Antegrade wire escalation

Toyohashi Heart Center

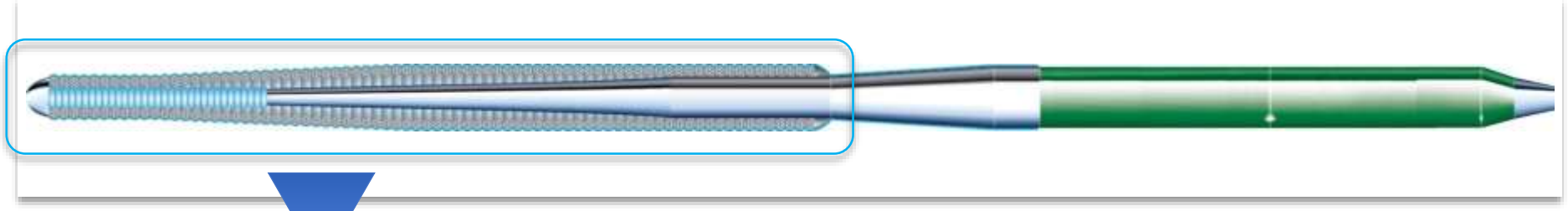
Maoto Habara, M.D.

Antegrade approach; CTO GW Line-up

	Tip stiffness	Penetration	Maneuverability	Track ability
	Tip load	Tip load Tip diameter	No whip Response	Lubricity
XT-R	**0.6gf**	**0.010”** +	◎ ++	+++
XT-A	**1.0gf**	**0.010”** +	◎ ++	+++
Gaia First	**1.7gf**	**0.009”** +	◎ +++	++
Gaia Second	**3.5gf**	**0.010”** ++	◎ +++	++
Gaia Third	**4.5gf**	**0.011”** ++	◎ +++	++
UB3	**3.0gf**	**0.014”** +	▲ +	+
Conquest Pro12	**12gf**	**0.009”** +++	▲ +	++

