

# Microcatheters

## *Tips and Tricks for Complex PCI*

**Toyohashi Heart Center**

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# Kinds of Microcatheters

Corsair Pro



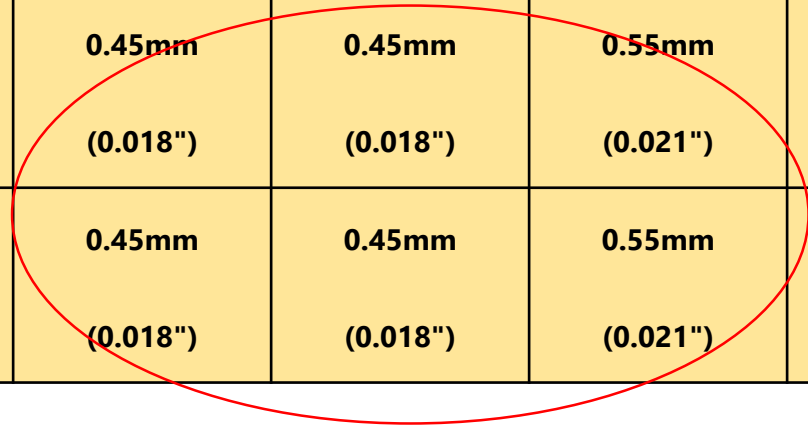
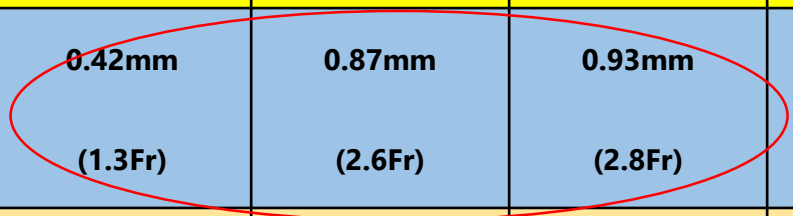
Caravel






Finecross



		Outer Lumen			Inner Lumen			Length
		Entry	Tip	Proximal	Entry	Tip	Proximal	
Hard	ASAHI Caravel	0.48mm (1.4Fr)	0.62mm (1.9Fr)	0.85mm (2.6Fr)	0.40mm (0.016")	0.43mm (0.017")	0.55mm (0.022")	135cm
	ASAHI Corsair	0.42mm (1.3Fr)	0.87mm (2.6Fr)	0.93mm (2.8Fr)	0.38mm (0.015")	0.45mm (0.018")	0.45mm (0.018")	135cm 150cm
Soft	Finecross MG	0.60mm (1.8Fr)	0.60mm (1.8Fr)	0.87mm (2.6Fr)	0.45mm (0.018")	0.45mm (0.018")	0.55mm (0.021")	135cm 150cm
	Finecross GT	0.57mm (1.7Fr)	0.60mm (1.8Fr)	0.87mm (2.6Fr)	0.45mm (0.018")	0.45mm (0.018")	0.55mm (0.021")	135cm 150cm



		Outer	Inner	Tip • Cahte	Rotate
Corsair Pro		Large	Small	Hard	○
Caravel		Small	Large	Hard	X
Finecross		Small	Large	Soft	X

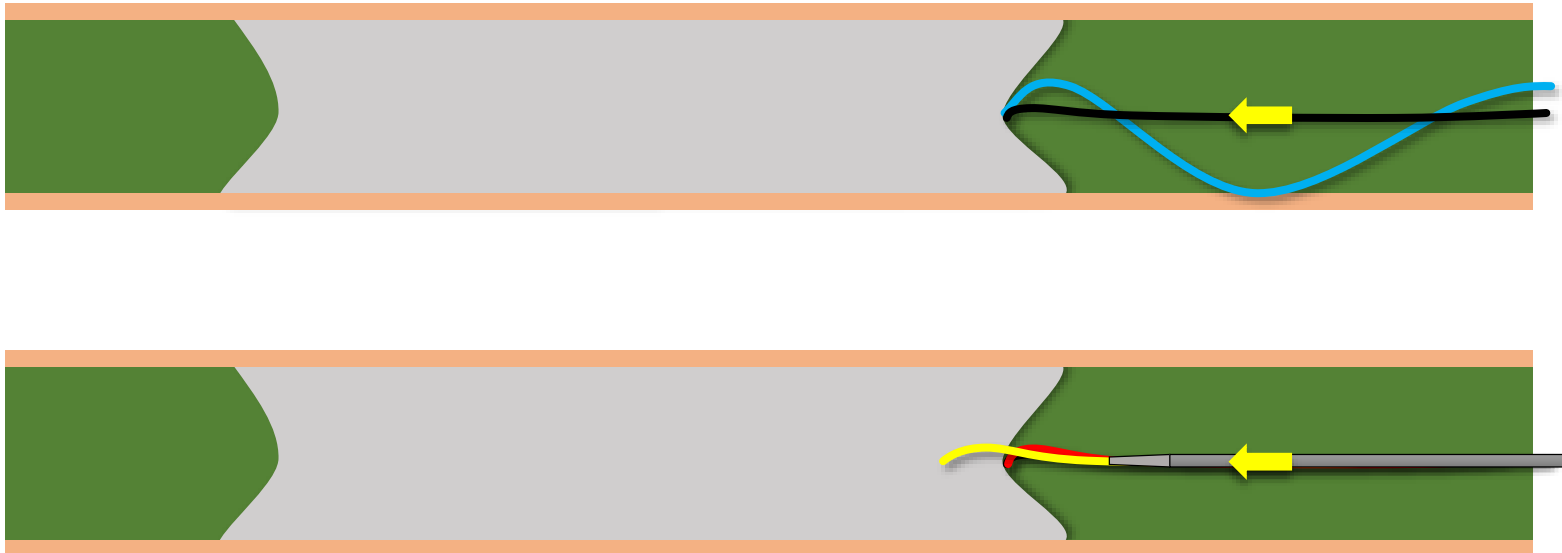
# Why use microcahteter ?

- ① Produce back-up support

# Entry

## Need back up support

Microcatheter Inhibit the GW deflection and support the push force

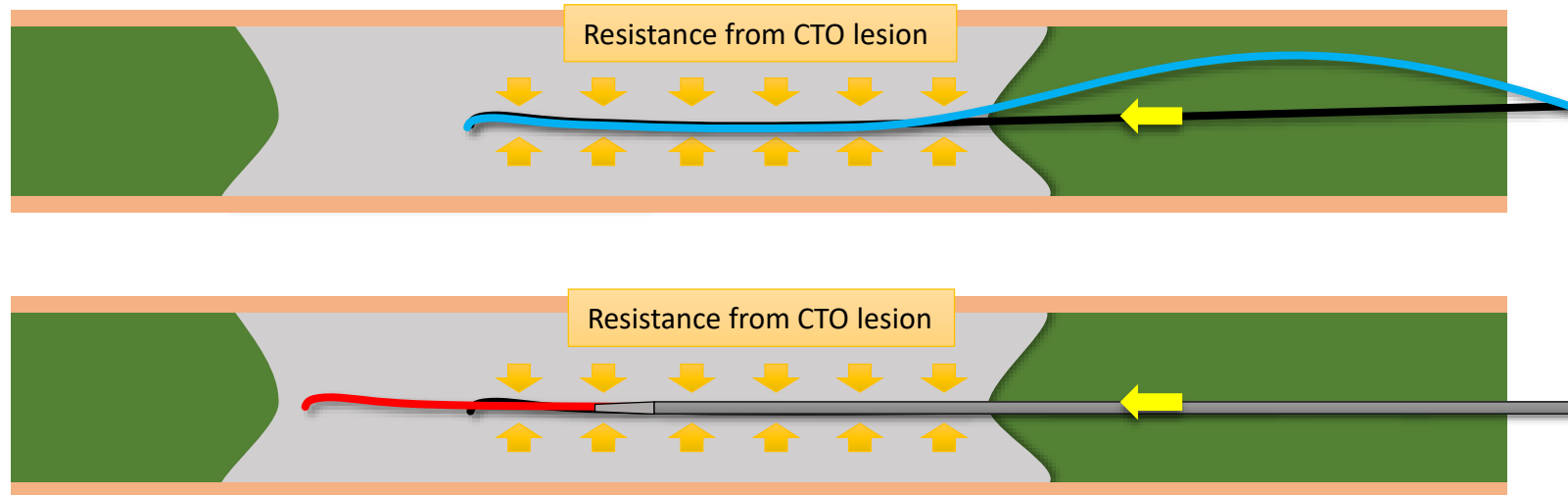


When GW advance to hard tissue, GW could not enter the lesion with GW deflection at the open space. Microcatheter have no meaning for back up when the microcatheter also undergo a deflection.

Microcatheter has role to constrict the deflection of a GW and transfer the push power from GW proximal to distal tip.

## Lesion Body: Push

Microcatheter decrease the GW friction resistance and support the push force

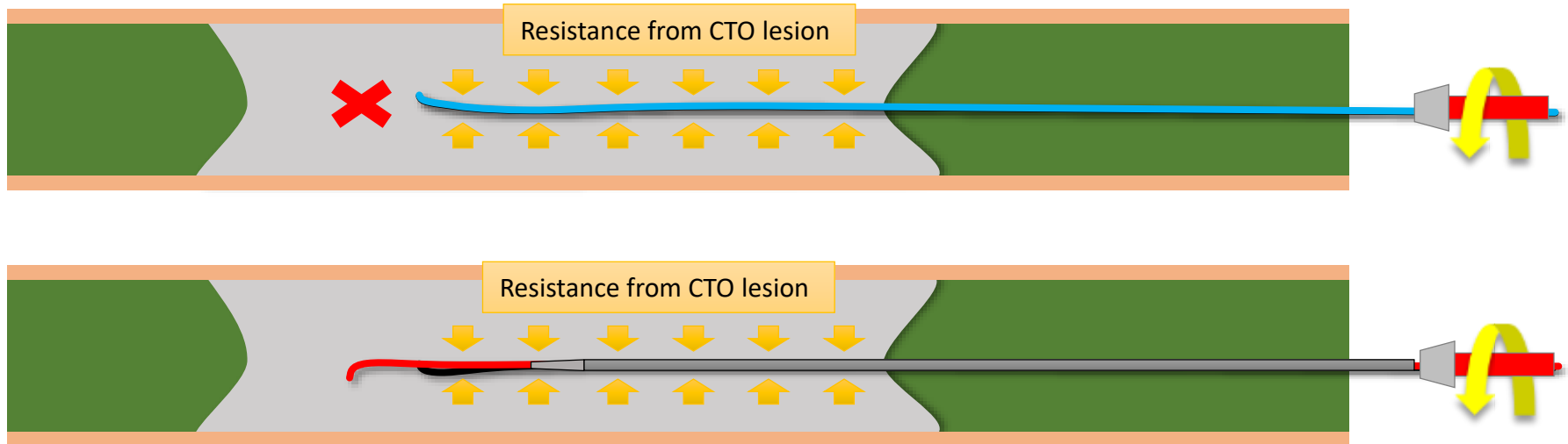


There is the friction resistance around the GW in the CTO lesion. When in the hard tissue or long lesion, the friction resistance of GW would increase. Therefore, it lead inhibit the push force transmission of GW.

Microcatheter cover the GW in the CTO lesion. It decrease the GW friction resistance from CTO lesion and improve the push force transmission.

Lesion Body : Torque

Microcatheter decrease the GW friction resistance and improve torque response

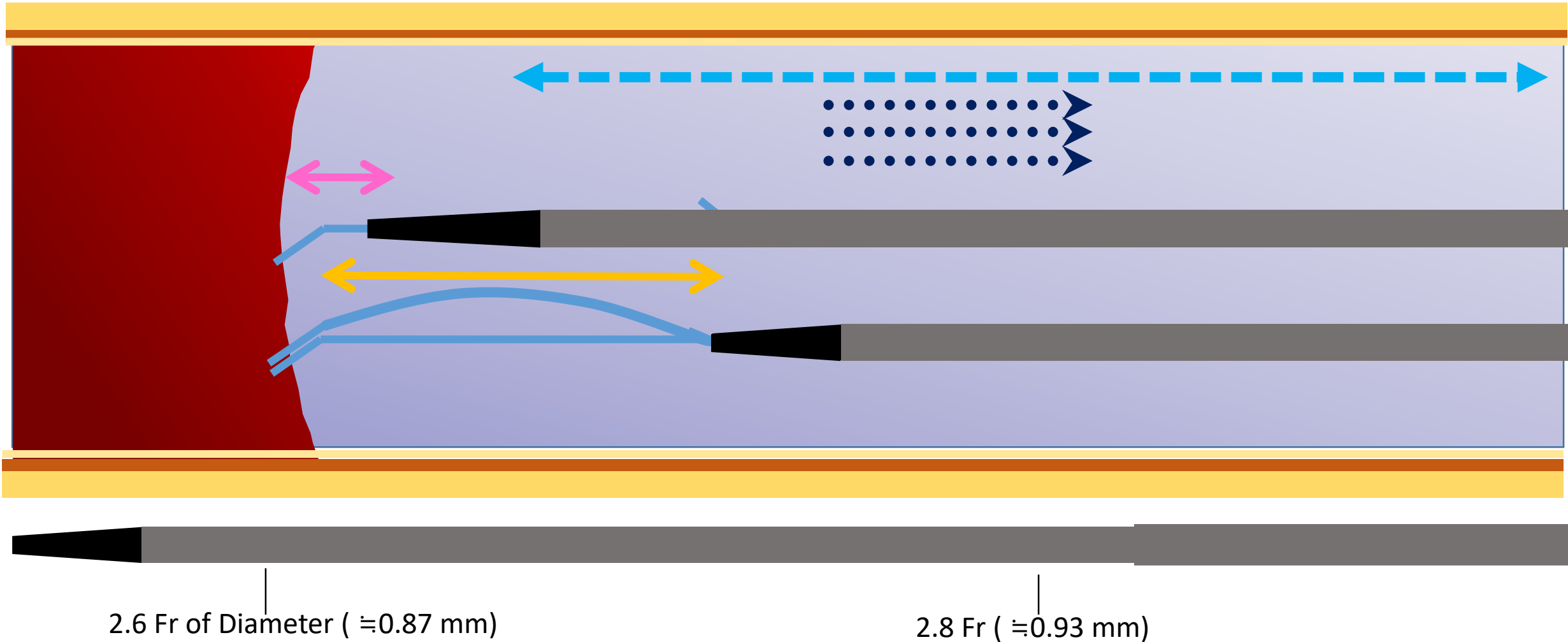


Friction resistance from CTO lesion also decrease GW torque response

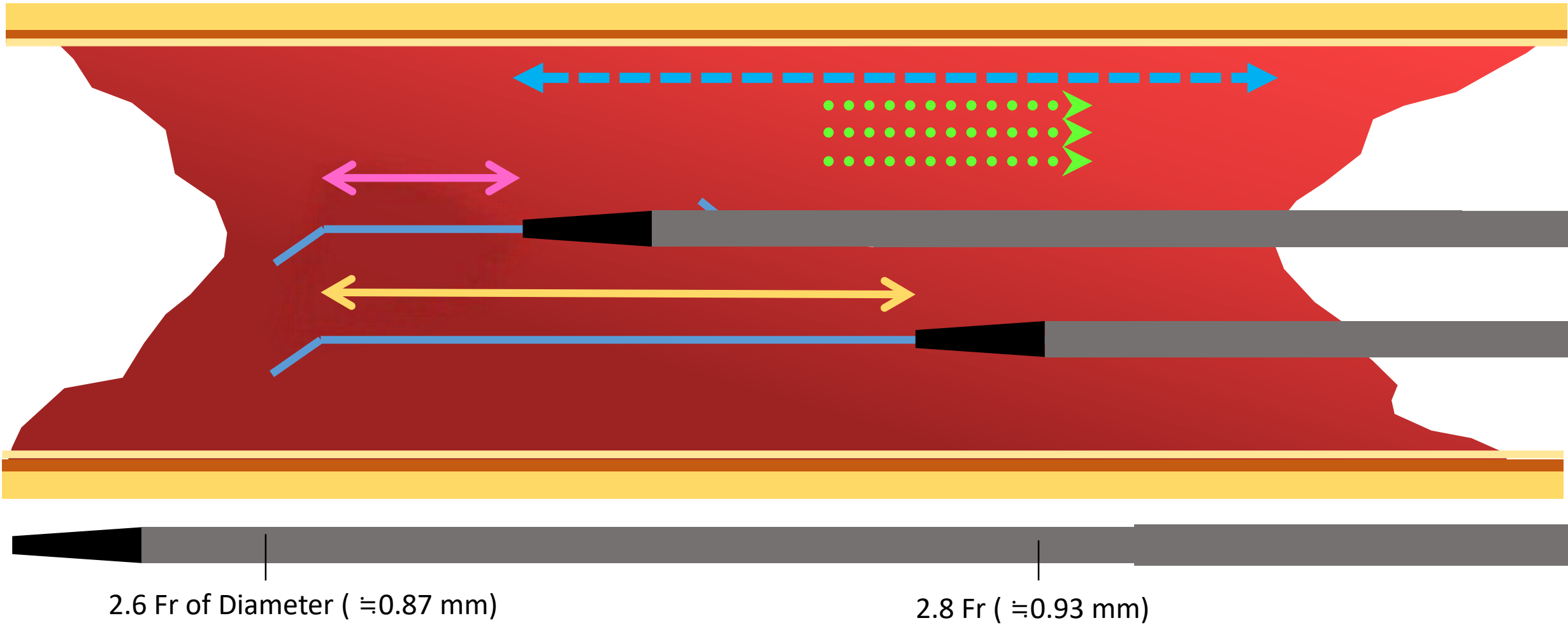
Microcatheter cover the GW in the CTO lesion. It decrease the GW friction resistance from CTO lesion and improve the torque response of GW.



