic dissection	5 (0.3%)
– Acute occlusion	12 (0.8%)
– Subacute occlusion	4 (0.3%)
– Side branch compromise	50 (3.2%)
– Coronary perforation	
• Type-I	145 (9.2%)
• Type-II	13 (0.8%)

Angiographic Follow Up

	BMS era (Jan.'03-Sep.'04)	DES era (Jan.'07-Dec.'8)
No. of CTOs	227	307
Initial success	183 (80.6%)	279(90.9%)
No. of CAG F/U	139 (76.0%)	163 (58.4%)
No. of restenosis	54 (38.8%)	37 (22.7%)
No. of reocclusion	23 (16.5%)	12 (7.4%)
	77 (55.3%)	49 (30.1%)
No. of TLR	60 (43.1%)	41 (25.1%)
Clinical restenosis	29.5%	17.6%
Clinical TLR	32.8%	14.7%
Mean F/U period	7.1±4.4 (mos.)	9.3±4.9 (mos.)

Summary

- The success rate of CTO-PCI in Toyohashi Heart Center is very high with low restenosis and reocclusion rates.
- With expert technique as well as appropriate device selections, CTO-PCI is not inferior to CABG.

Summary

- Over the past two decades, CTO-PCI has dramatically evolved in both technical and technological aspects.
- The advent of drug-eluting stents has also improved the long-term patency rate of CTO-PCI.
- Therefore, the role of vascular interventionists further expanded.


CTO Club
Save the Date!!
The 12th Seminar of Angioplasty of Chronic Total Occlusions
Date
June
11 fri. - 12 sat., 2010
Venue
Hotel Nikko Toyohashi, Aichi, Japan