ASAHI Gaia Next

First / Second / Third



XTRAND™ coil

SION TECC
Leading to the NEXT

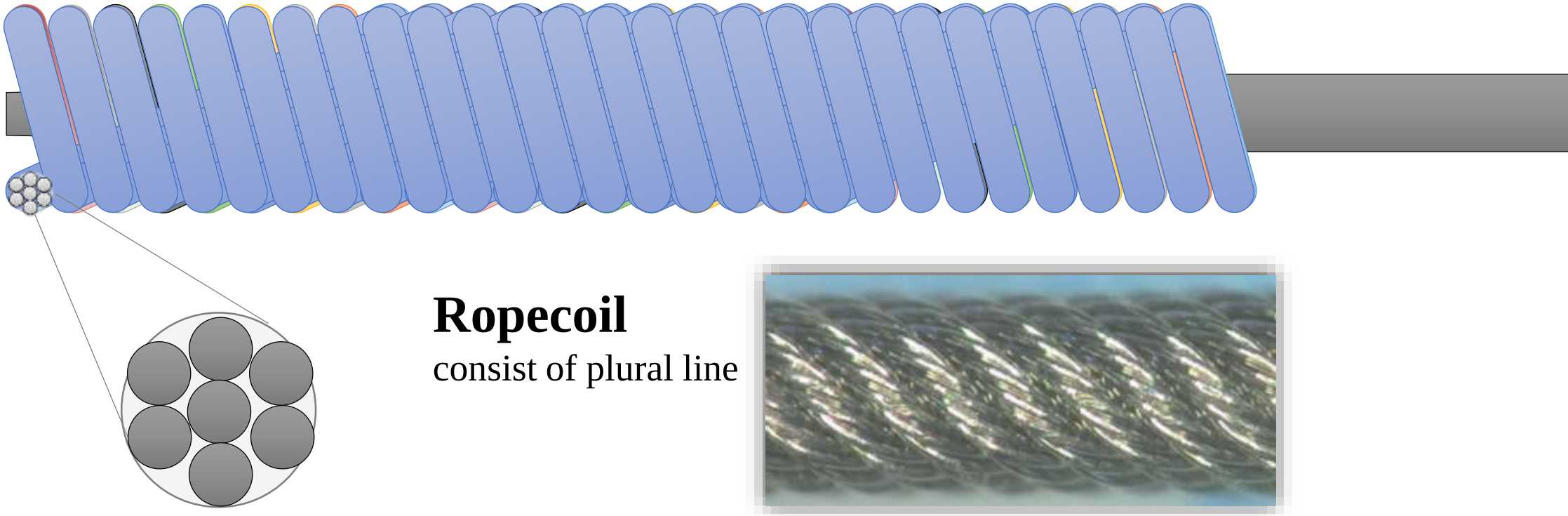
Hollow coil woven with multiple thread

less prone to coil extension and fracturing

What`s XTRAND coil

XTRAND^{TM} coil

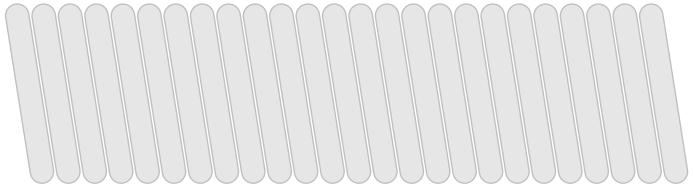
SION TECC
Leading to the NEXT



Ropecoil
consist of plural line

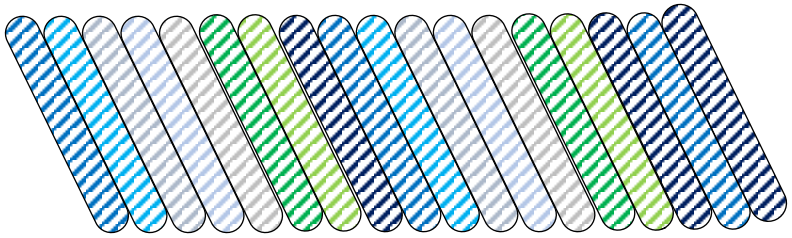
Innovative outer coil design

Single wire coil



Gaia series

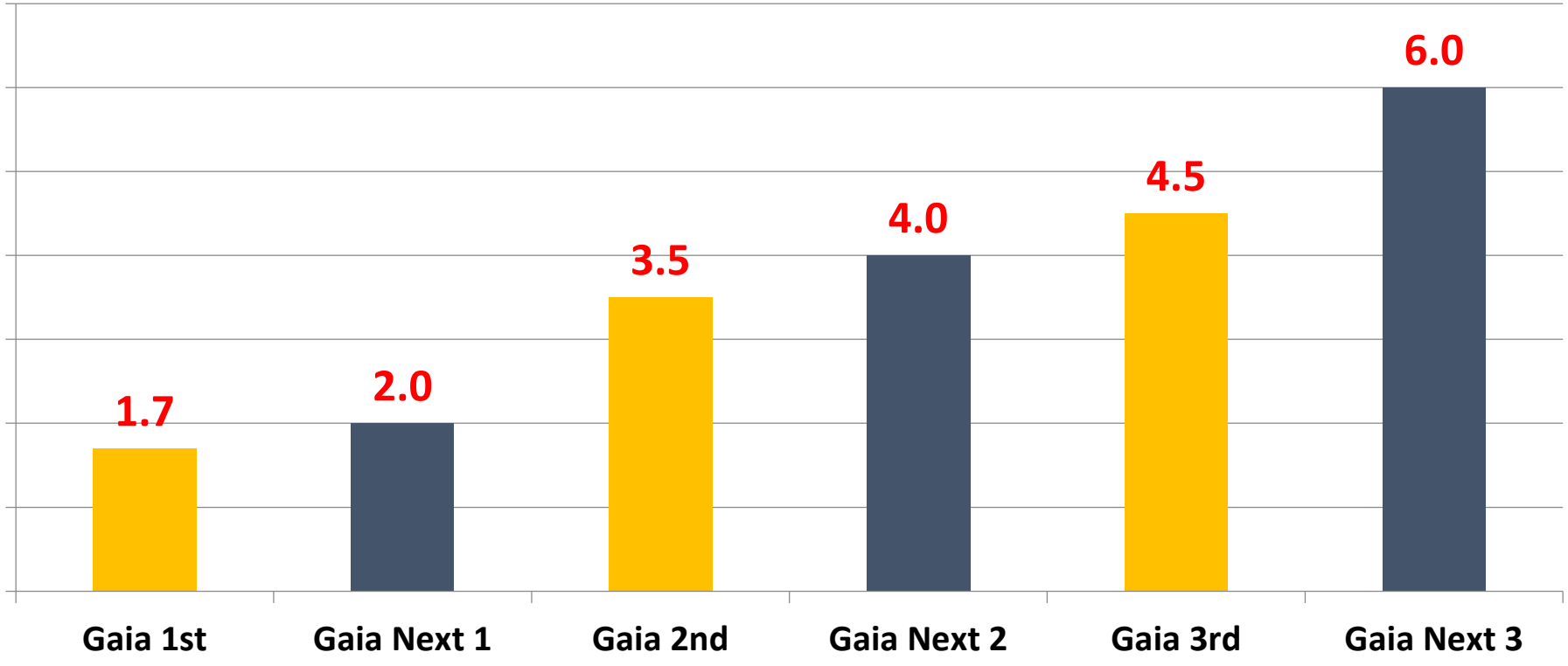
XTRAND coil



Gaia Next series

Coil design	Longitudinal Flexibility	Anti-breakage (Durability)	Torque force Prox to tip response
Single wire coil	◎	▲	▲
XTRAND coil	○	◎	◎

Tip load
- Gaia Next and Gaia



*The above data was obtained by a company standardized test, which may differ from industry standardized tests.
*The above data does not prove that all devices have exactly the same performance as those of the samples used for these tests.

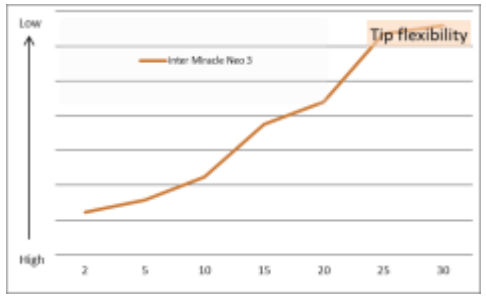
Miracle Neo3

◆Penetration efficacy

a. Tip load (~ 10mm) ☛ **3**.0gf

b. Tip cross section area ☛ Tip end design **:Blunt tip**

c. Tip flexibility (~ 30mm)