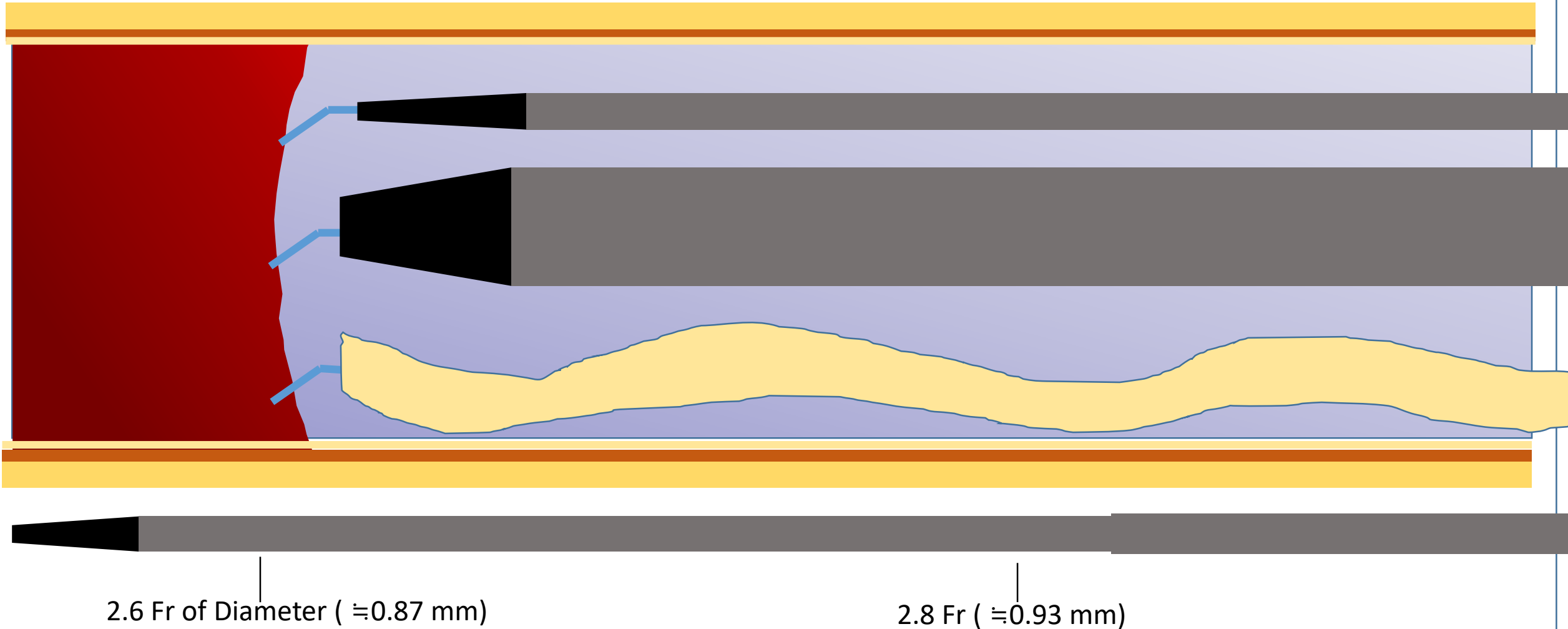
# What's a back up support using MC : Open space



# What's a back up support using MC ? : within CTO body



# What's a back up support using MC





✓ Distance from tip to MC




✓ Stiffness of MC

✓ Shaft support of GW

✓ Additional support of GEx



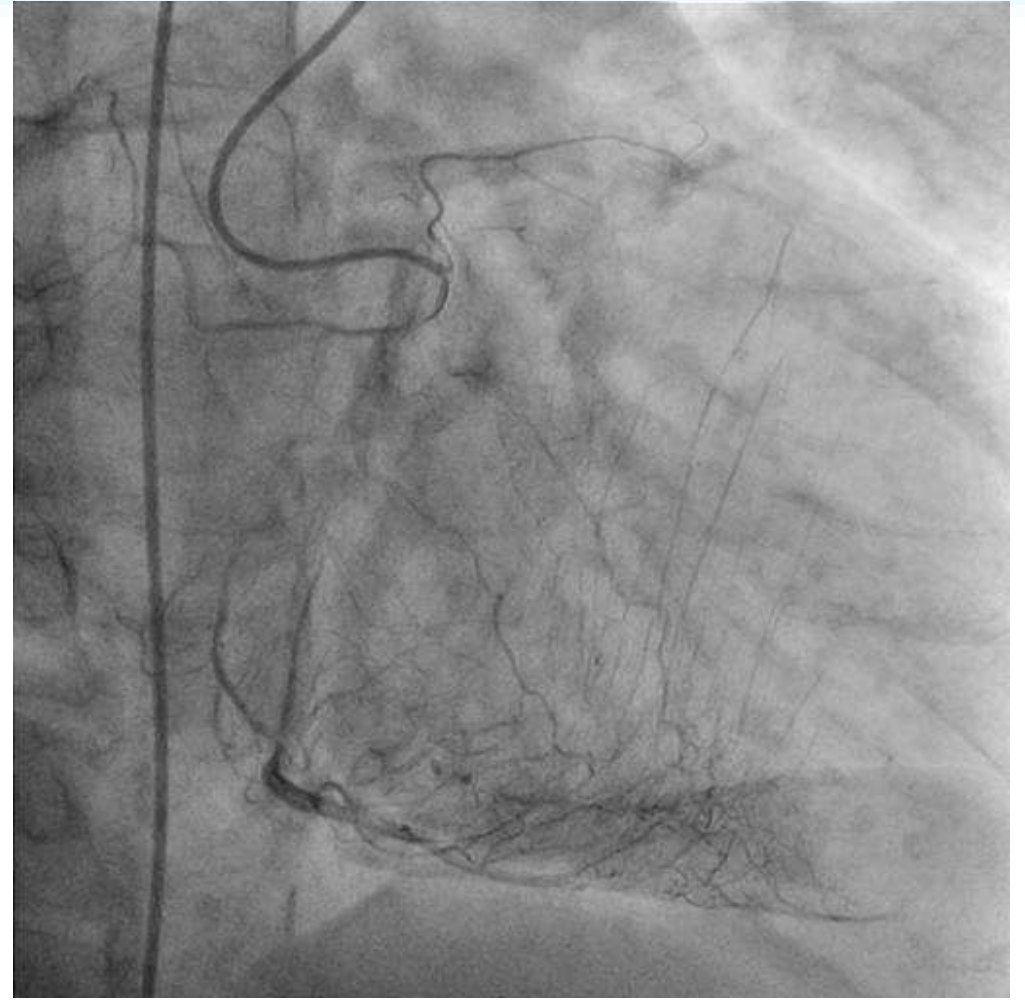
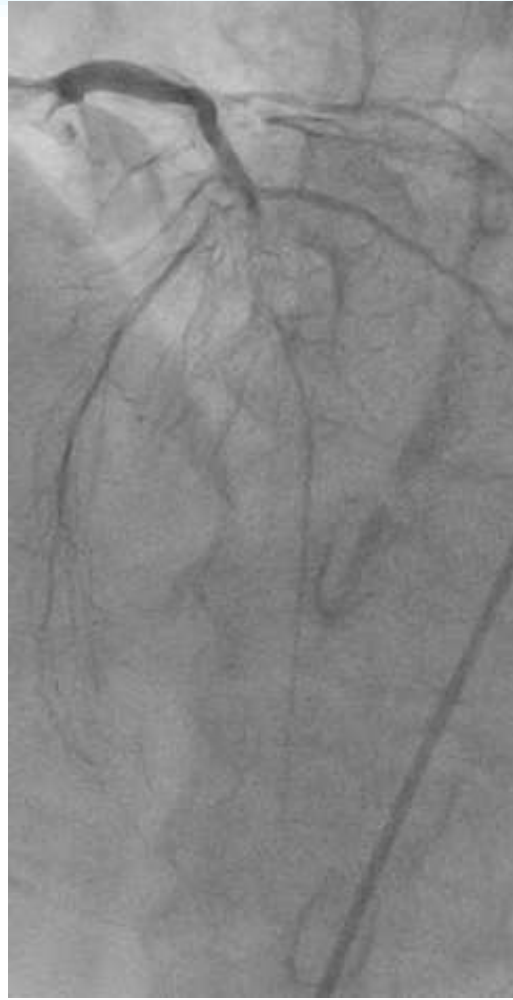
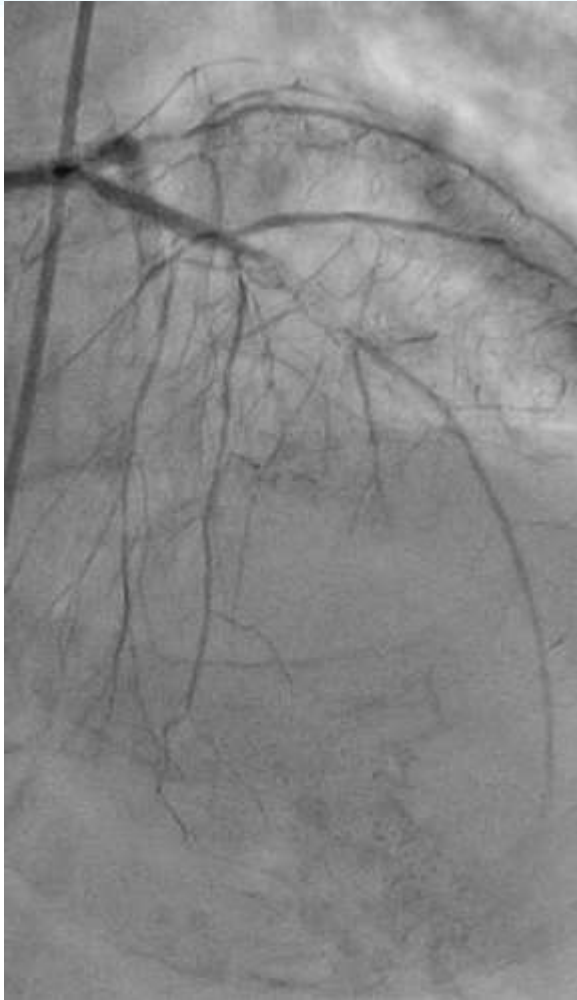
# For strong back up support

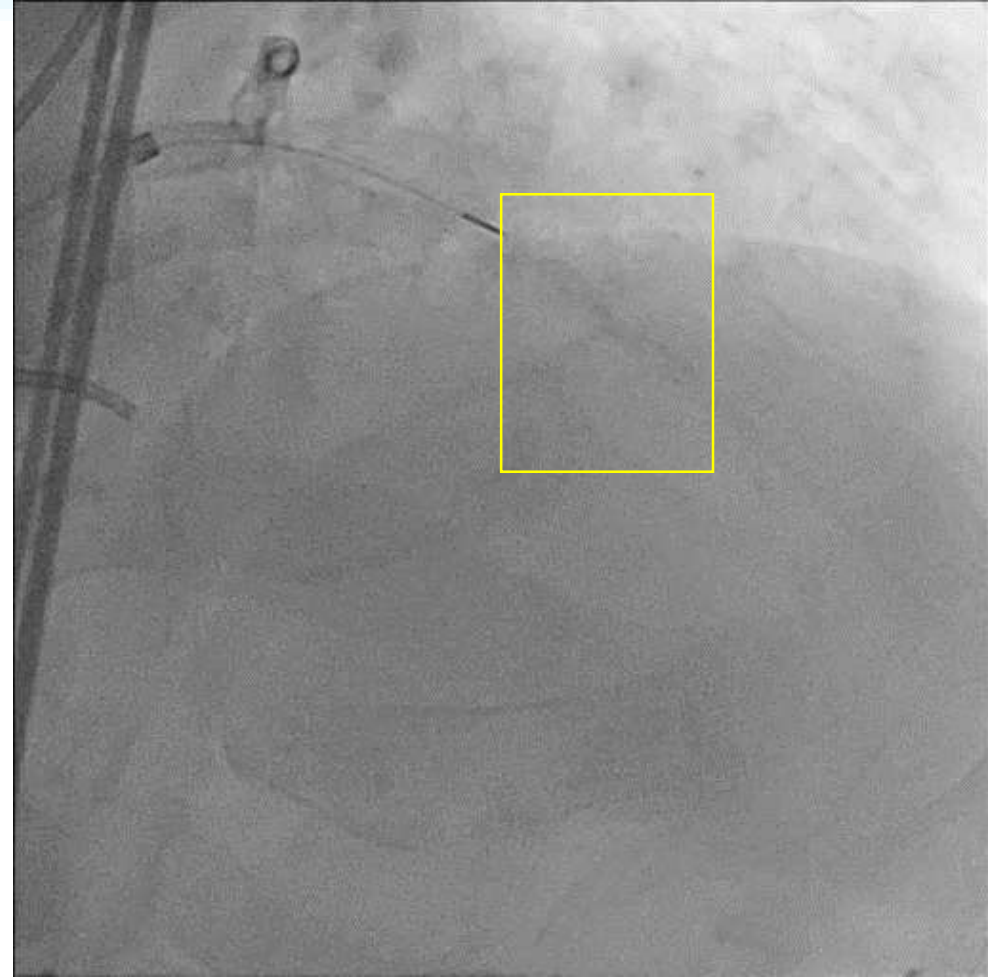
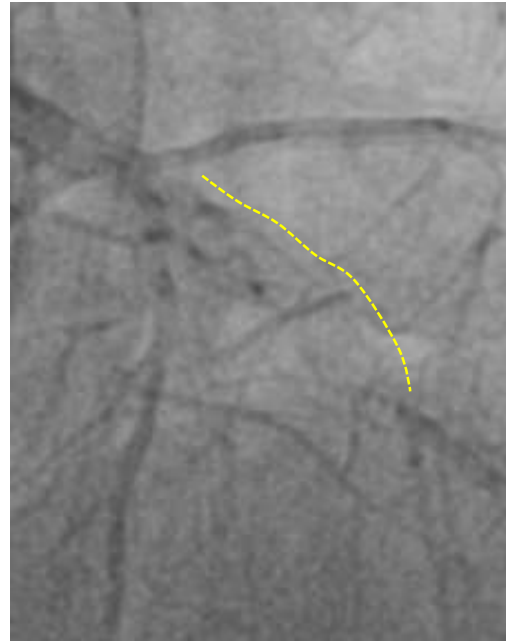
		Outer	Inner	Tip • Cathe	Rotate
Corsair Pro		Large	Small	Hard	○
Caravel		Small	Large	Hard	X
Finecross		Small	Large	Soft	X

# Why use microcatheter ?

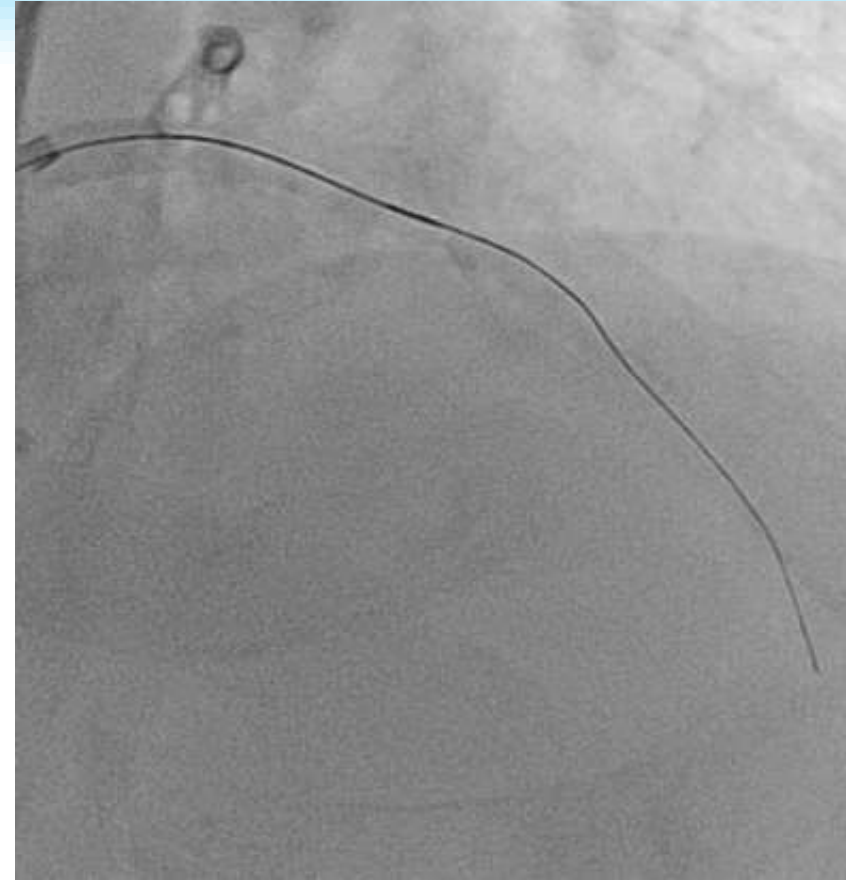
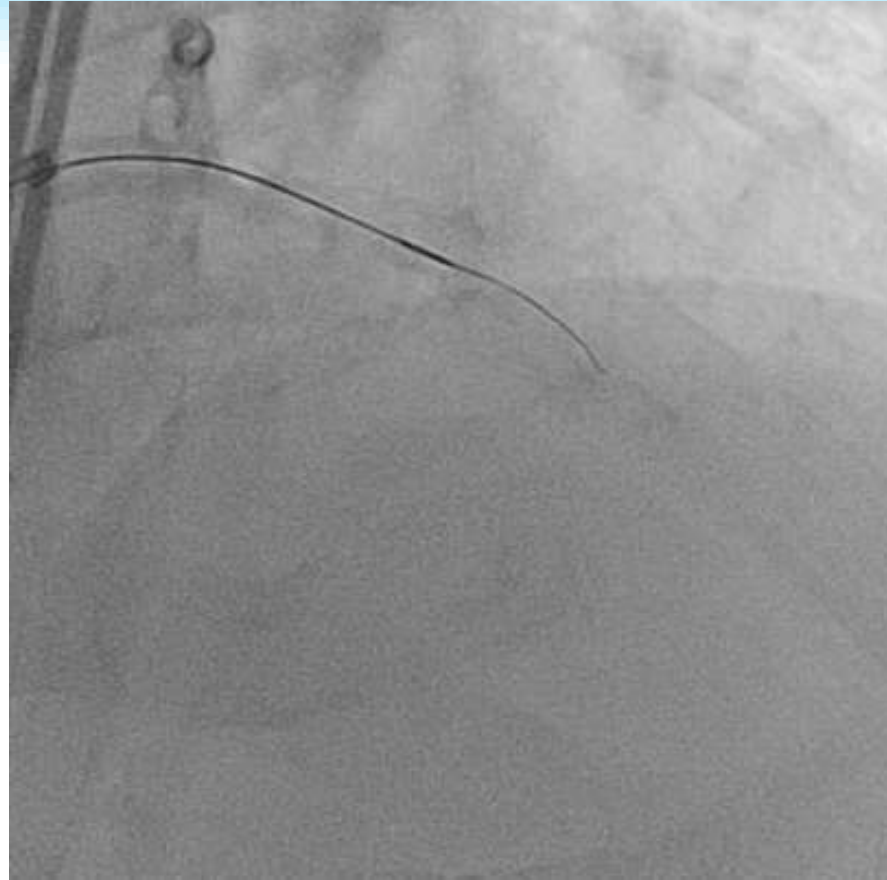
② Tip injection