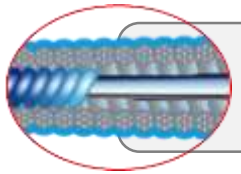


d. Tip lubricity ☛ Hydrophilic

◆Manipulation capability

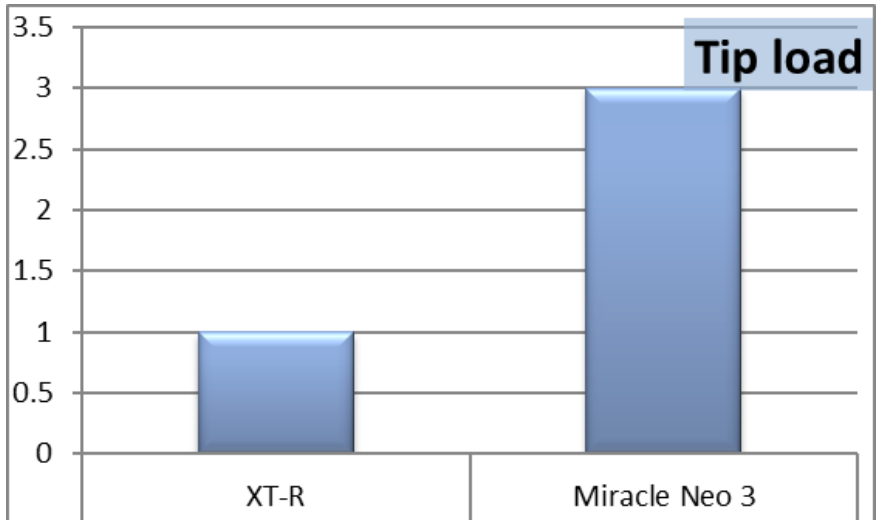
a. Torque force

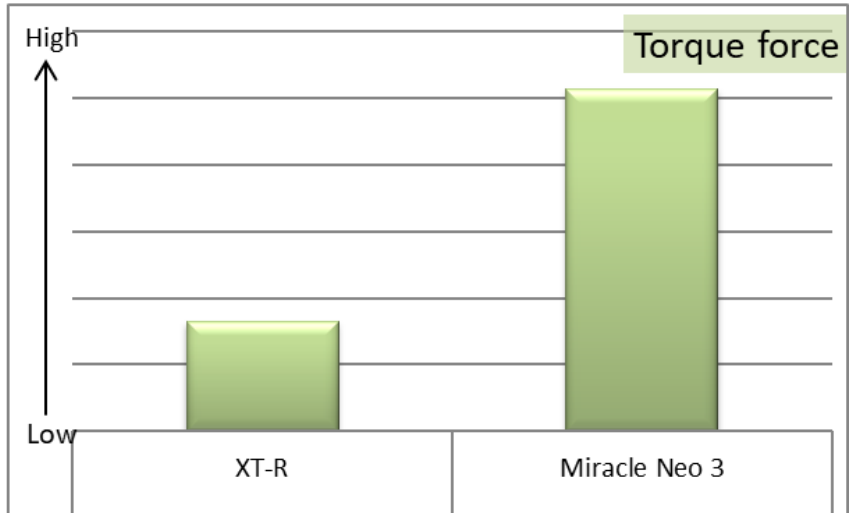
b. Torque response

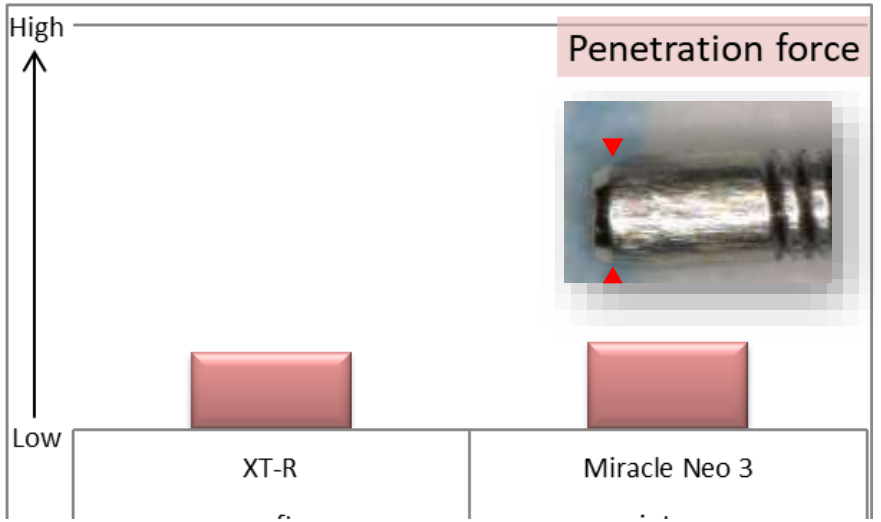


ASAHI composite guide wire

XT-R vs Miracle Neo3

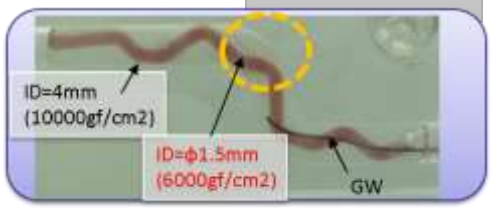






Gaia second vs Miracle Neo3

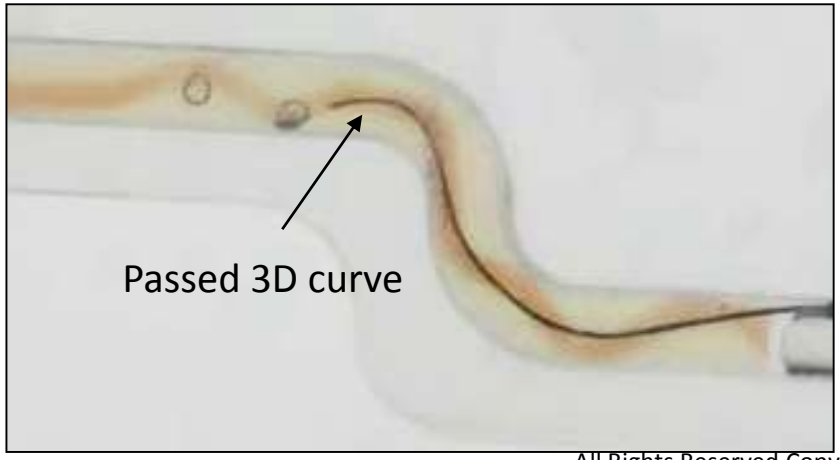
Test Method

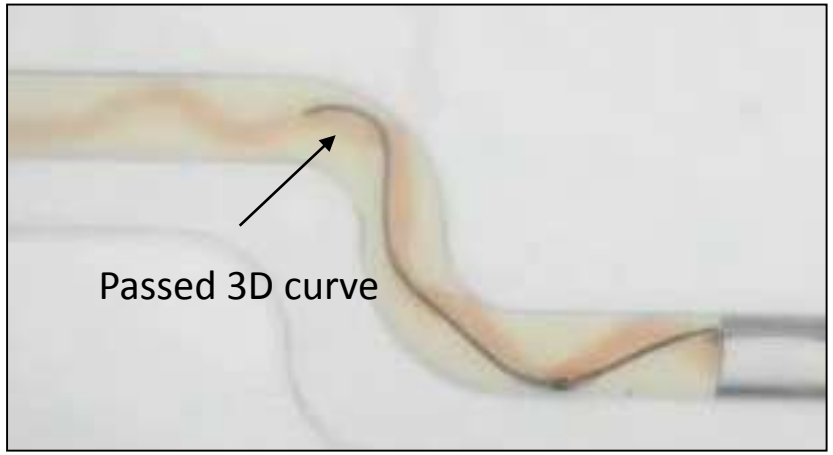


Miracle Neo3 specification/structure/performance

Trackability same as Gaia Second

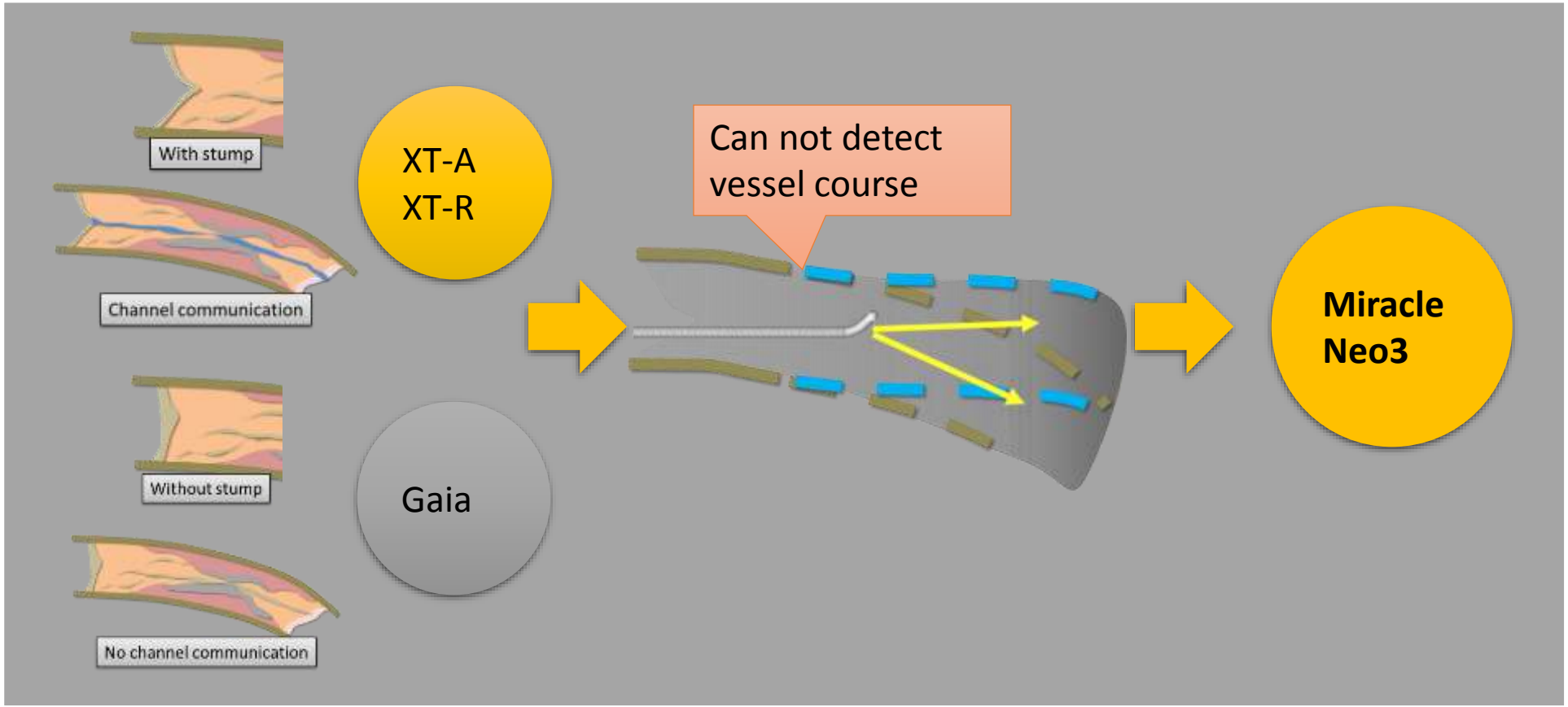
Miracle Neo3 maintain its maneuverability same as Gaia Second at the bend





ASAHI
Miracle Neo 3
PTCA GUIDE WIRE

Adaptation case	・ CTO with undetectable vessel course
Positioning	・ Better support compare to XT or Gaia series ・ Combination with XT-A/R・Gaia



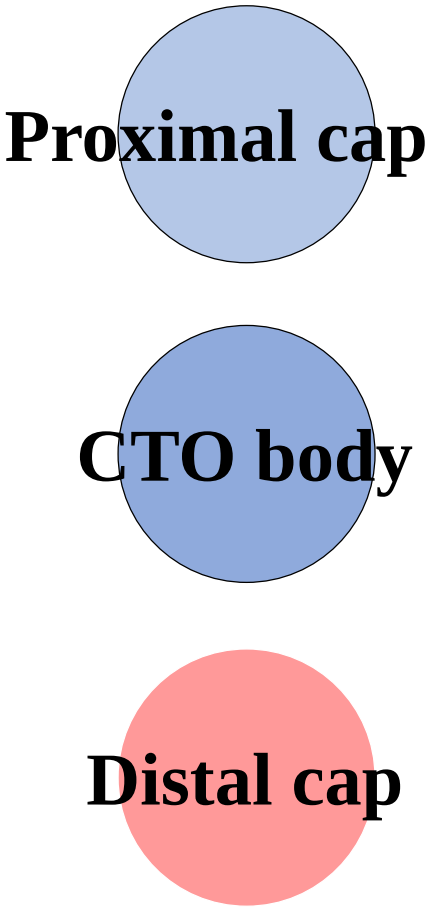
Antegrade approach; CTO GW Line-up

	Tip stiffness	Penetration	Maneuverability	Track ability
	Tip load	Tip load Tip diameter	No whip Response	Lubricity
XT-R	**0.6gf**	**0.010”** +	◎ ++	+++
XT-A	**1.0gf**	**0.010”** +	◎ ++	+++
Gaia Next 1	**2.0gf**	**0.011”** +	◎ +++	++
Gaia Next 2	**4.0gf**	**0.012”** ++	◎ +++	++
Gaia Next 3	**6.0gf**	**0.012”** ++	◎ +++	++
UB3	**3.0gf**	**0.014”** +	▲ +	+
Miracle Neo3	**3.0gf**	**0.014”** +	◎ +++	
Conquest Pro12	**12gf**	**0.009”** +++	▲ +	++

Antegrade approach; Wire Based Strategy

	Visible micro channels	Tapered proximal cap	Blunt proximal cap
Proximal Cap	Low penetration force wire with polymer jacket and tapered tip ↓ Intermediate penetration force wire	Low penetration force wire ↓ Intermediate penetration force wire	Intermediate penetration force wire ↓ High penetration force wire
CTO body	Length <20 mm with unambiguous course	Reasonable to continue with wire used to cross proximal cap	
	Length >20 mm or ambiguous course	Step down to a low penetration force wire or intermediate non-tapered wire	
Distal Cap	Escalation from softer more steerable wire to a higher penetration-force wire may be required.		

Antegrade approach

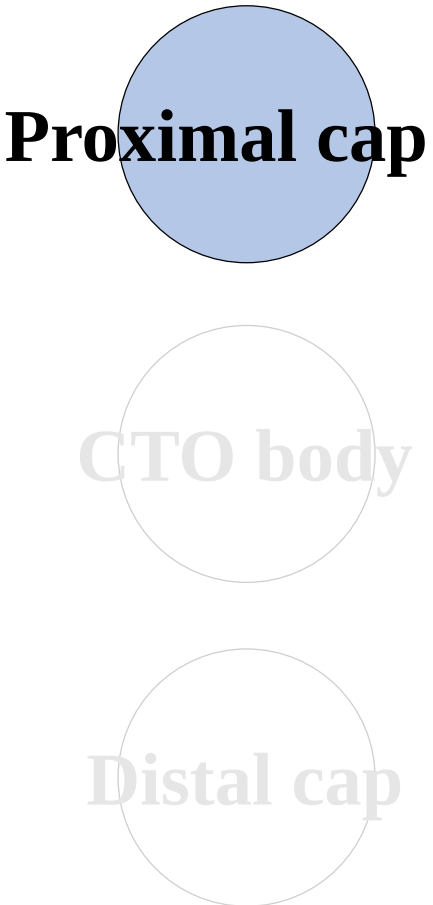


Visible micro channel
Tapered
Blunt

~20mm
20mm<

<u>w/o</u> fibrous cap （Soft)
<u>with</u> fibrous cap （Hard)

Antegrade approach



Needed GW performance

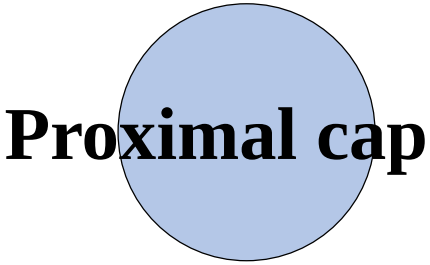
Micro channel
- Lower tip profile
- Softer tip <1.0g
- Lubricity