# LAD CTO












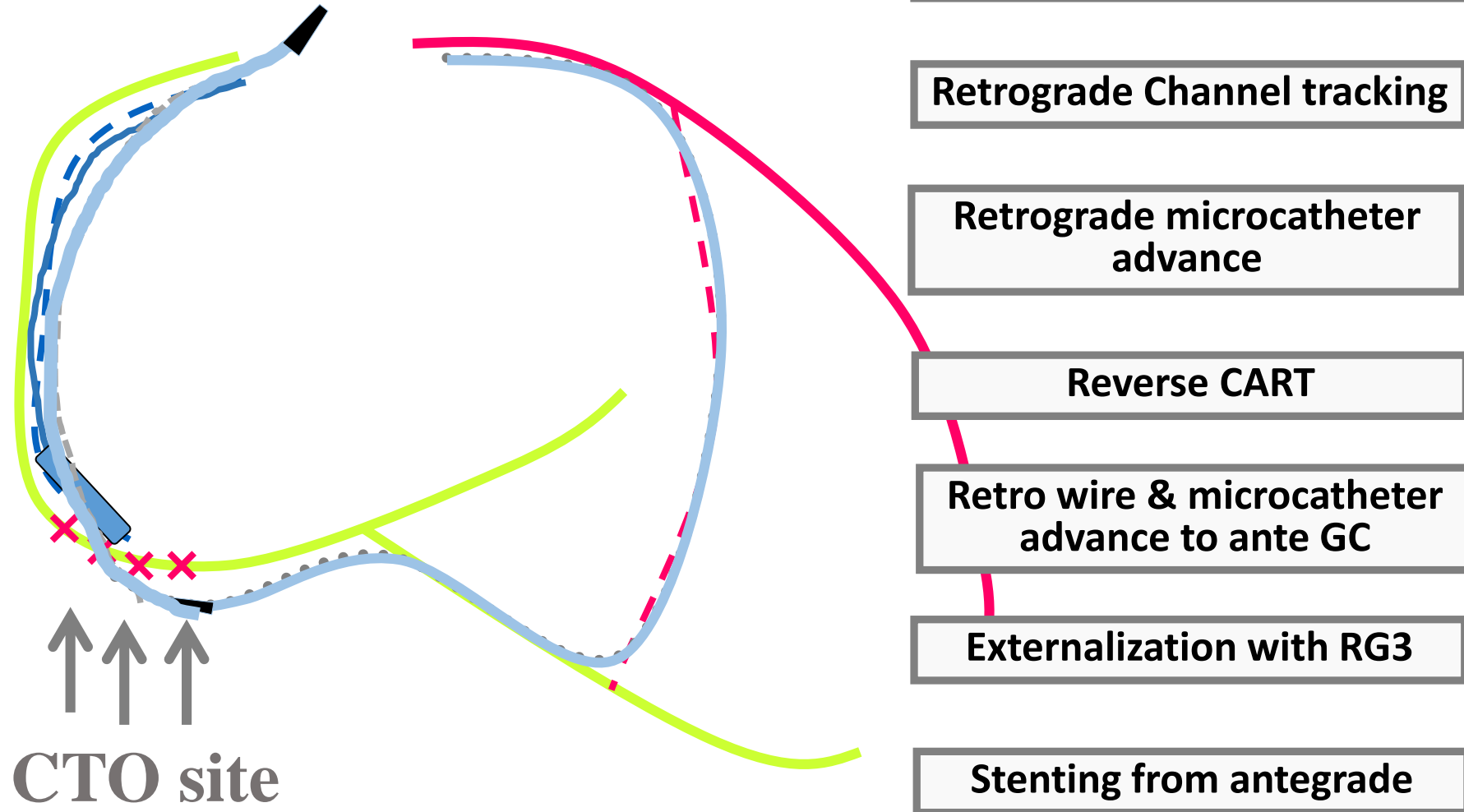
# For good image quality of tip injection

		Outer	Inner	Tip • Cathe	Rotate
Corsair Pro		Large	Small	Hard	○
Caravel		Small	Large	Hard	X
Finecross		Small	Large	Soft	X

# Why use microcahteter ?

③ Retrograde channel cross

# Usual strategy in retrograde PCI








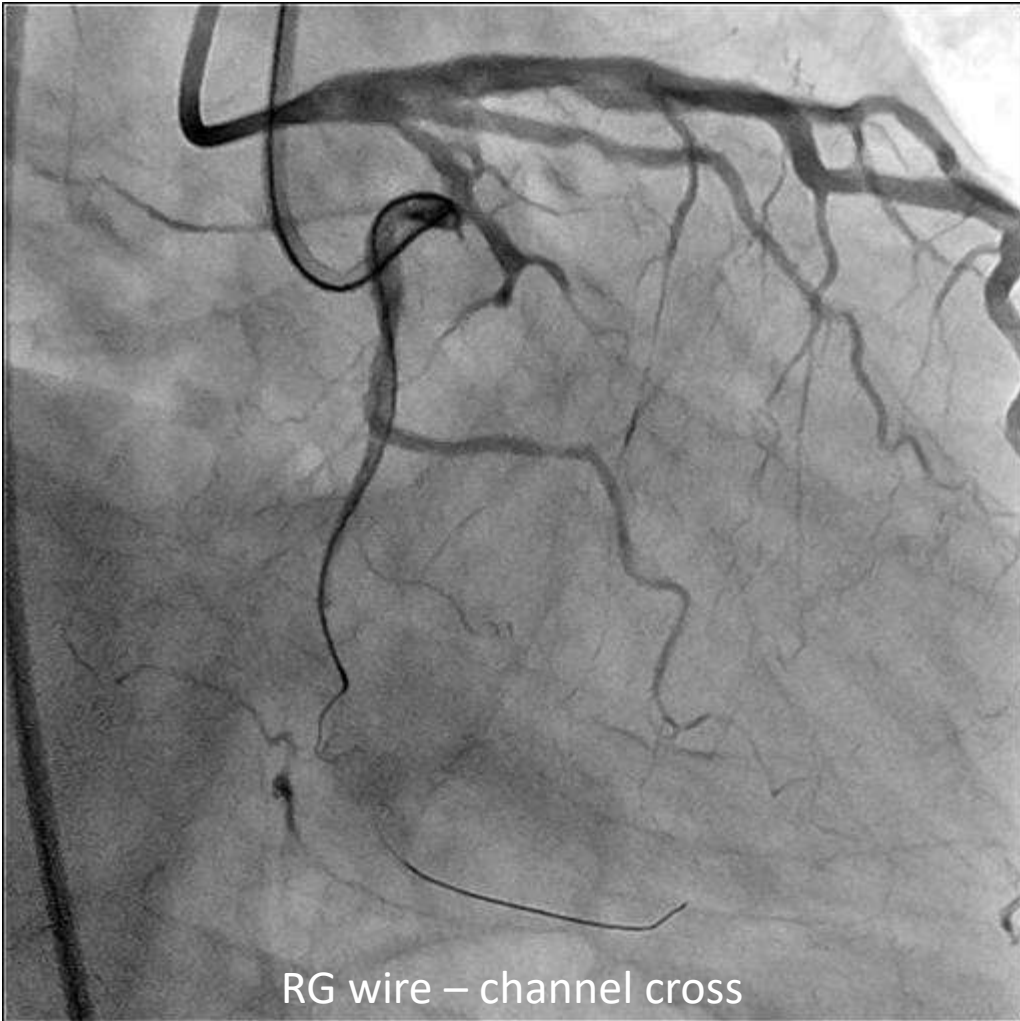
## Tip injection

Image quality is most important

# For good image quality of tip injection

		Outer	Inner	Tip • Cathe	Rotate
Corsair Pro		Large	Small	Hard	○
Caravel		Small	Large	Hard	X
Finecross		Small	Large	Soft	X

# After GW channel cross



Microcatheter cross

# For channel crossing

**Outer**

**Inner**

**Tip**

**Rotate**

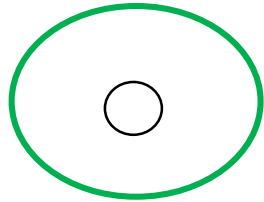
Corsair Pro



Large

Small

Hard



Caravel



Small

Large

Hard

X

Finecross



Small

Large

Soft

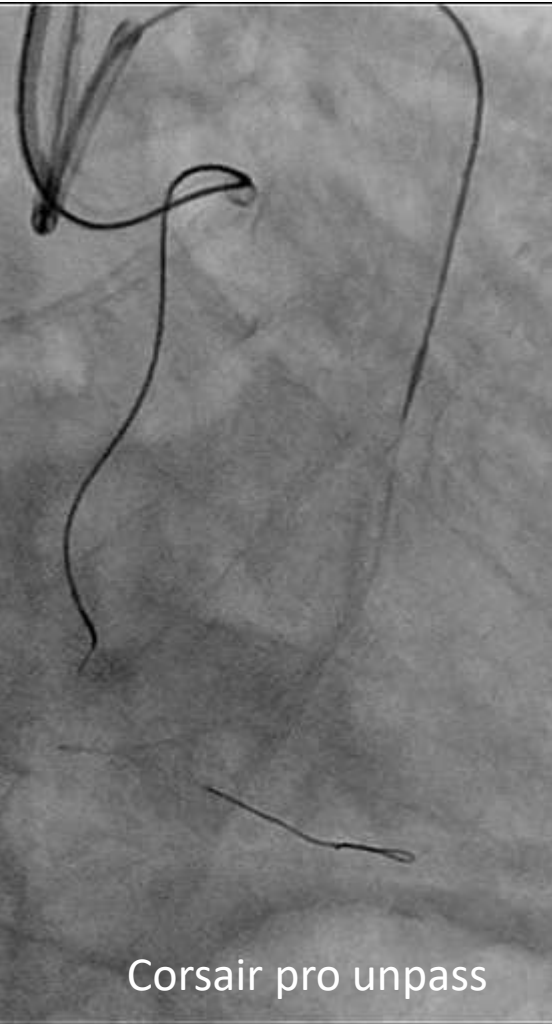
X

Depend on the channel morphology

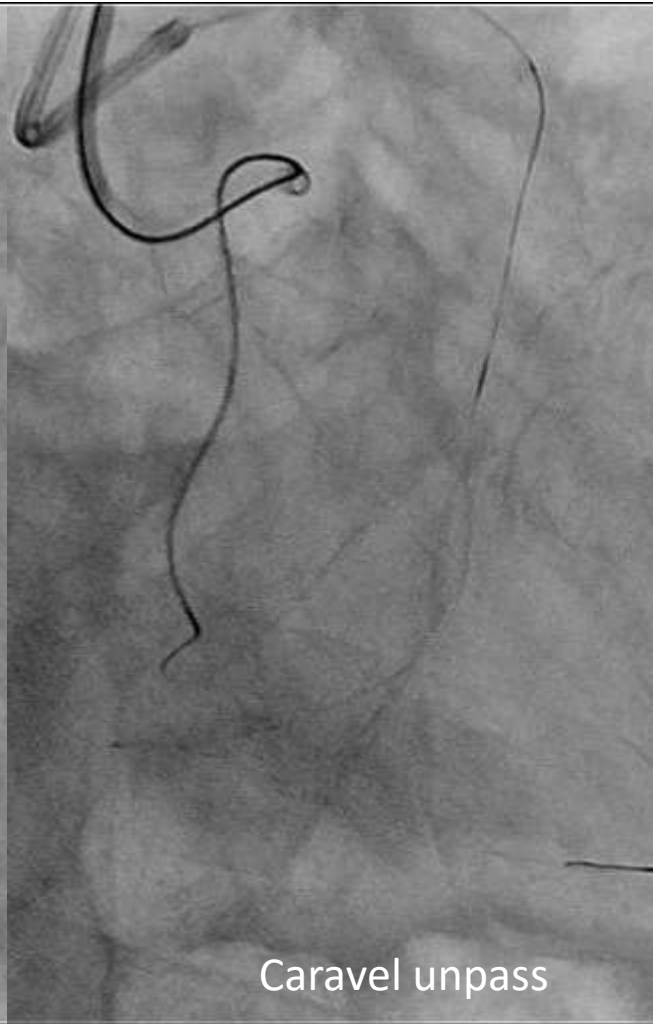




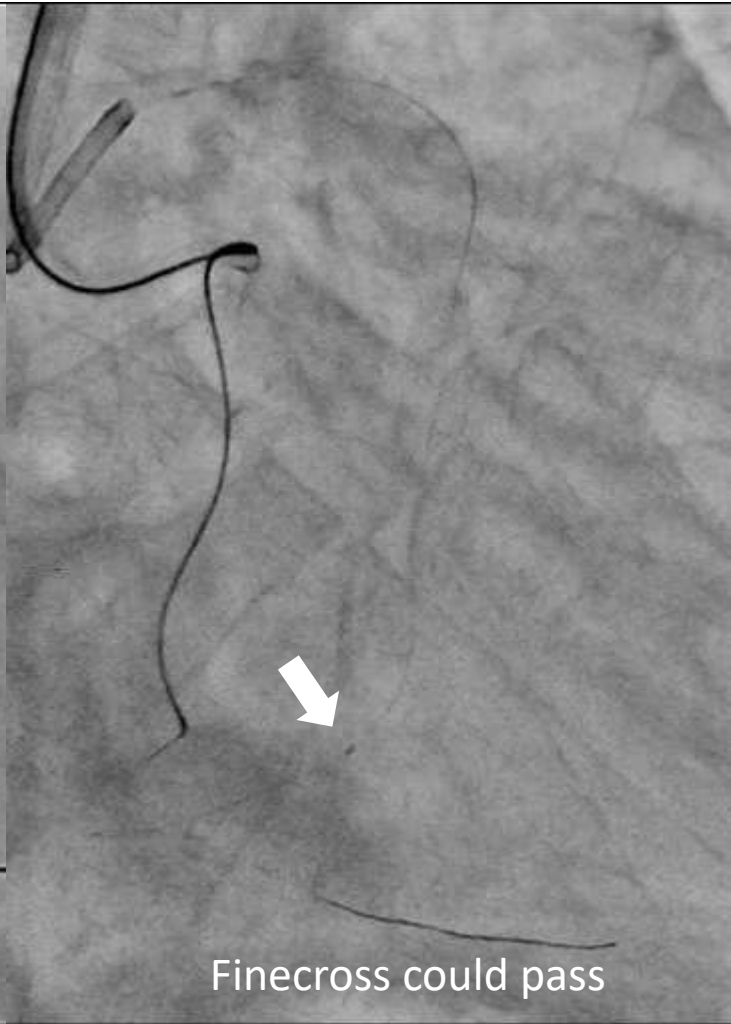
Caravel unpass



Corsair pro unpass



Caravel unpass



Finecross could pass

# Other kinds of microcatheter: Double lumen catheter

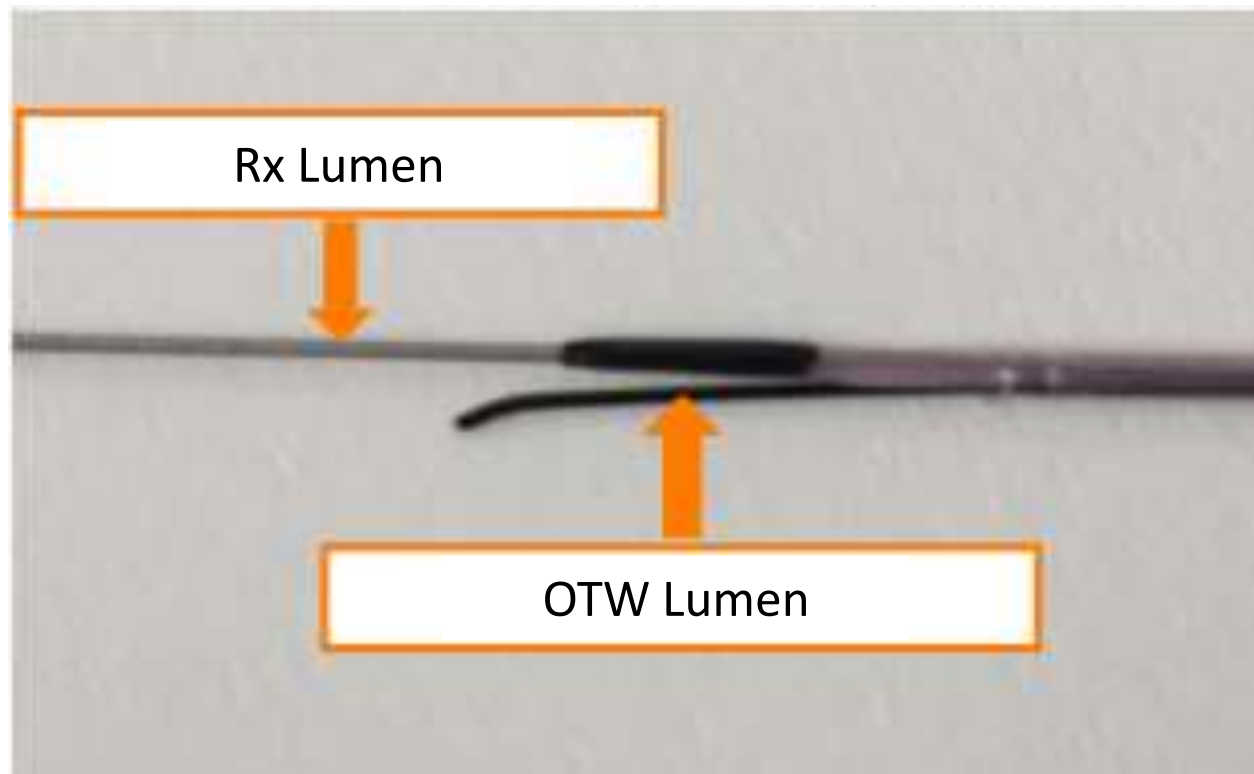


Crusade

Sasuke



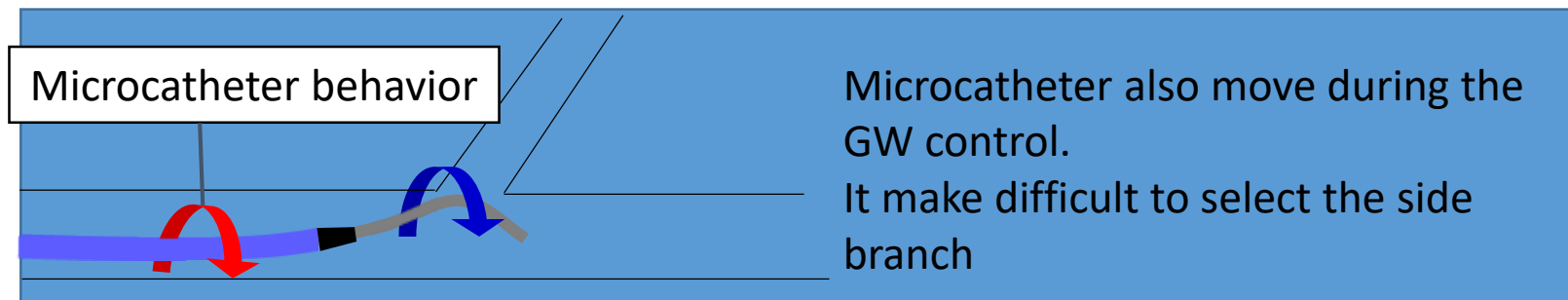
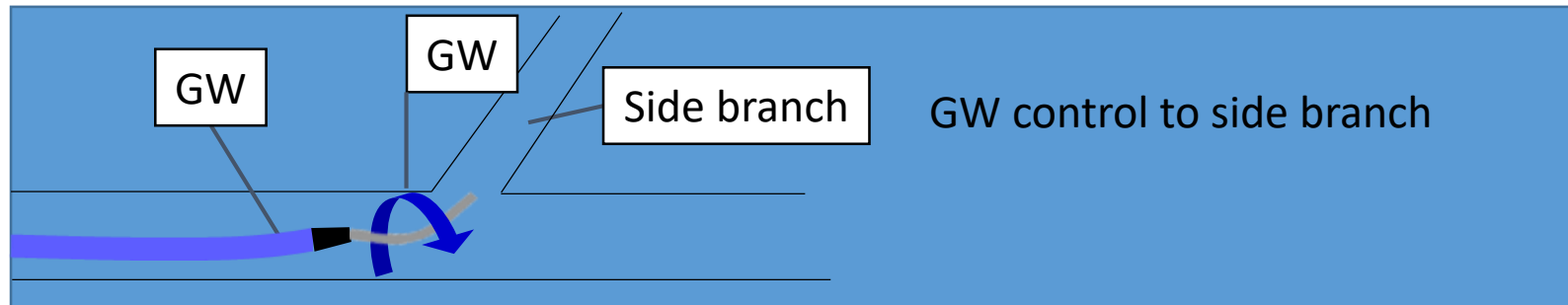
# Double lumen catheter (DLC)