Tapered
- Lower tip profile
- 1.0g< Softer tip <3.0g
- Lubricity

Blunt
- Lower tip profile
- Softer tip >3.0g
- Easy to enter lesion

Antegrade approach

Needed GW performance



Proximal cap

Micro channel { **Lower tip profile**, **Softer tip <1.0g**, **Lubricity**

CTO body

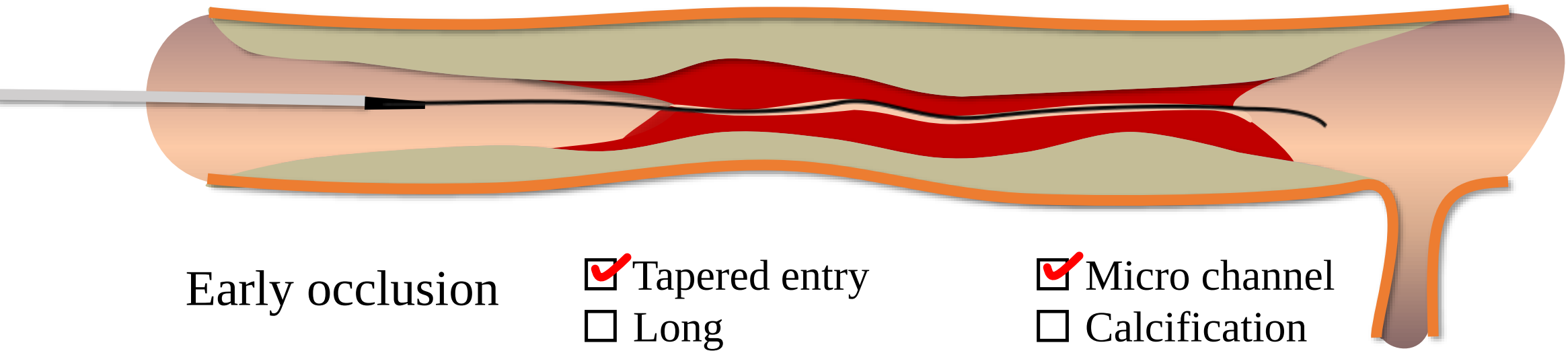
Tapered {

Distal cap

Blunt {

Antegrade Guide Wire Selection;

for early occlusion with Tapered entry & continuous micro channel



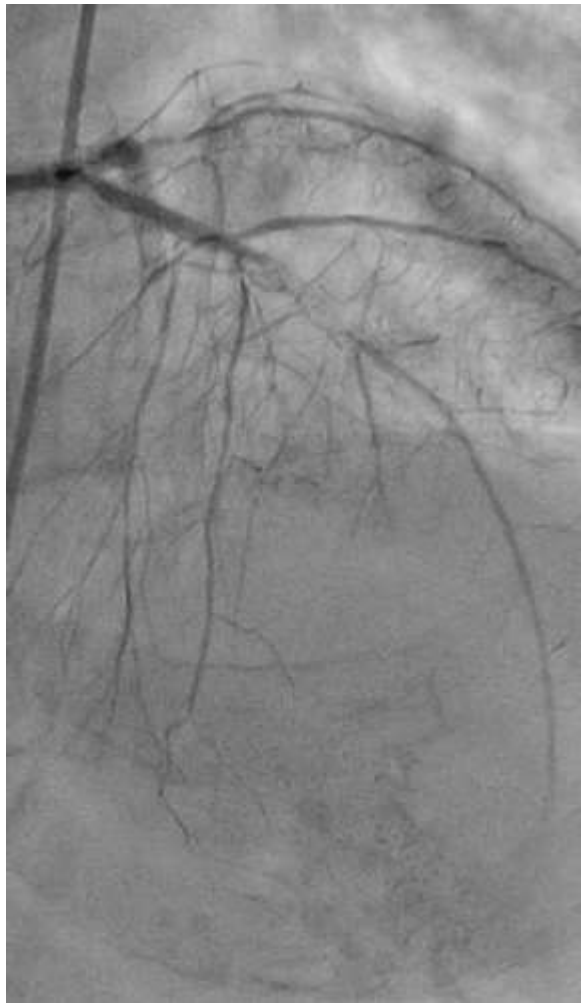
Early occlusion

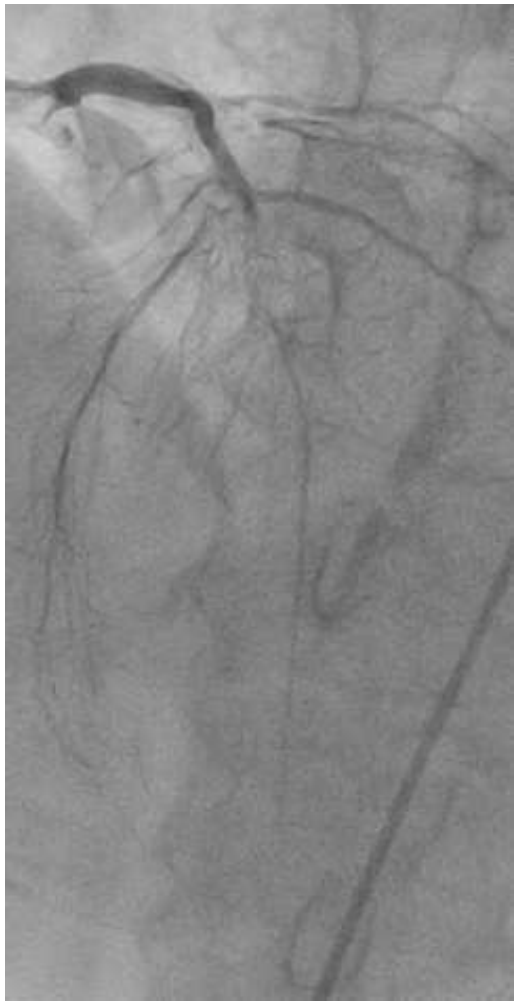
- ☑ Tapered entry
- ☐ Long
- ☐ Fibrous cap
- ☑ Micro channel
- ☐ Calcification
- ☐ Unclear vessel morphology