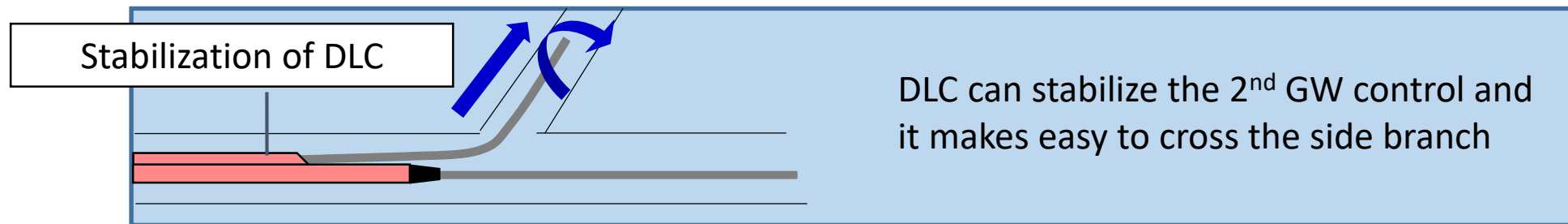
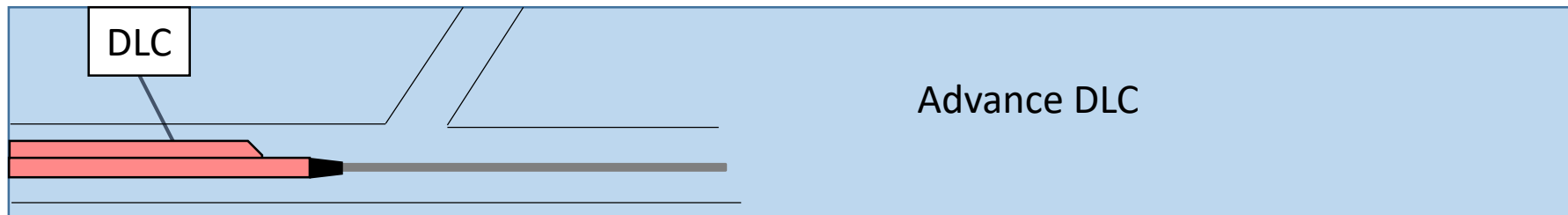
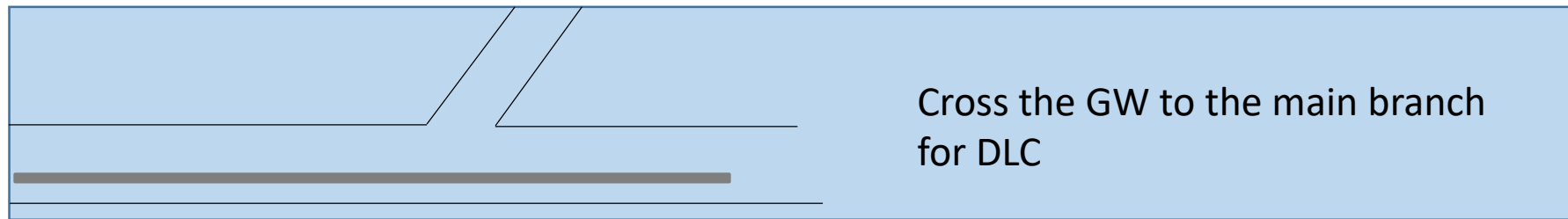
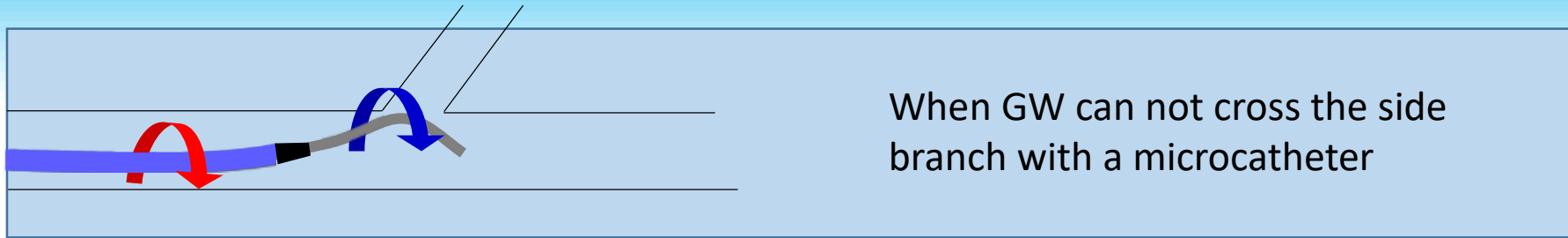


# Why use DLC ?

- ① Side branch selection

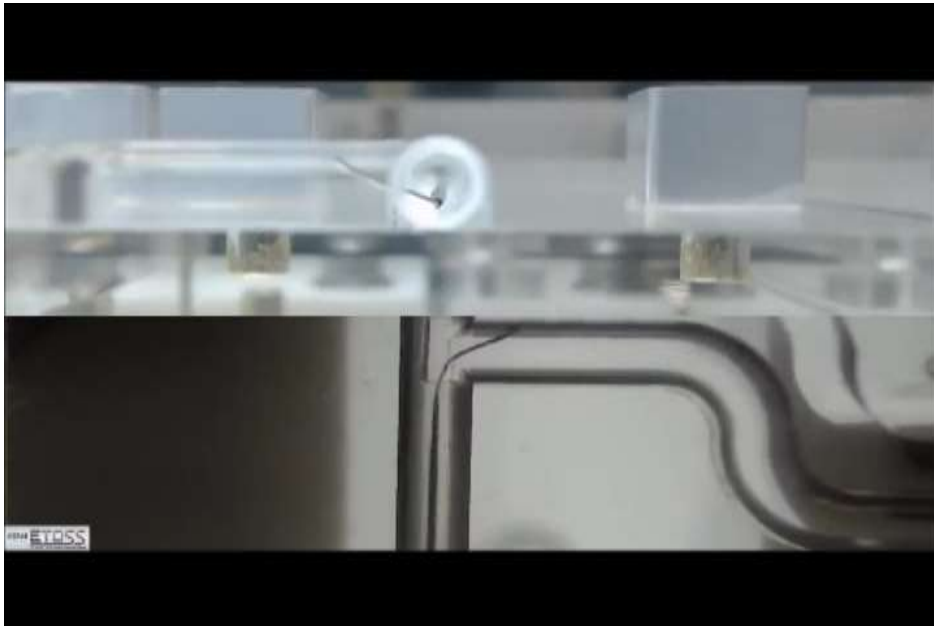
## Limitation of single lumen microcatheter





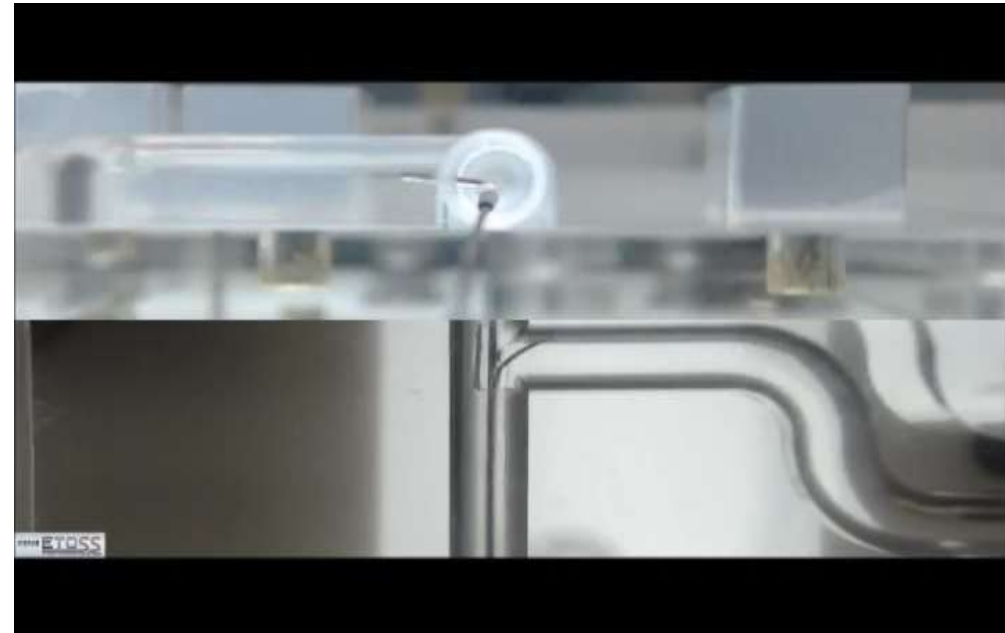
# For Side Branch

Micro-catheter



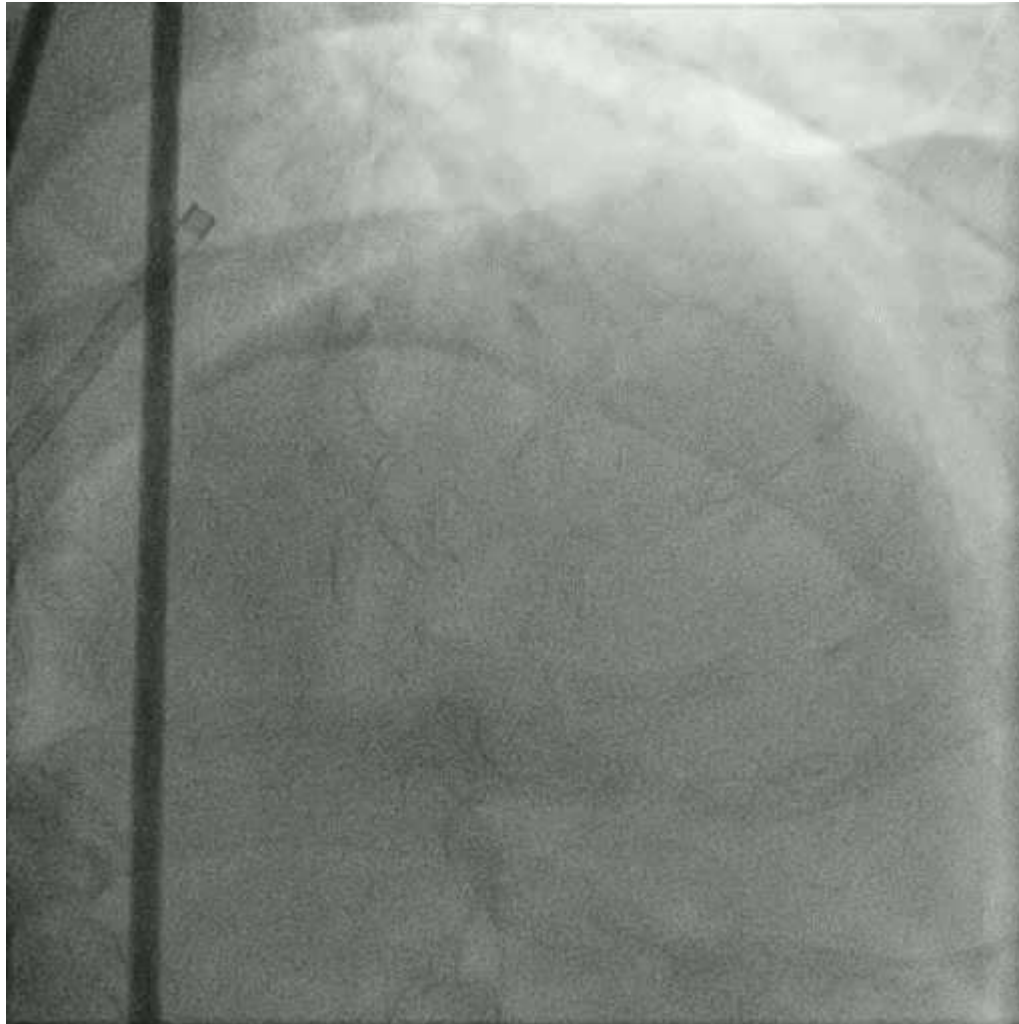
Micro-catheter is unstable

DLC



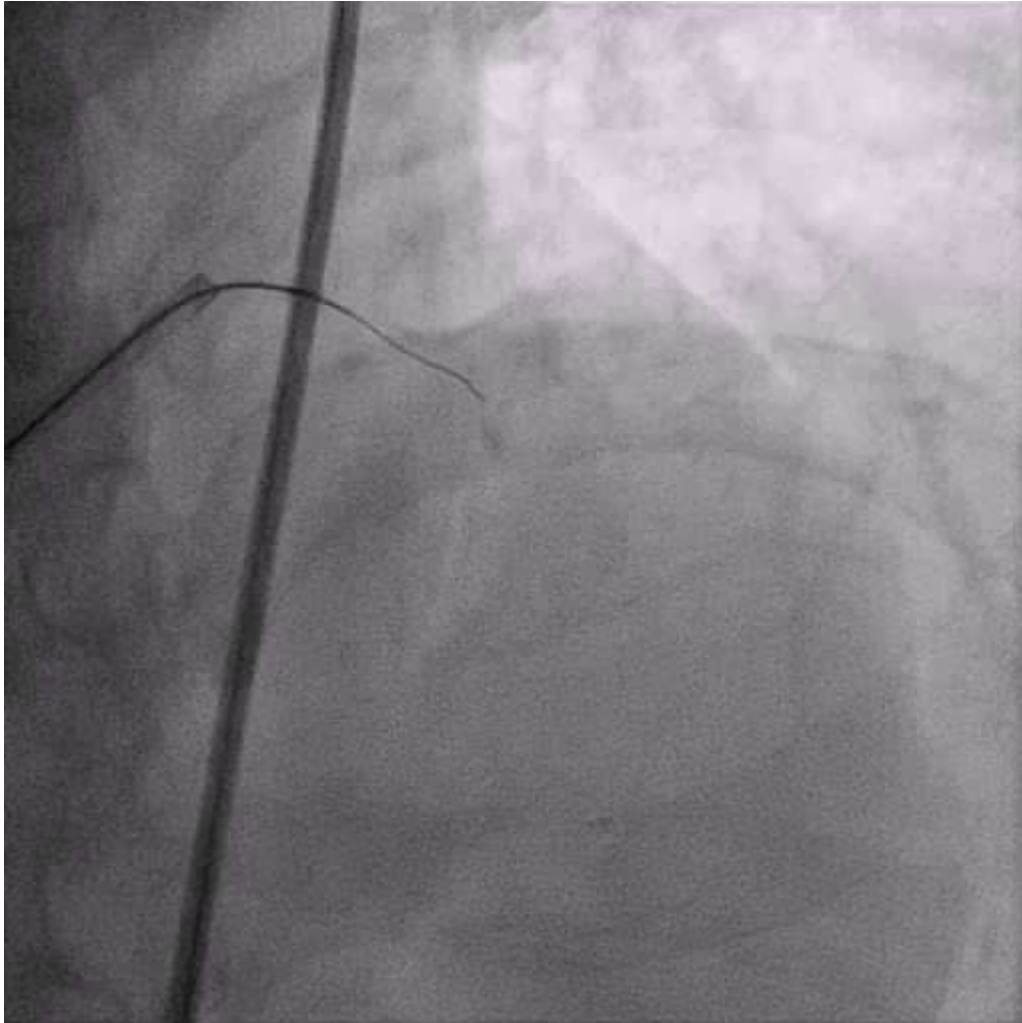
DLC is stable

## Sever stenosis at LAD & D

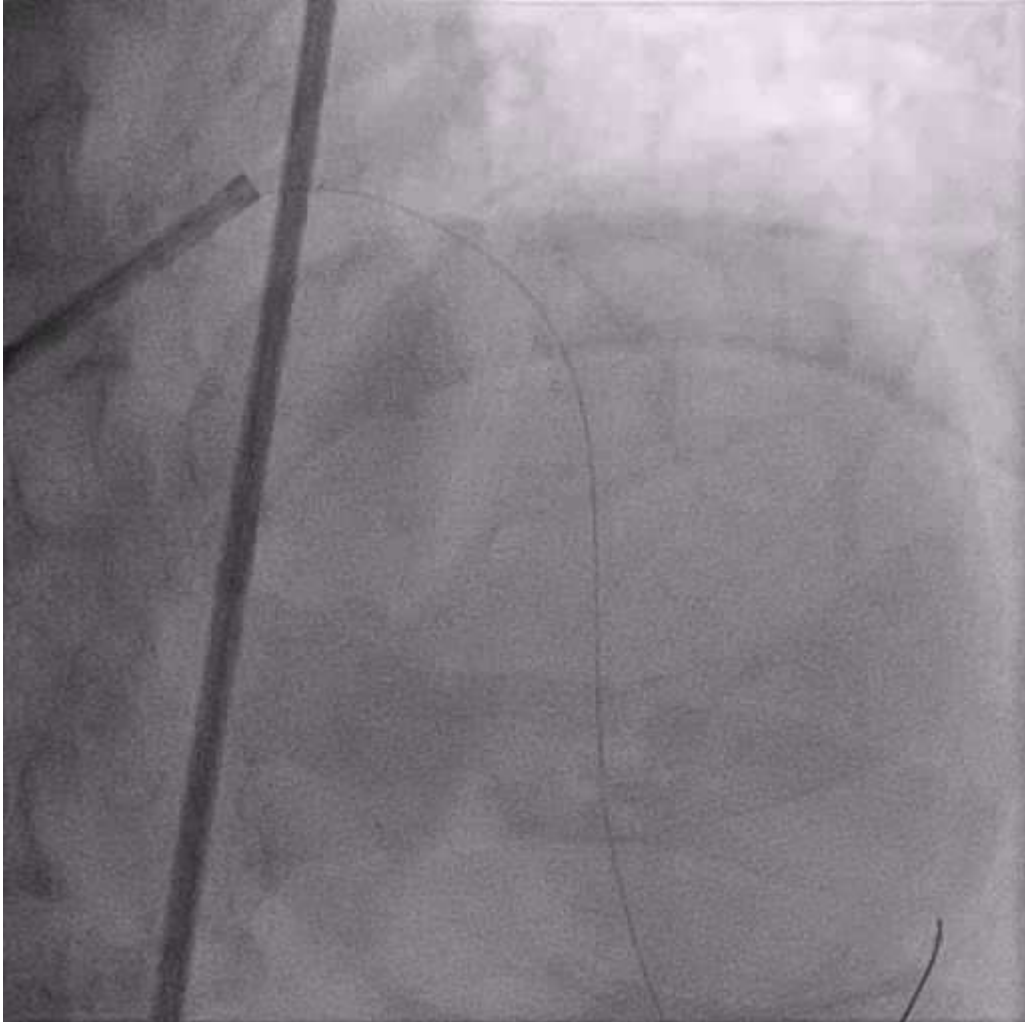






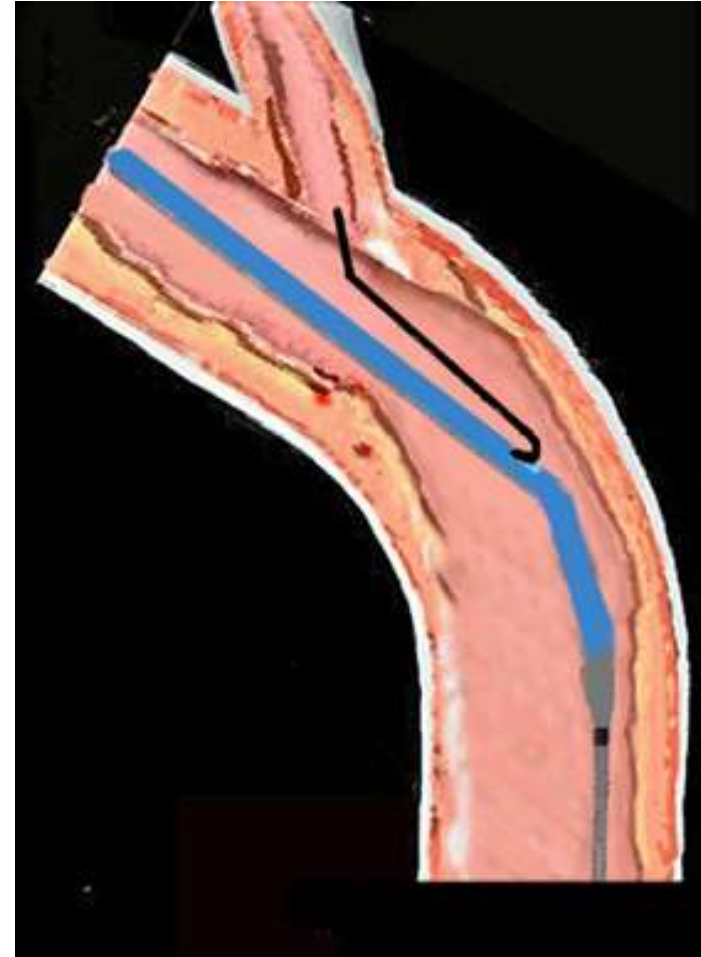
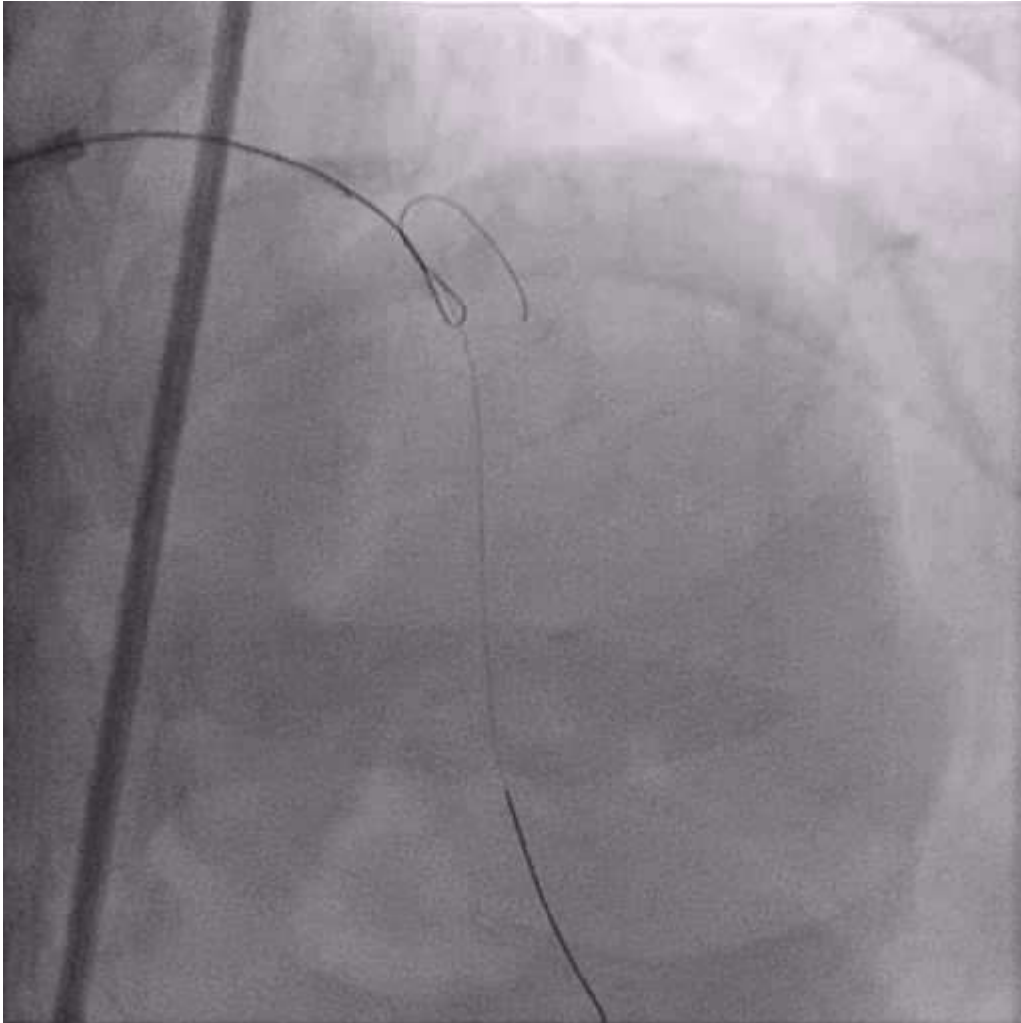


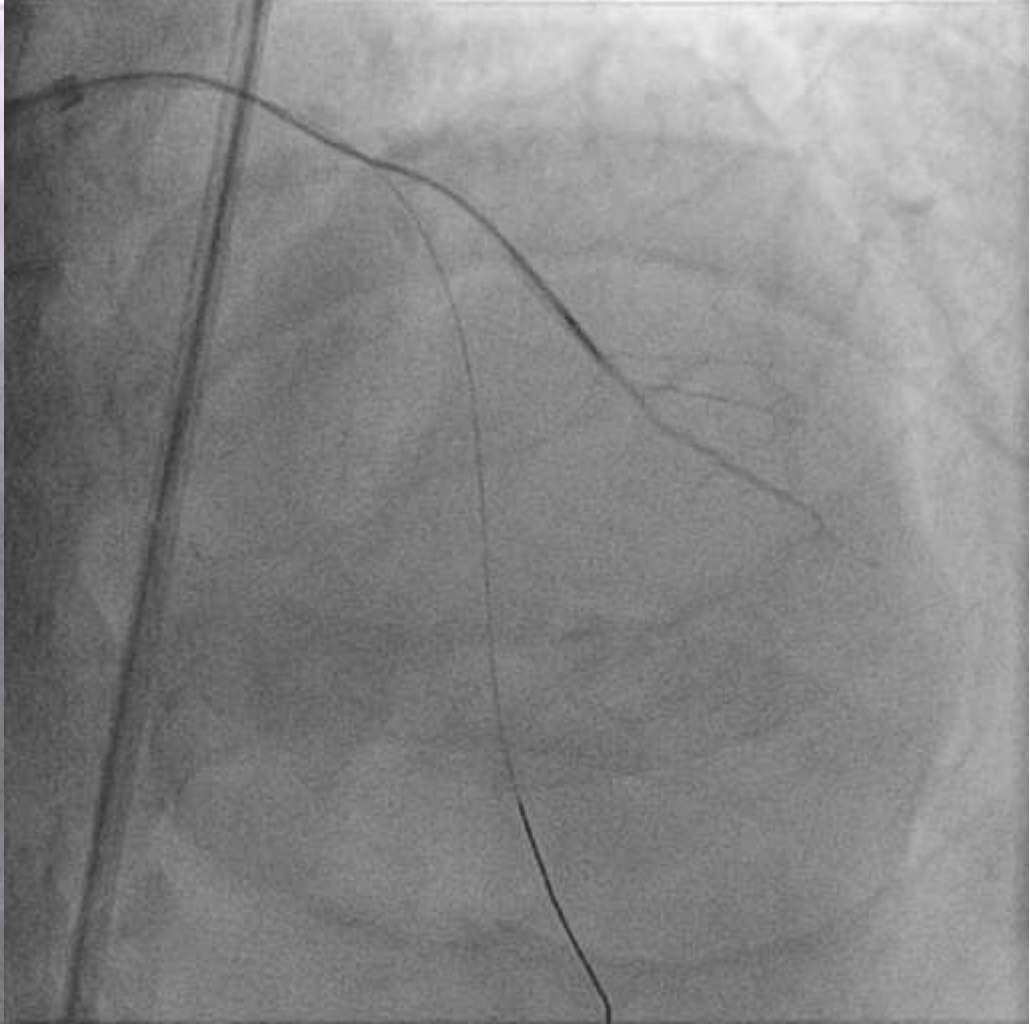
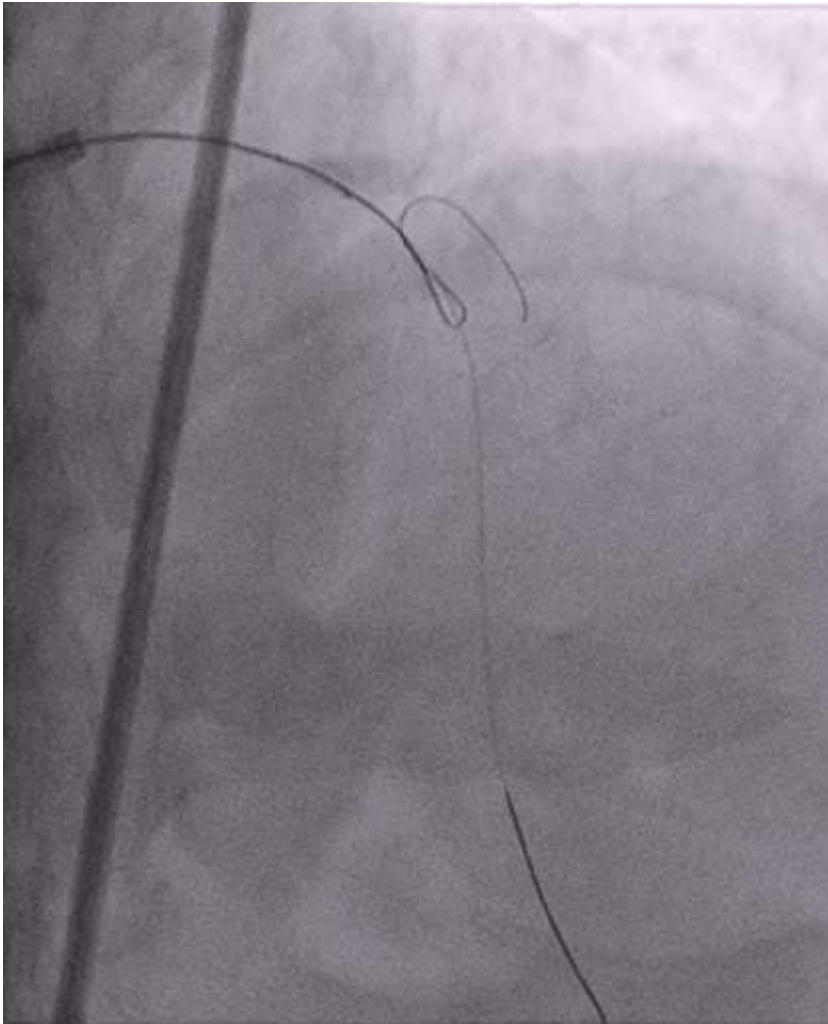
Corsair + XT-R

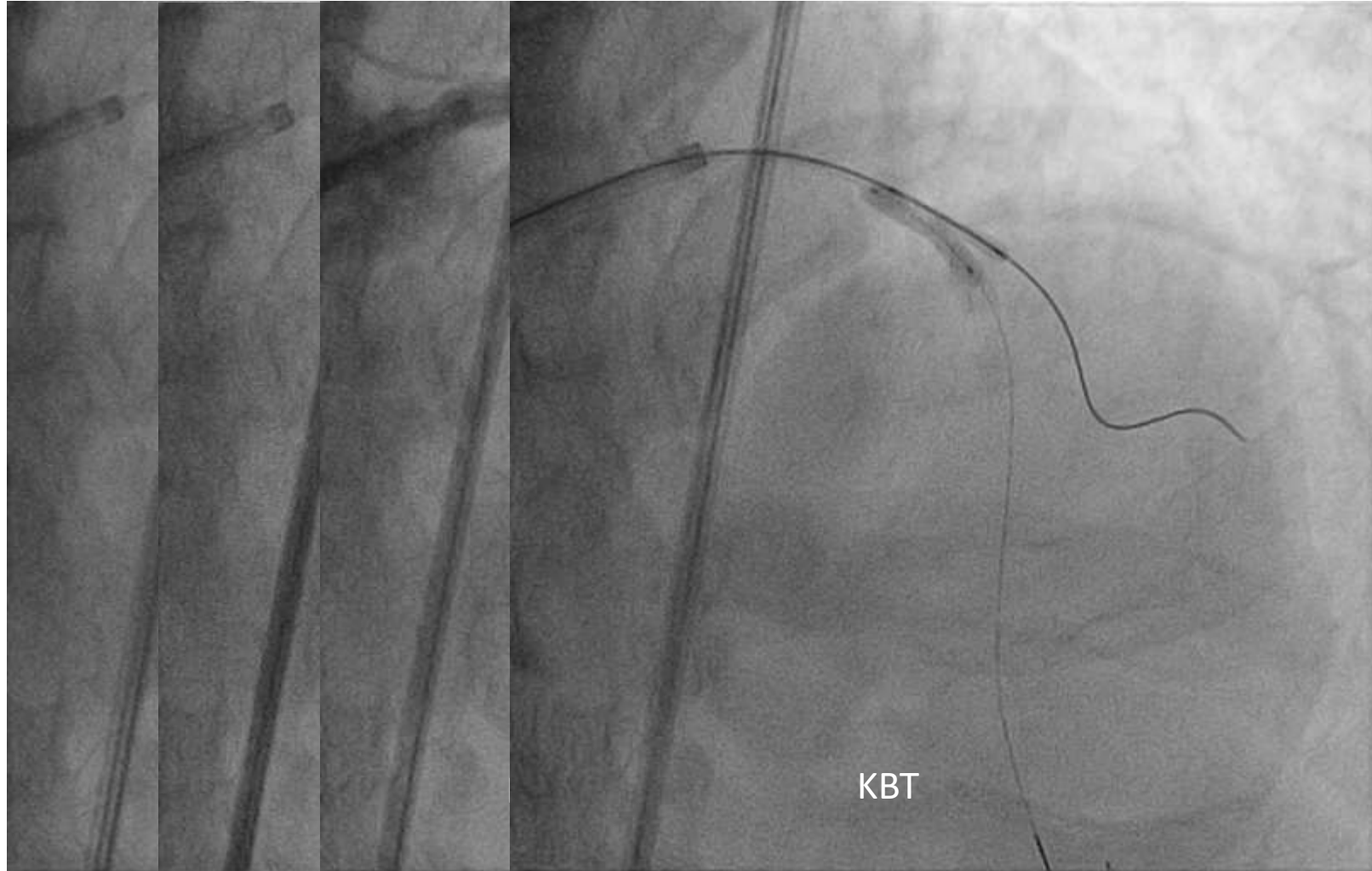


~~Corsair+Sion blue~~

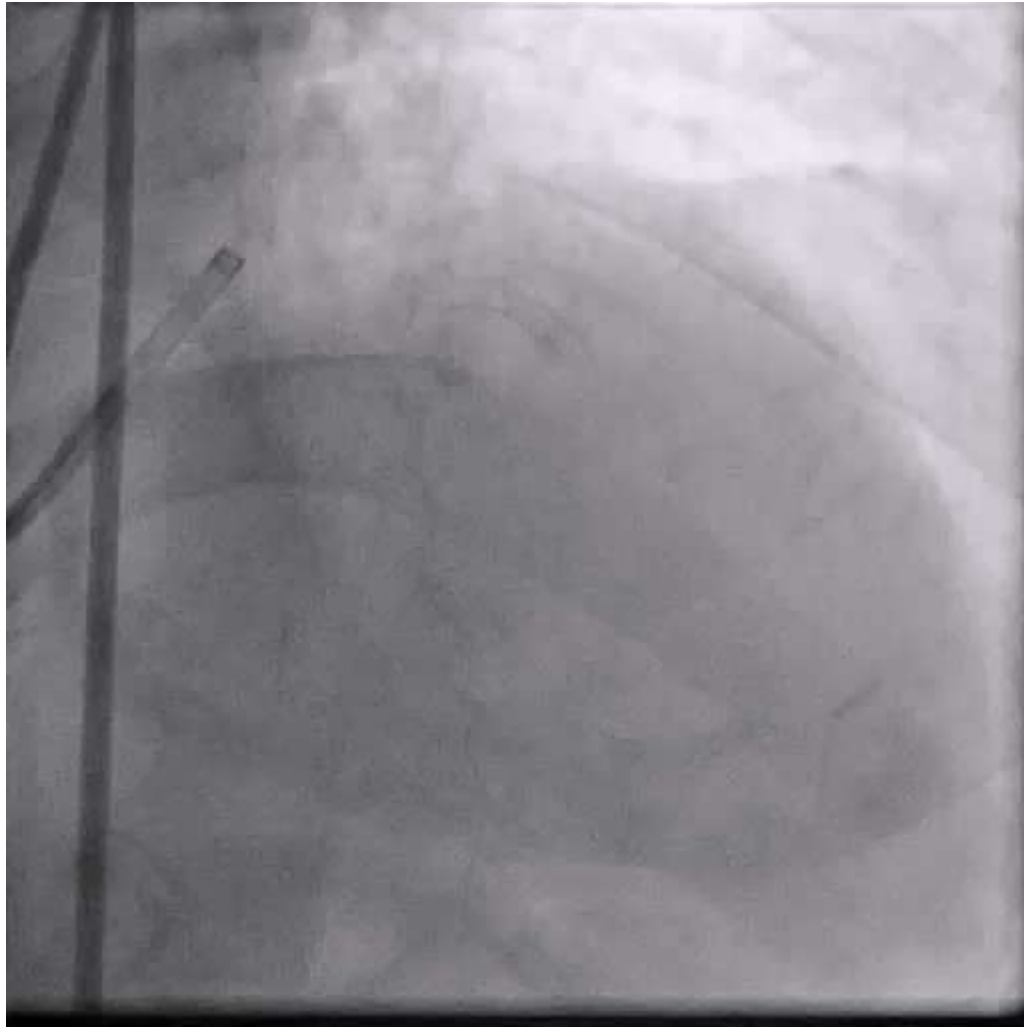
# Reverse wire technique







KBT

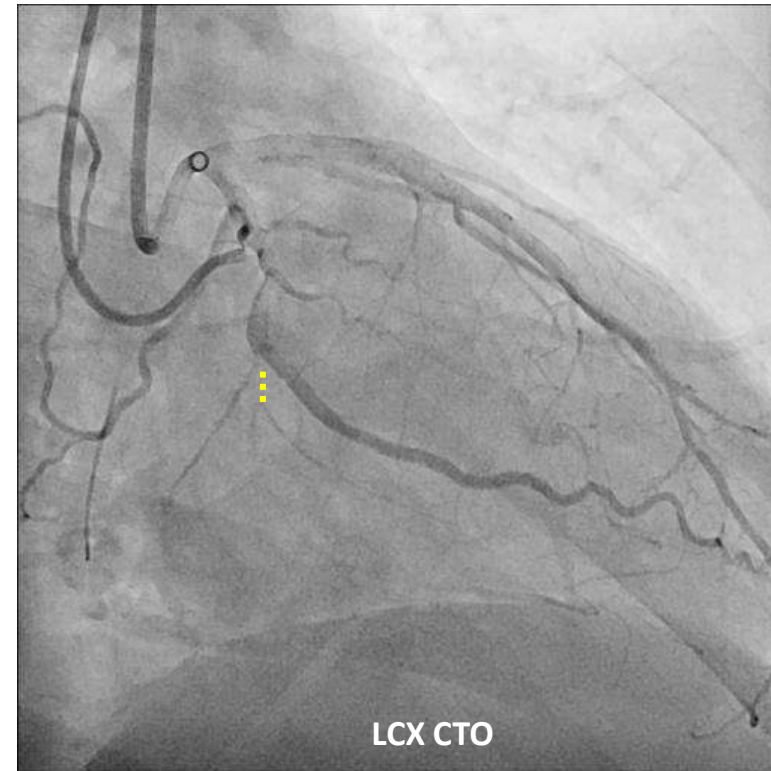
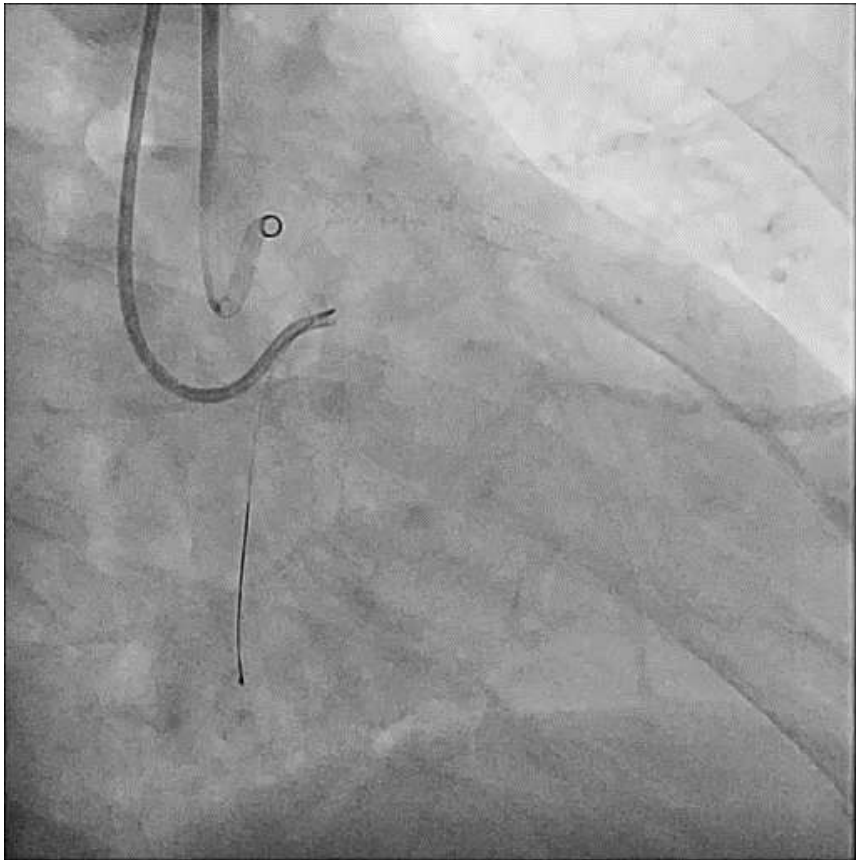