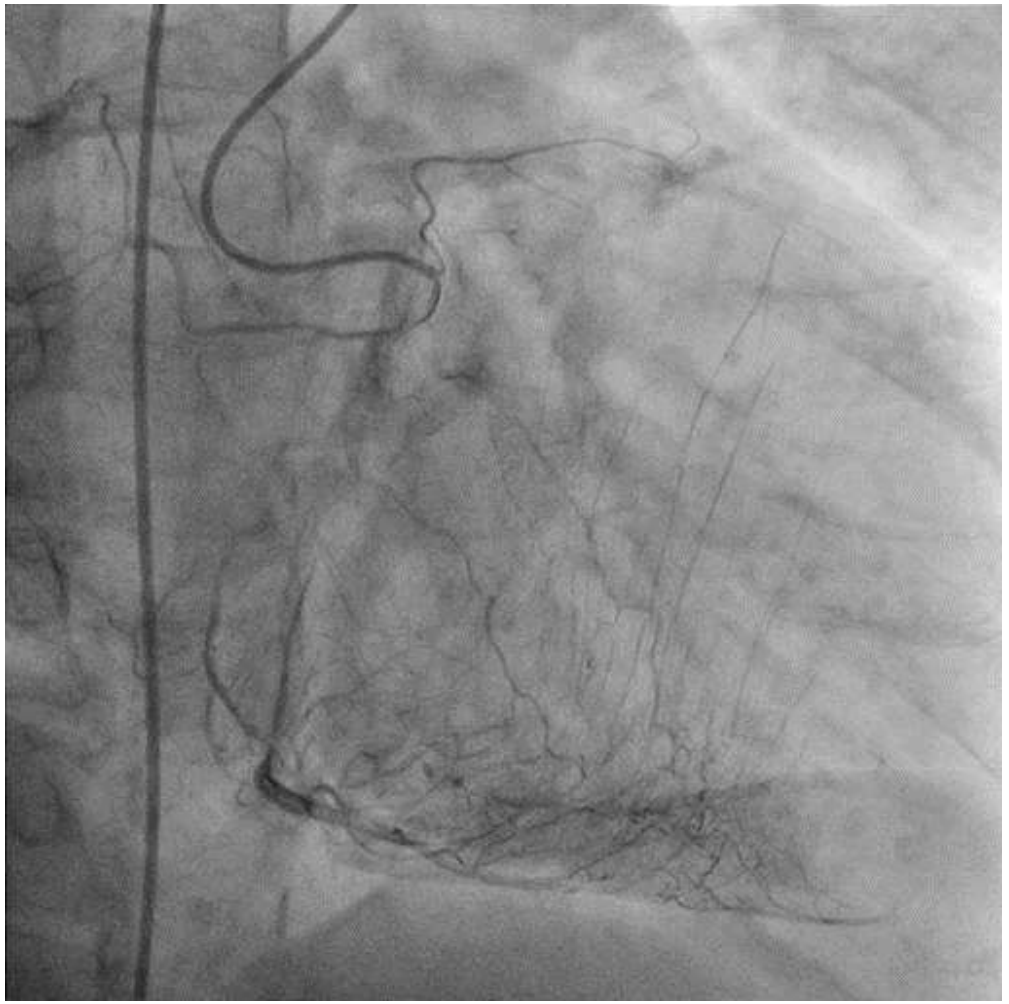
XT-R

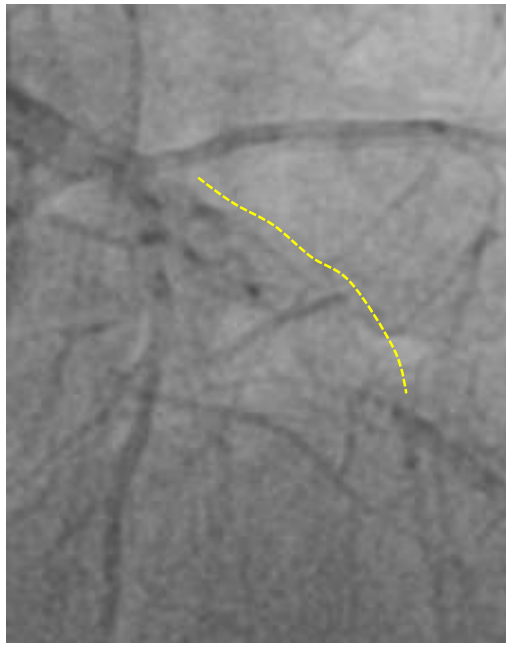
- ✓ Soft tapered tip
  - ➢ to avoid dissection or break channel route