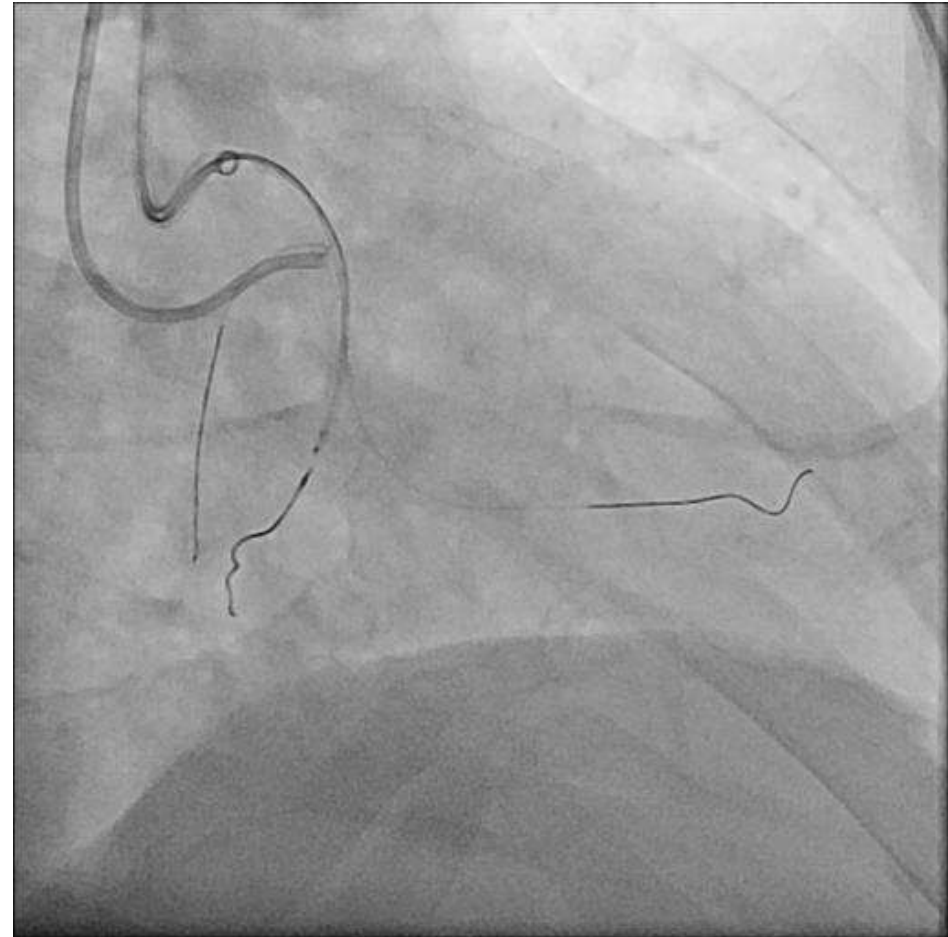
## Why use DLC ?

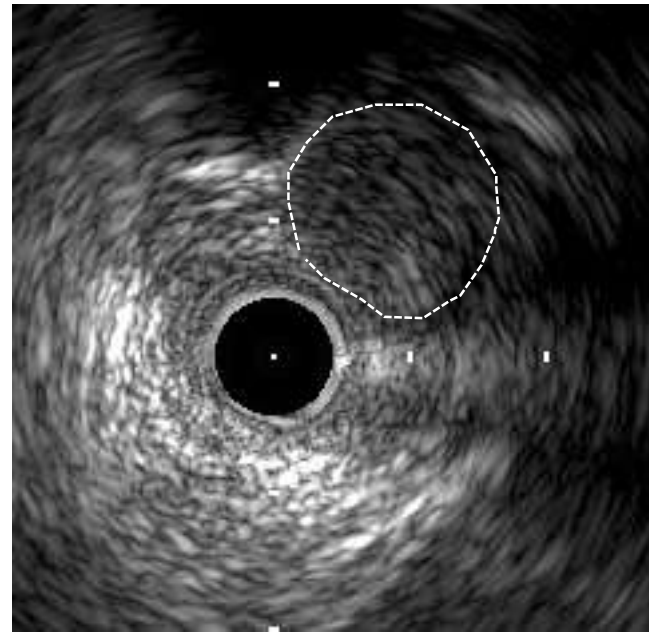
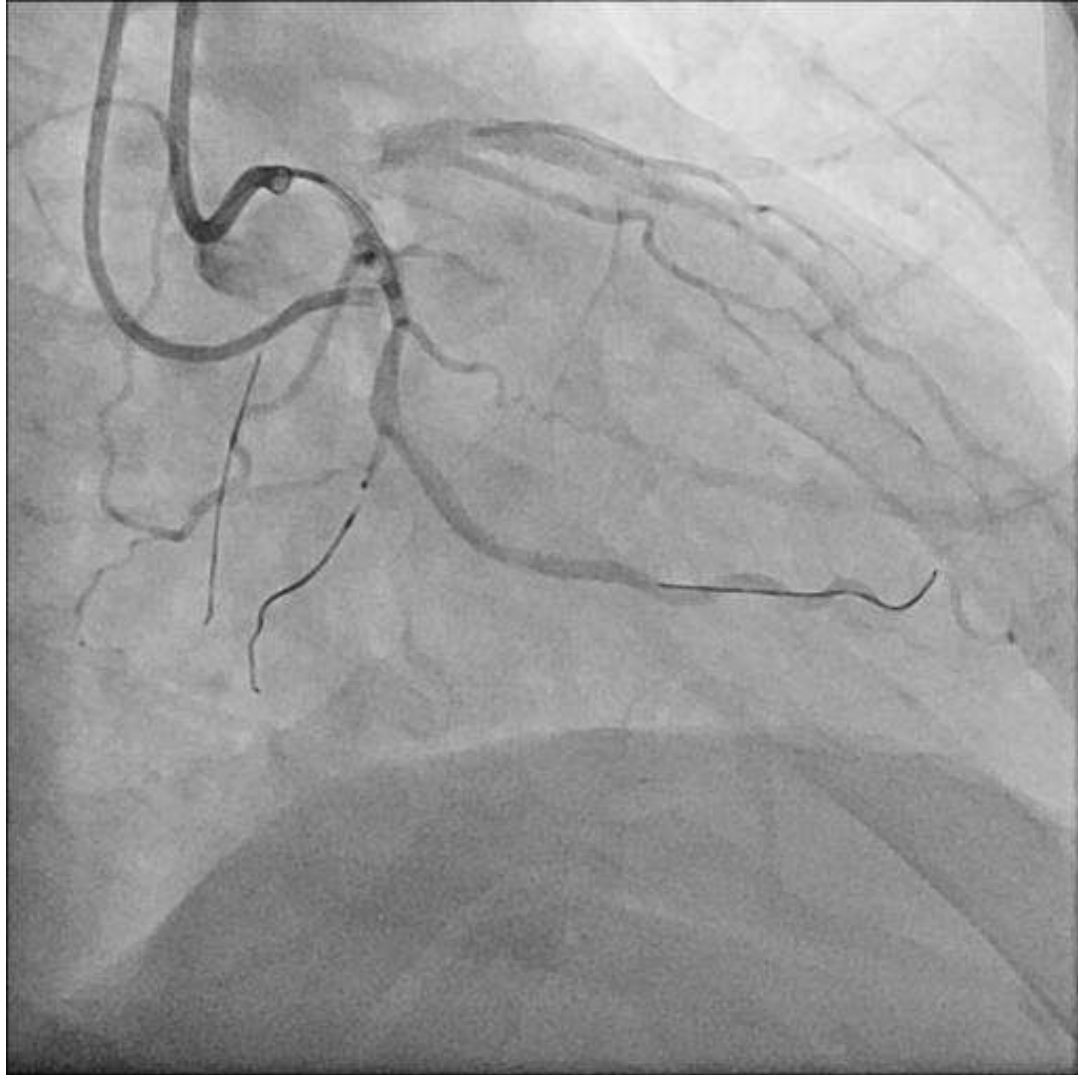
- ② For strong back up support

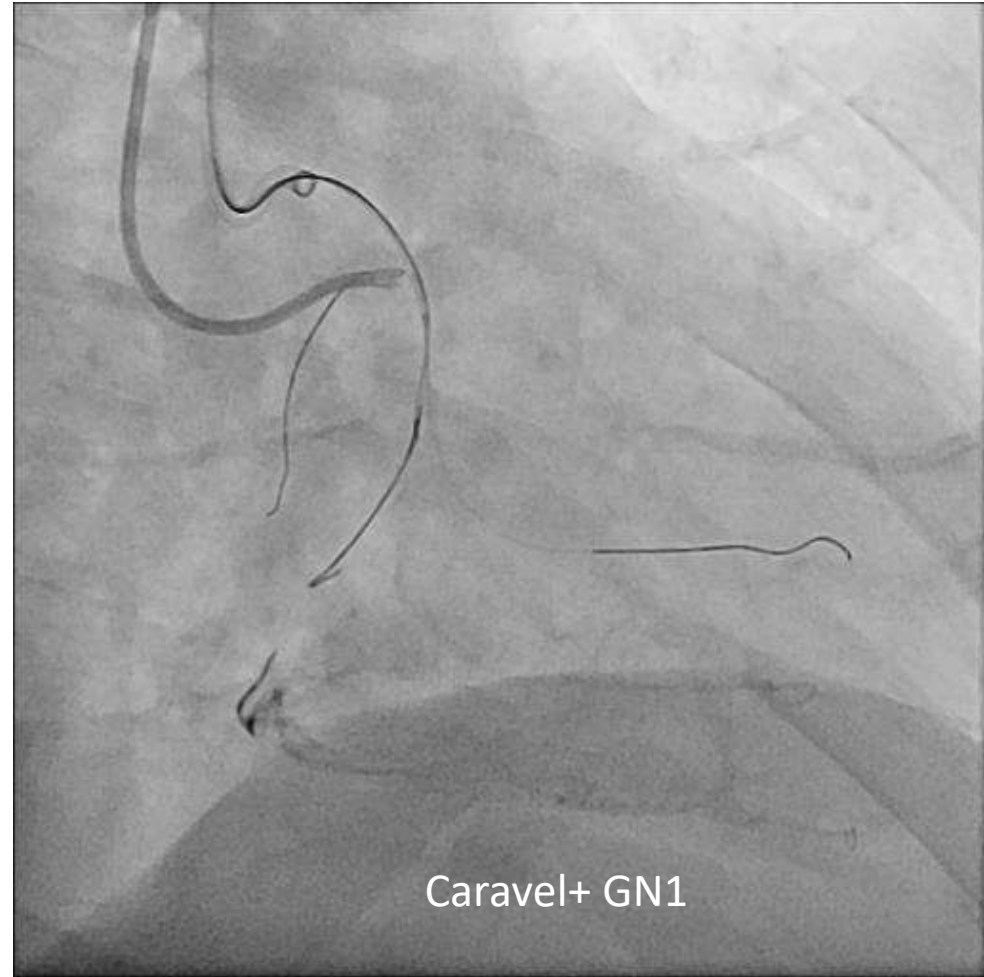
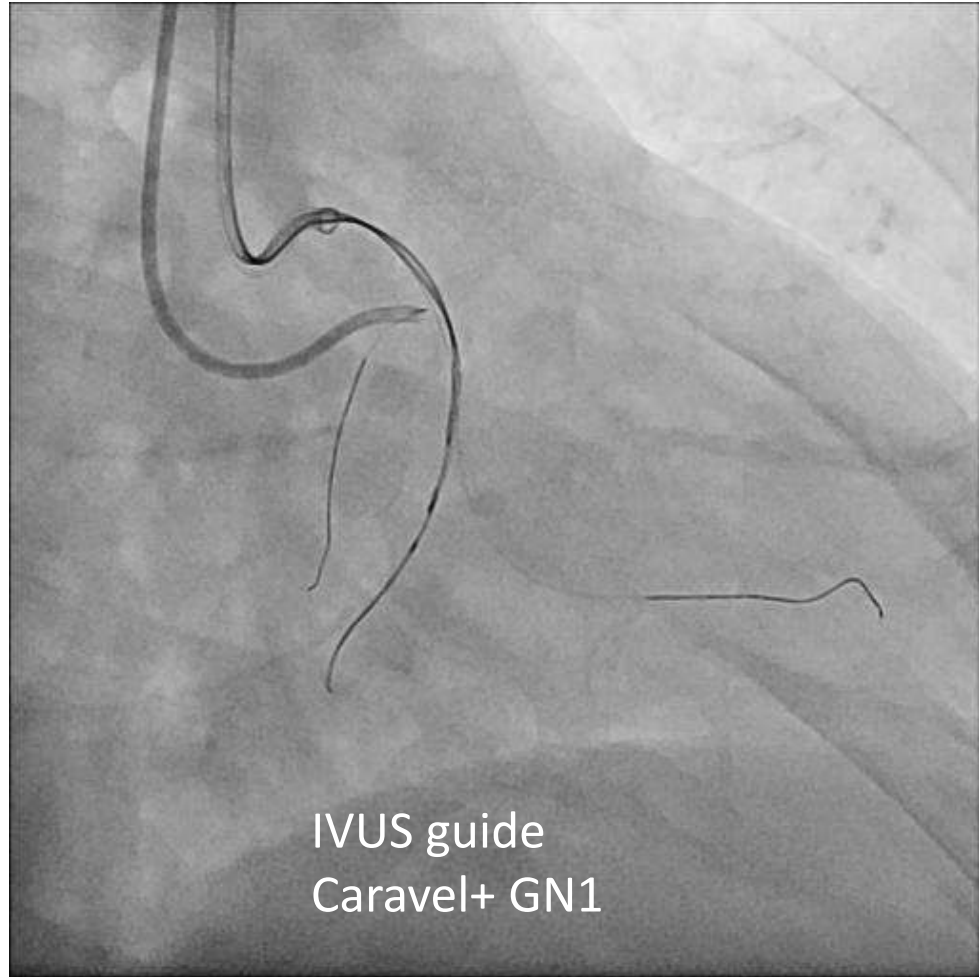


## Side branch DLC (double lumen catheter)



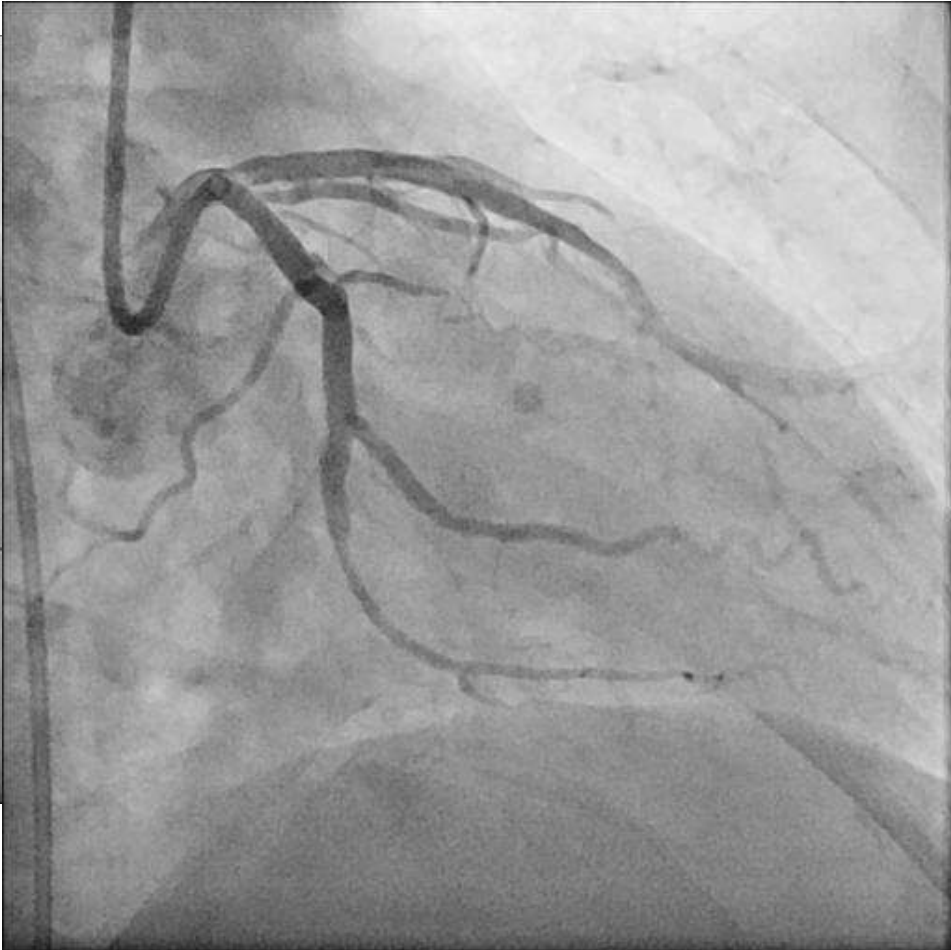








Sasuke (DLC) + GN1

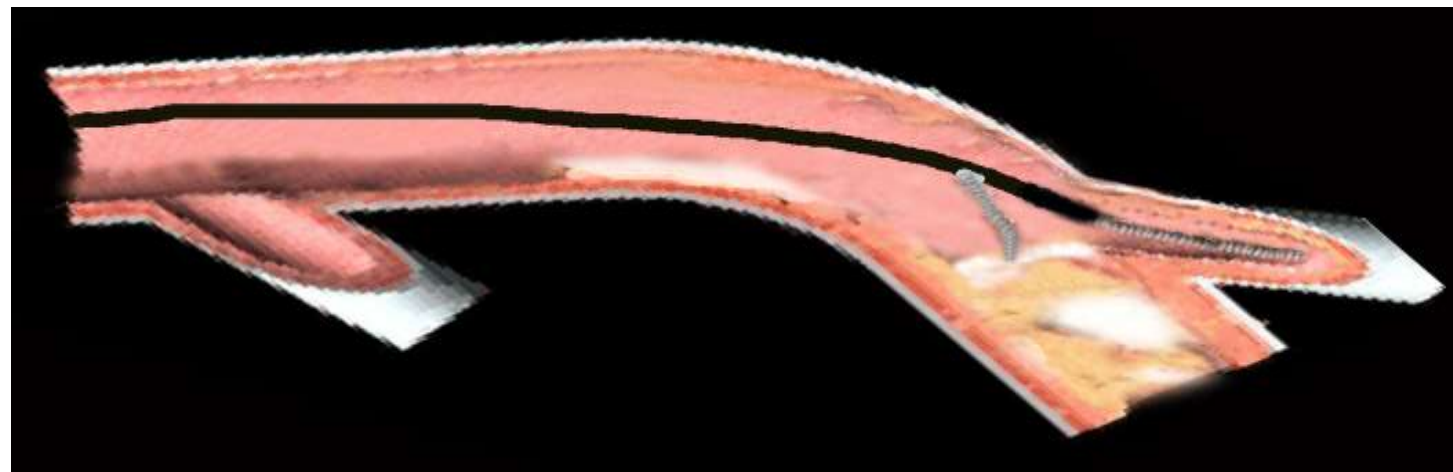


Sasuke (DLC) + GN2

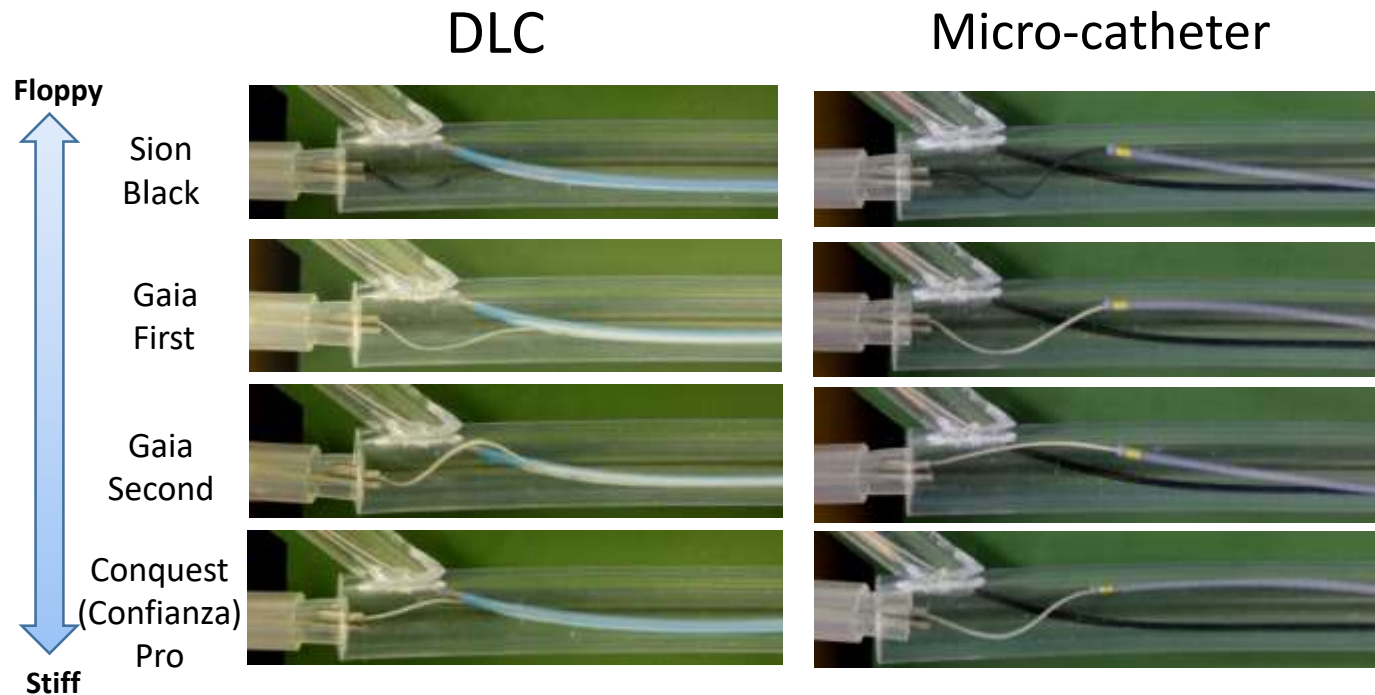
**Micro-catheter**



**DLC**



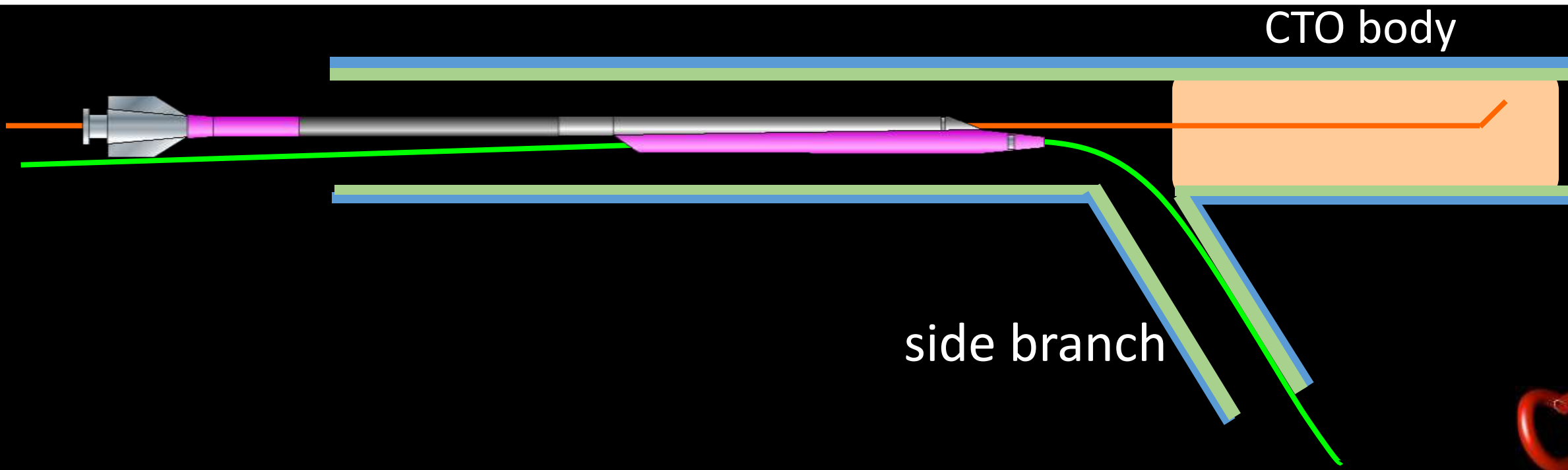
# Crusade<sup>®</sup> Side-branch data



GW pushing force / gf	
Crusade	Microcatheter
1.2	0.6
2.3	0.7
6.4	1.5
13.5	1.6

# Schema of DLC mounted on a side branch guidewire

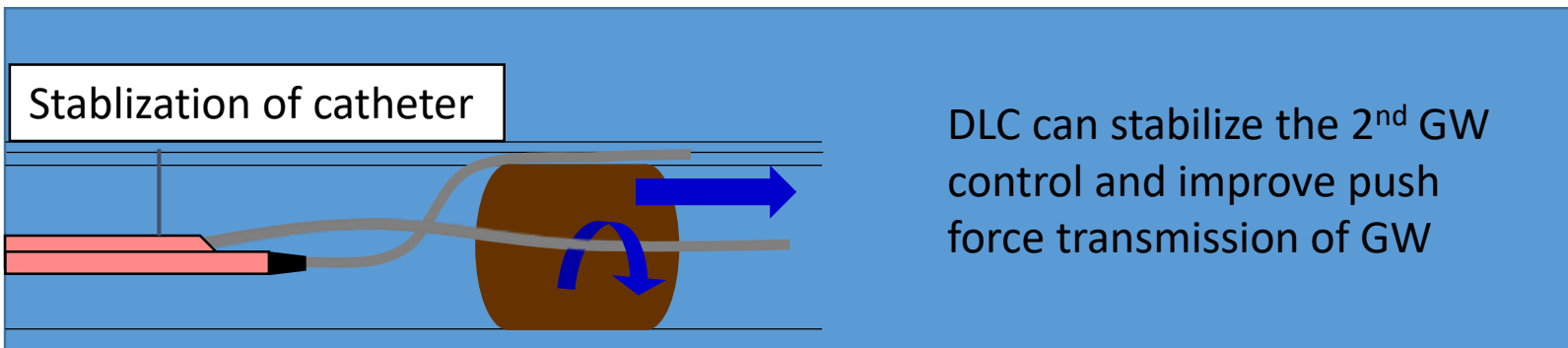
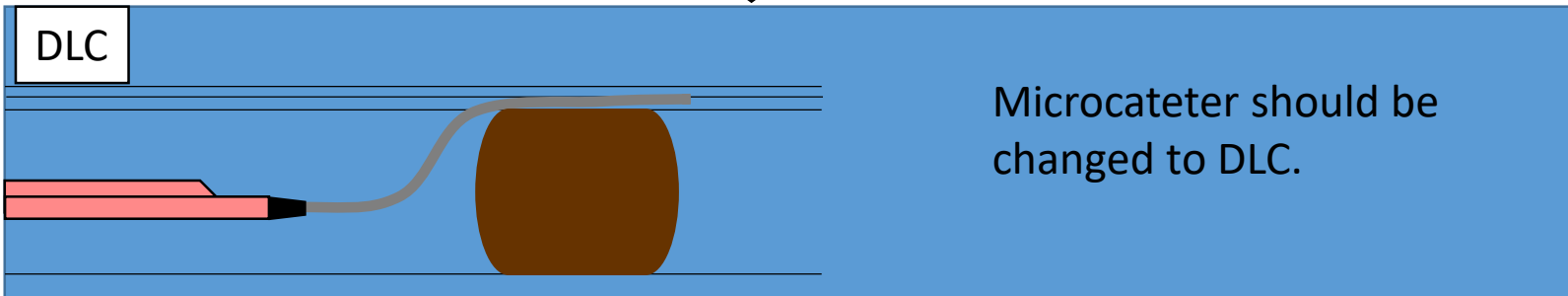
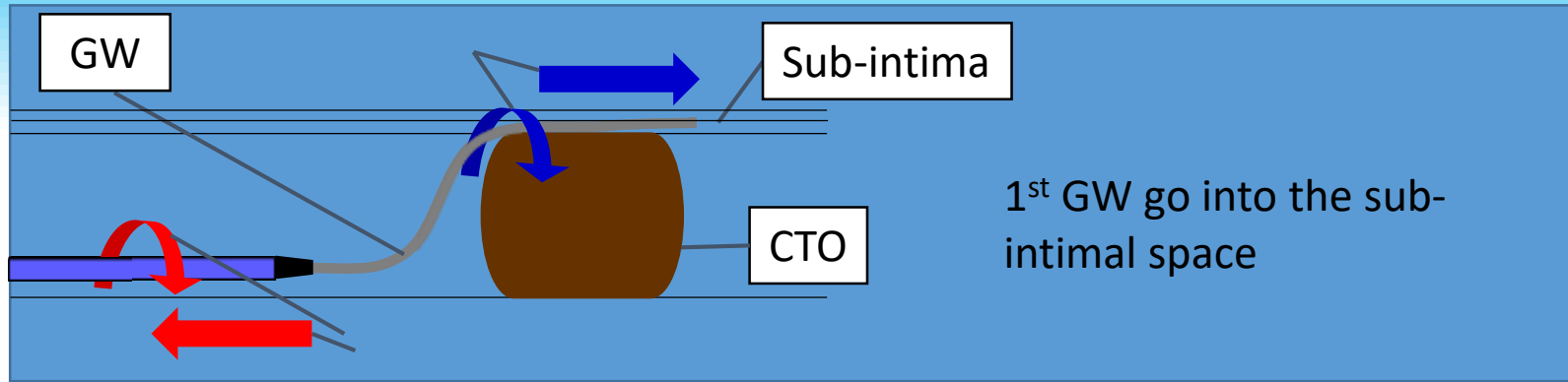
*Stabilization* by Rx lumen guidewire advancing side branch, and could provide pushing force of OTW lumen guidewire more (2 ~ 8 fold).

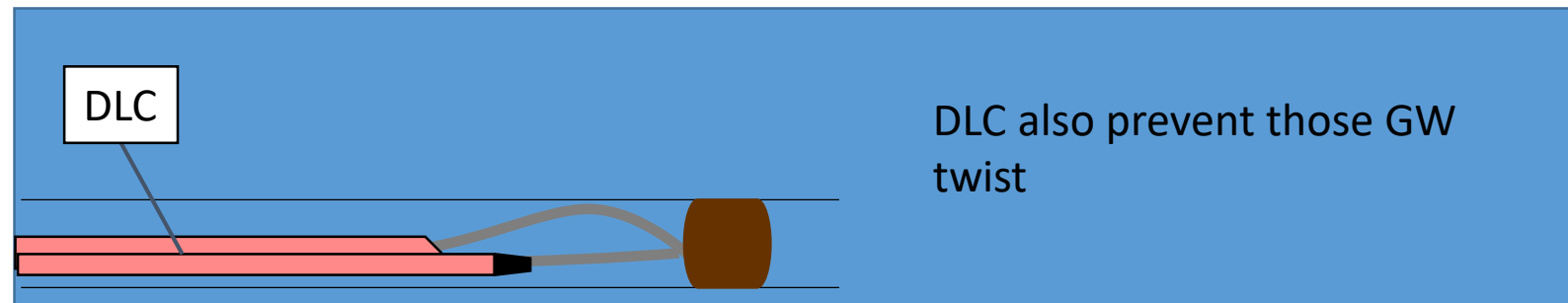
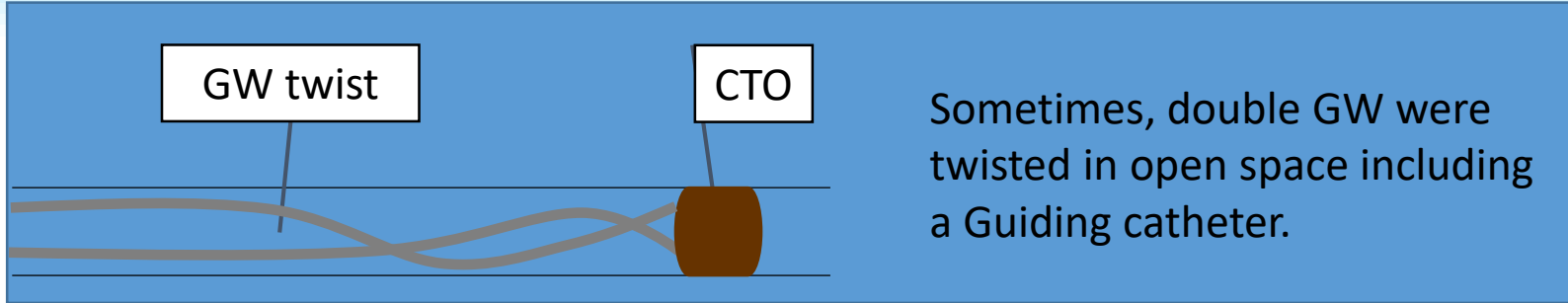




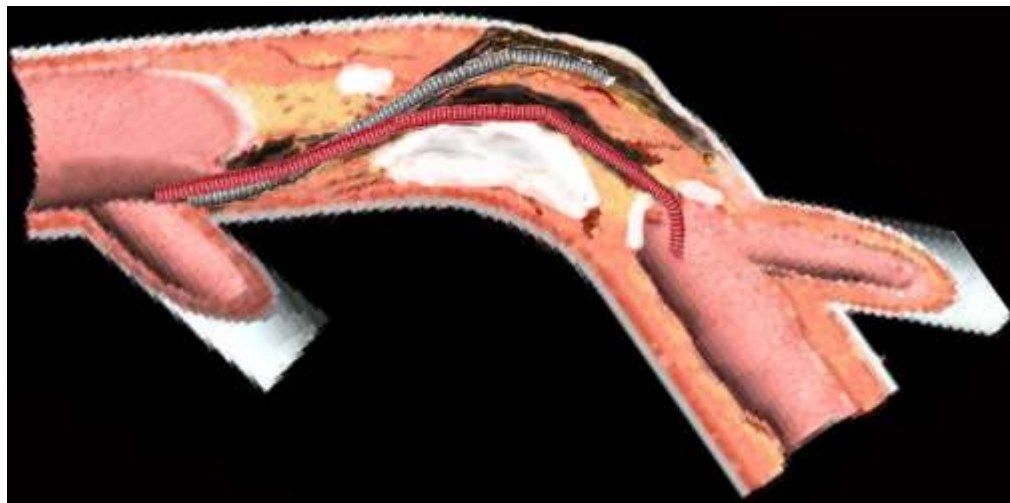
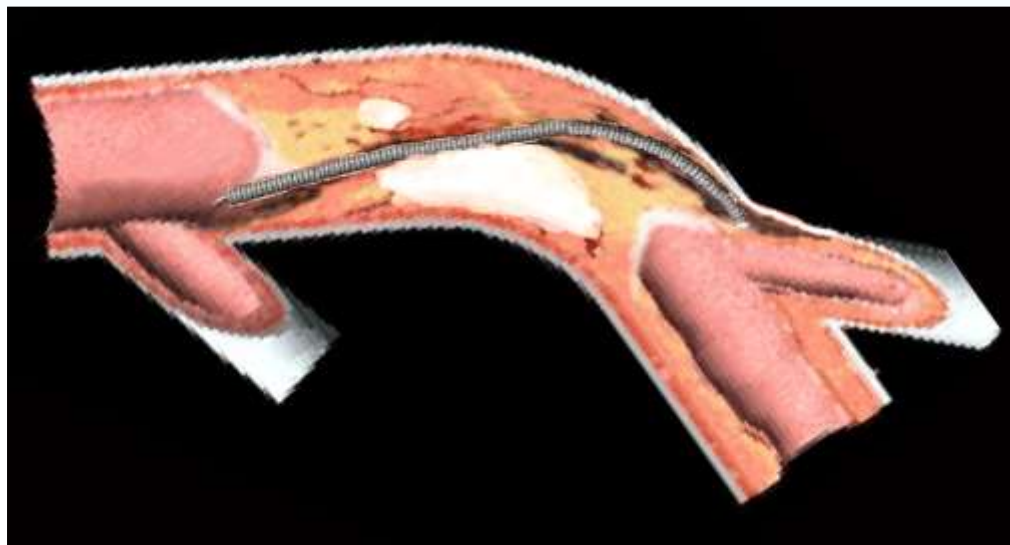
## Why use DLC ?