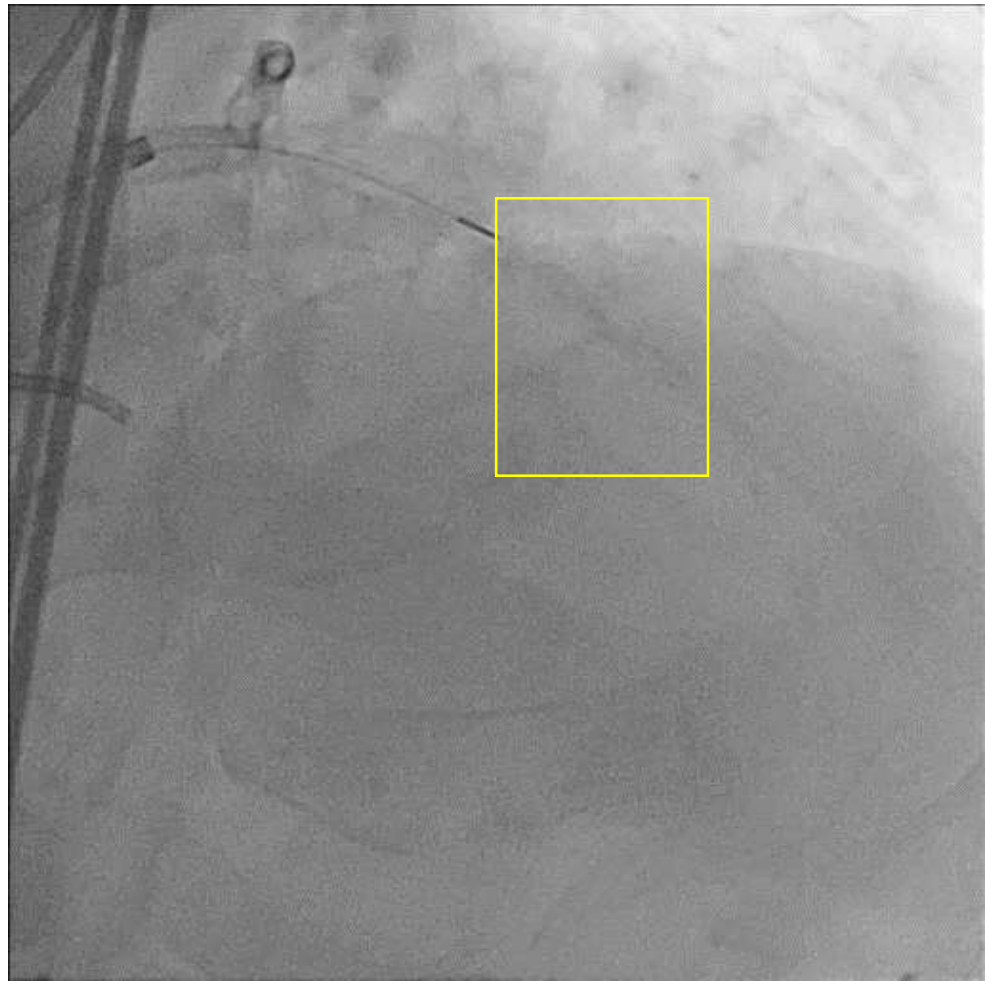
LAD CTO



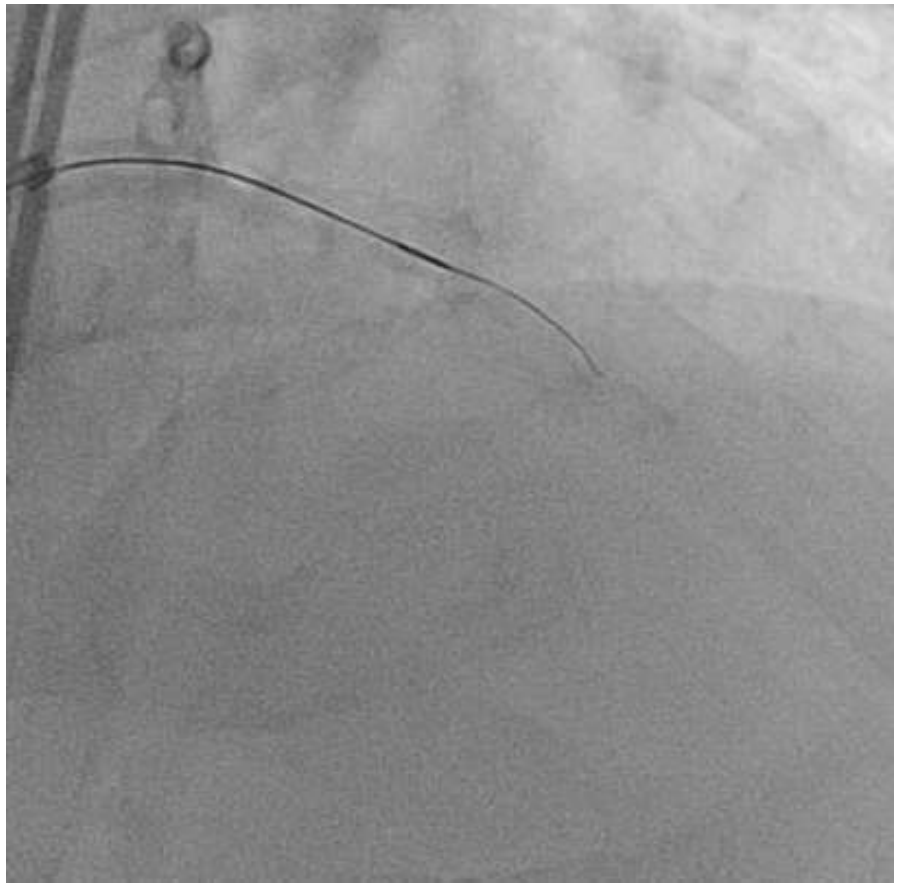




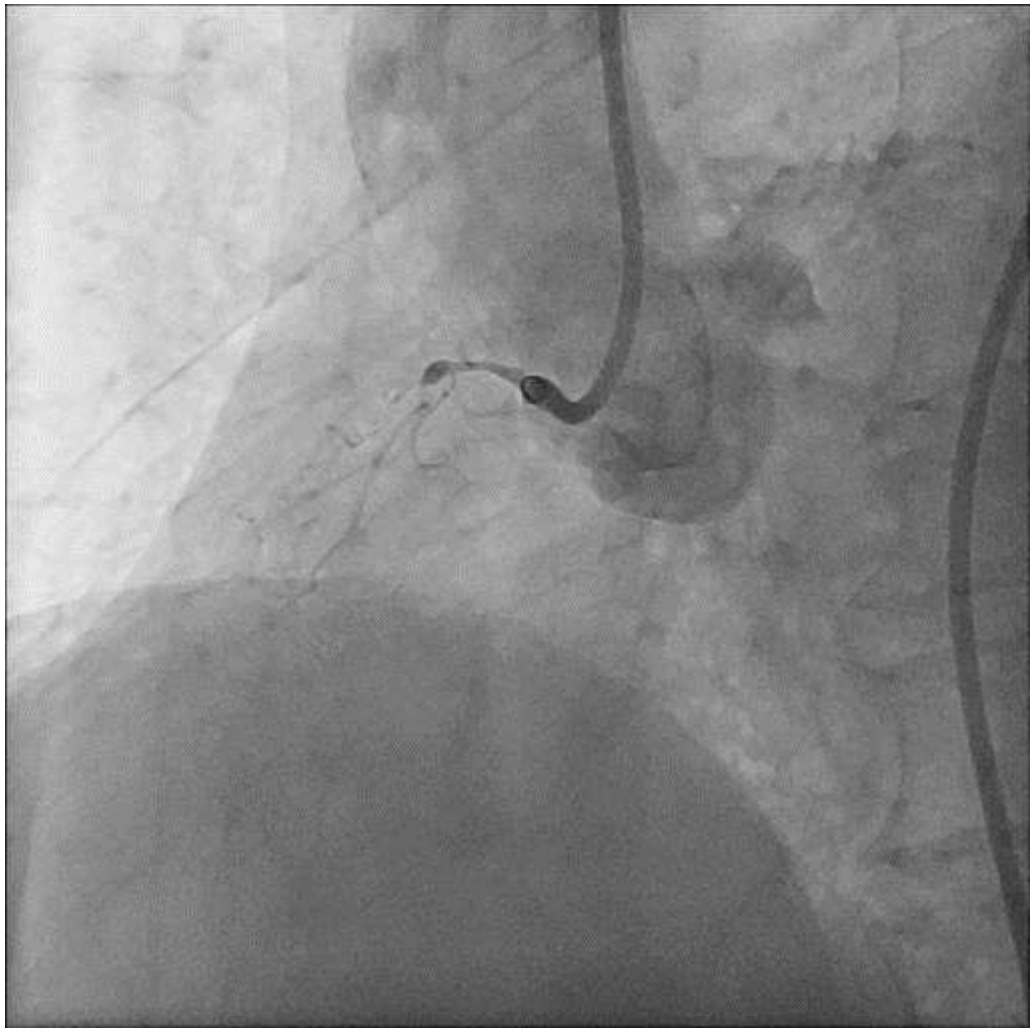