- ③ For parallel wire technique



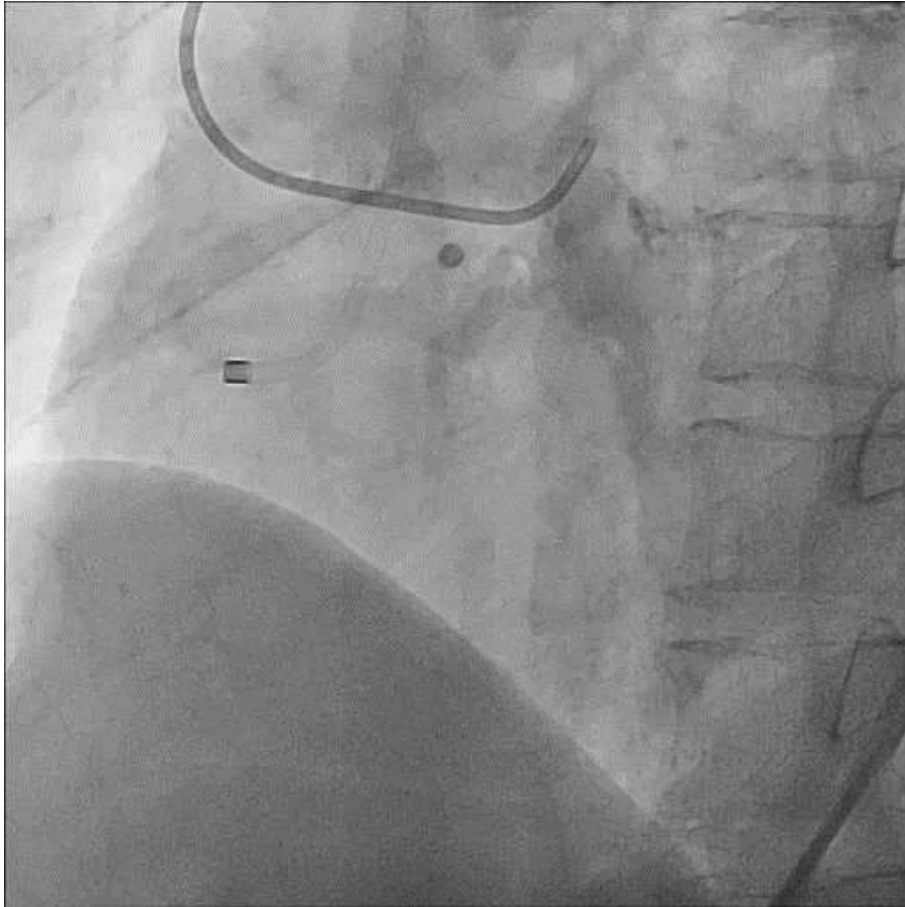


# Parallel Wire Technique

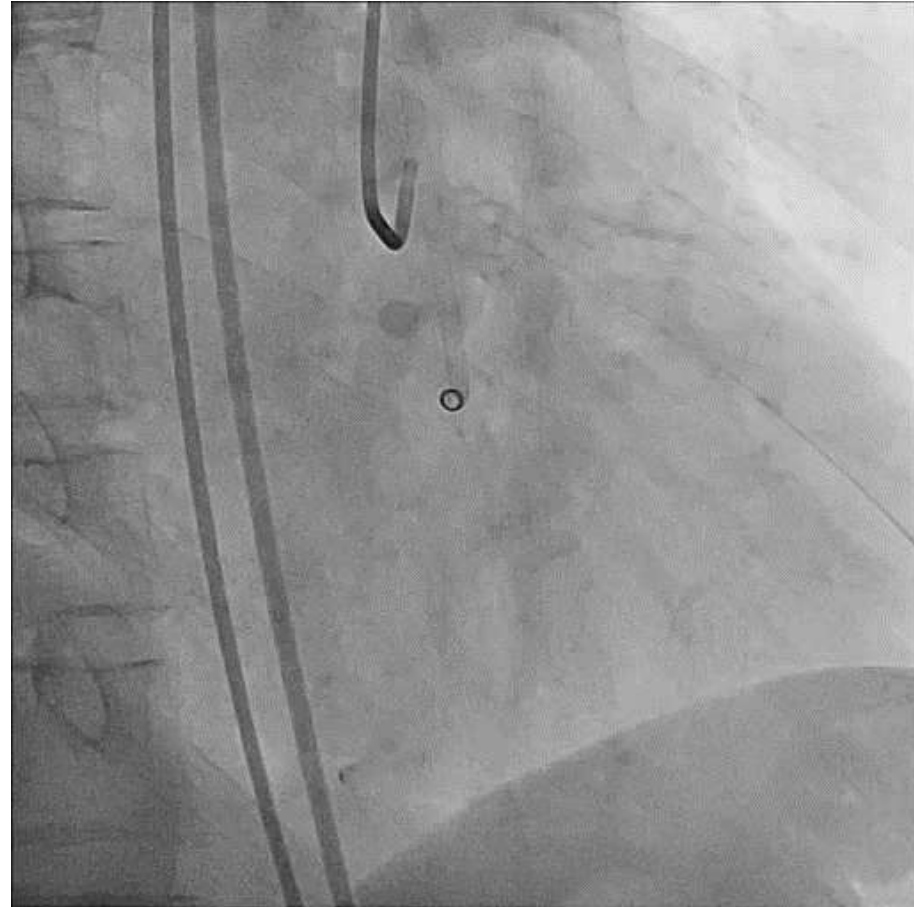


# Case

LAO 50

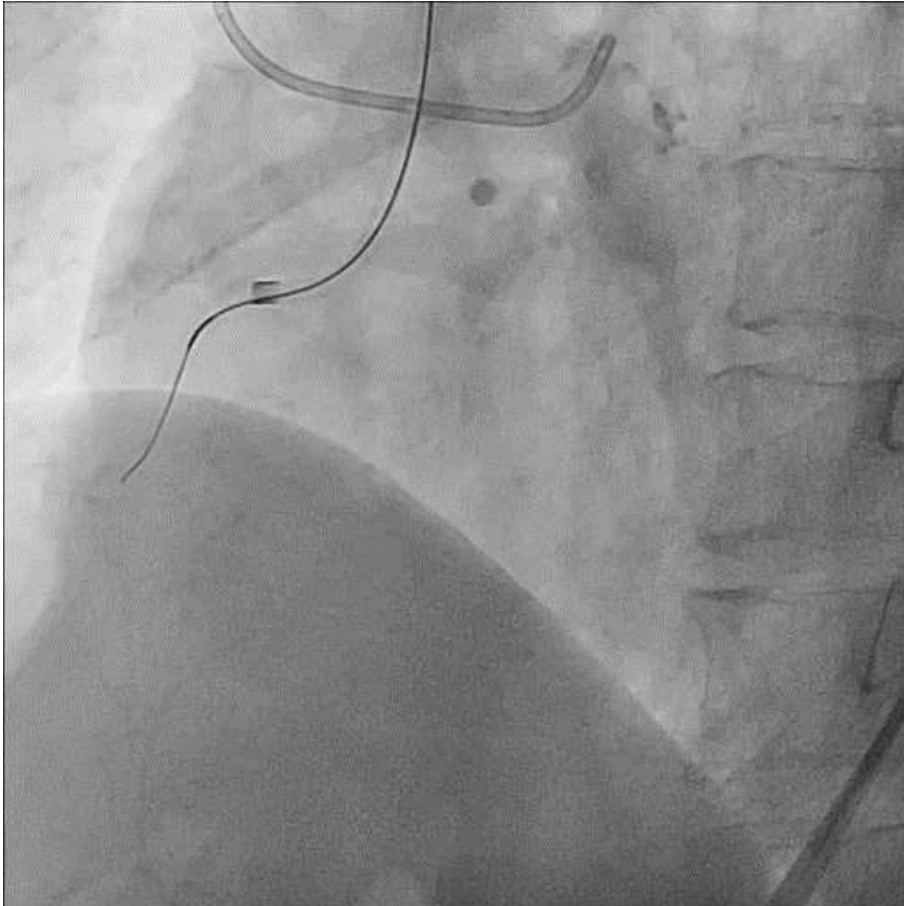


RAO 40

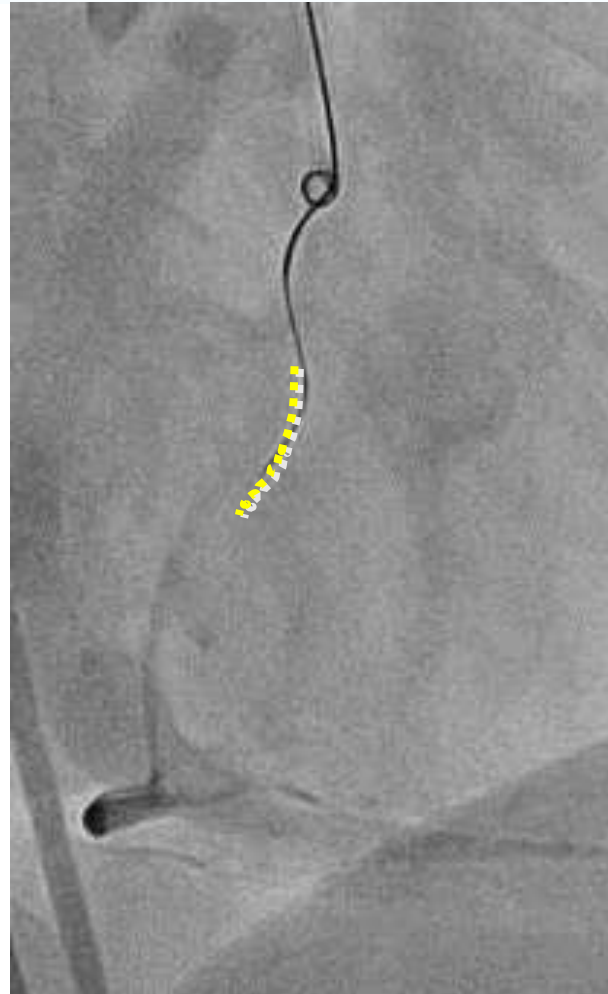
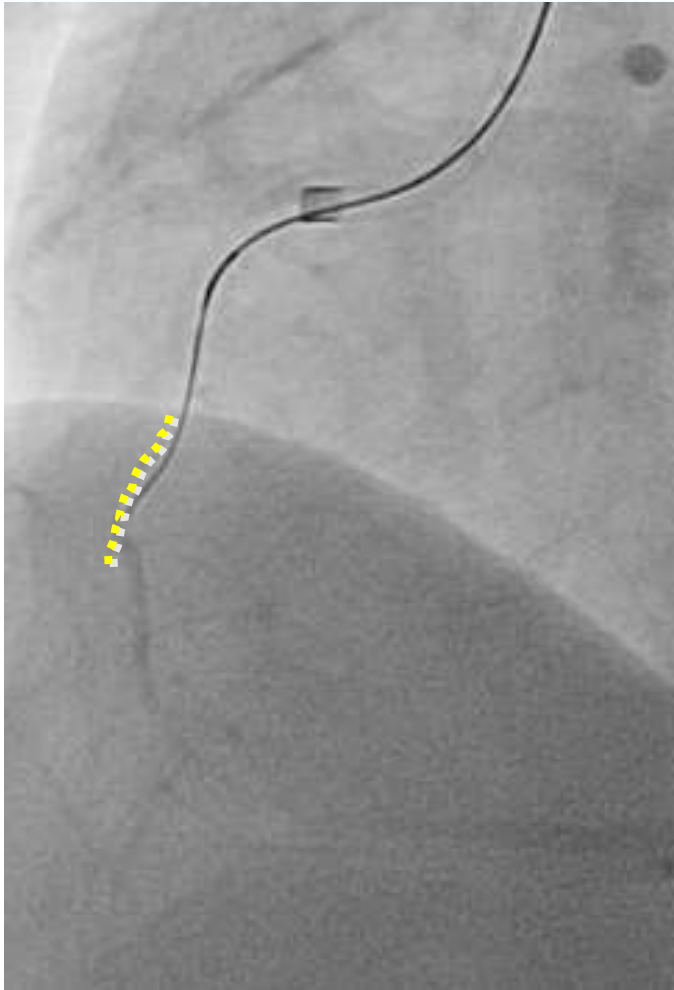


# Case

**Caravel + XT-R**



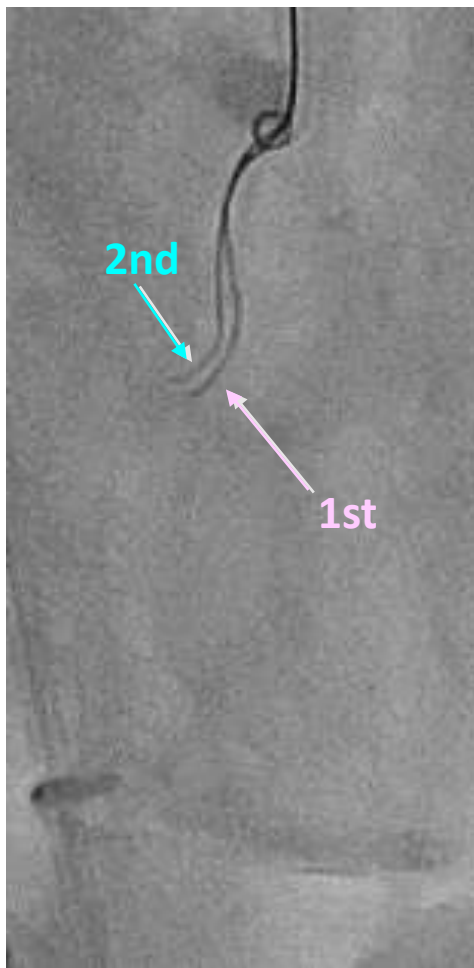
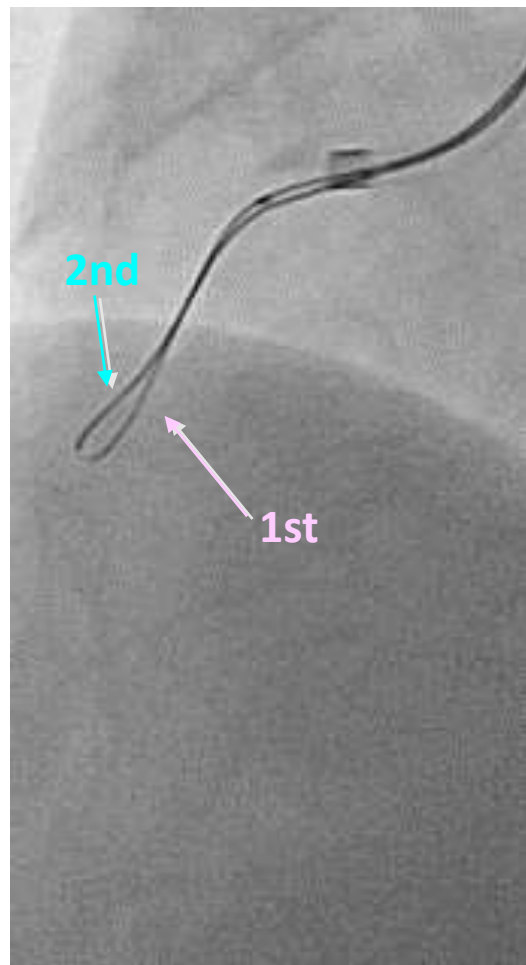
# Case



Caravel change to DLC

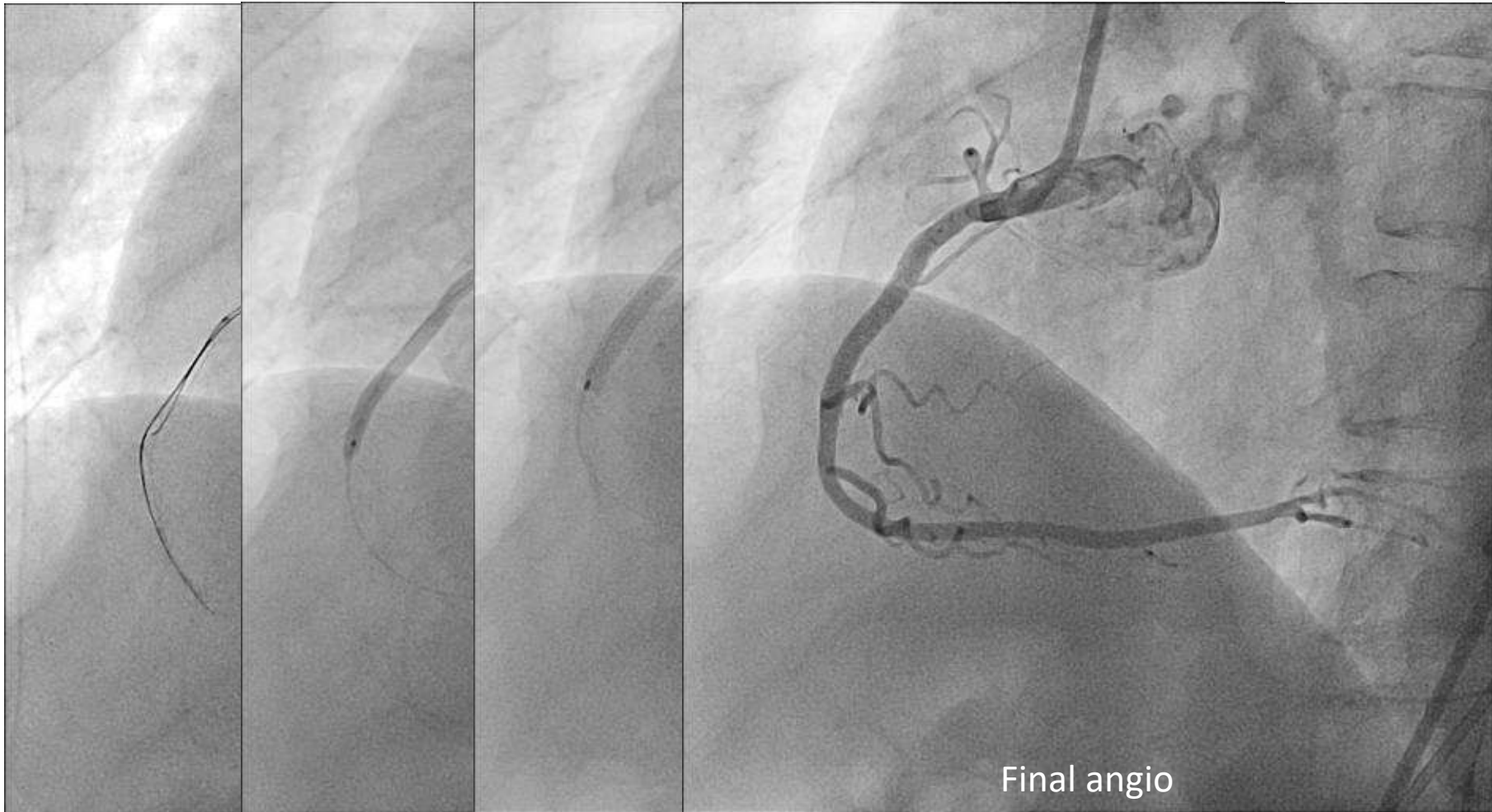
# Case

Crusade + Gaia2nd





# Case



# Take home message

- Understanding microcatheter (MC) is important to accumulate experience in PCI
- Knowing MC basic performance and how it works in different scenes improves comprehension of each MC's characteristics.
- Choosing the appropriate MC depends on the case will decrease the risk and facilitate the procedure.
- Having a basic understanding of MC is one of the short cuts to improve in PCI