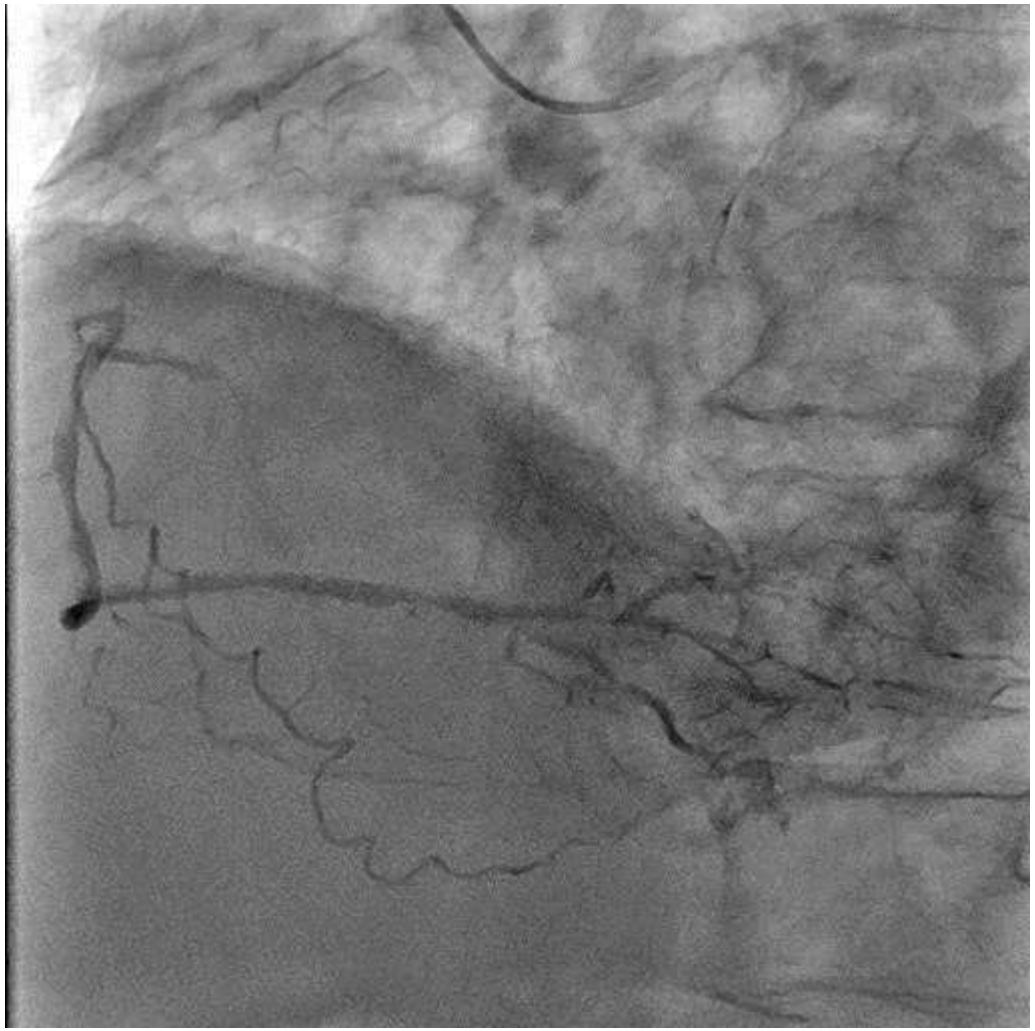


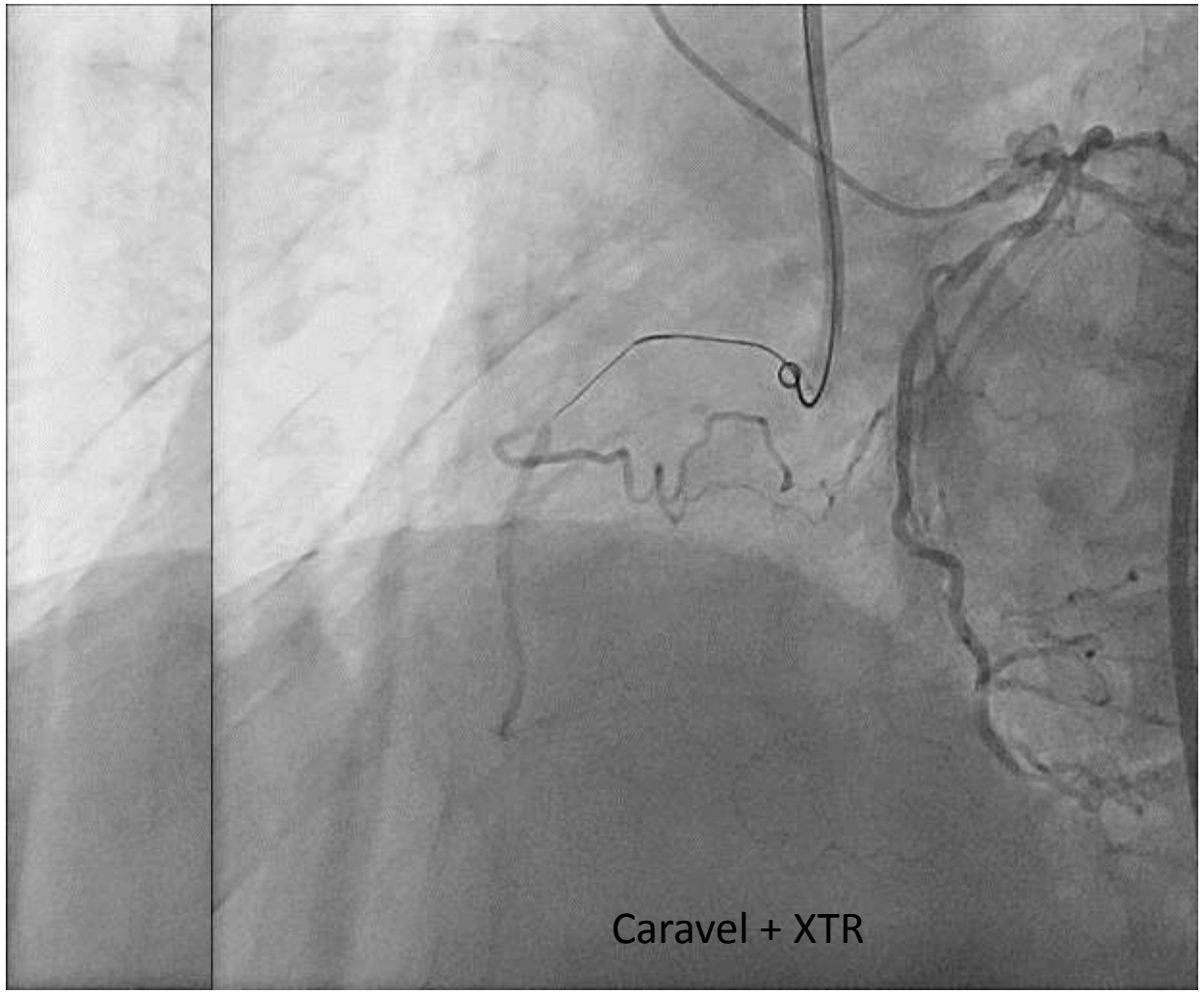
Tapered & Visible micro channel; XT-R


RCA CTO







Caravel + XTR

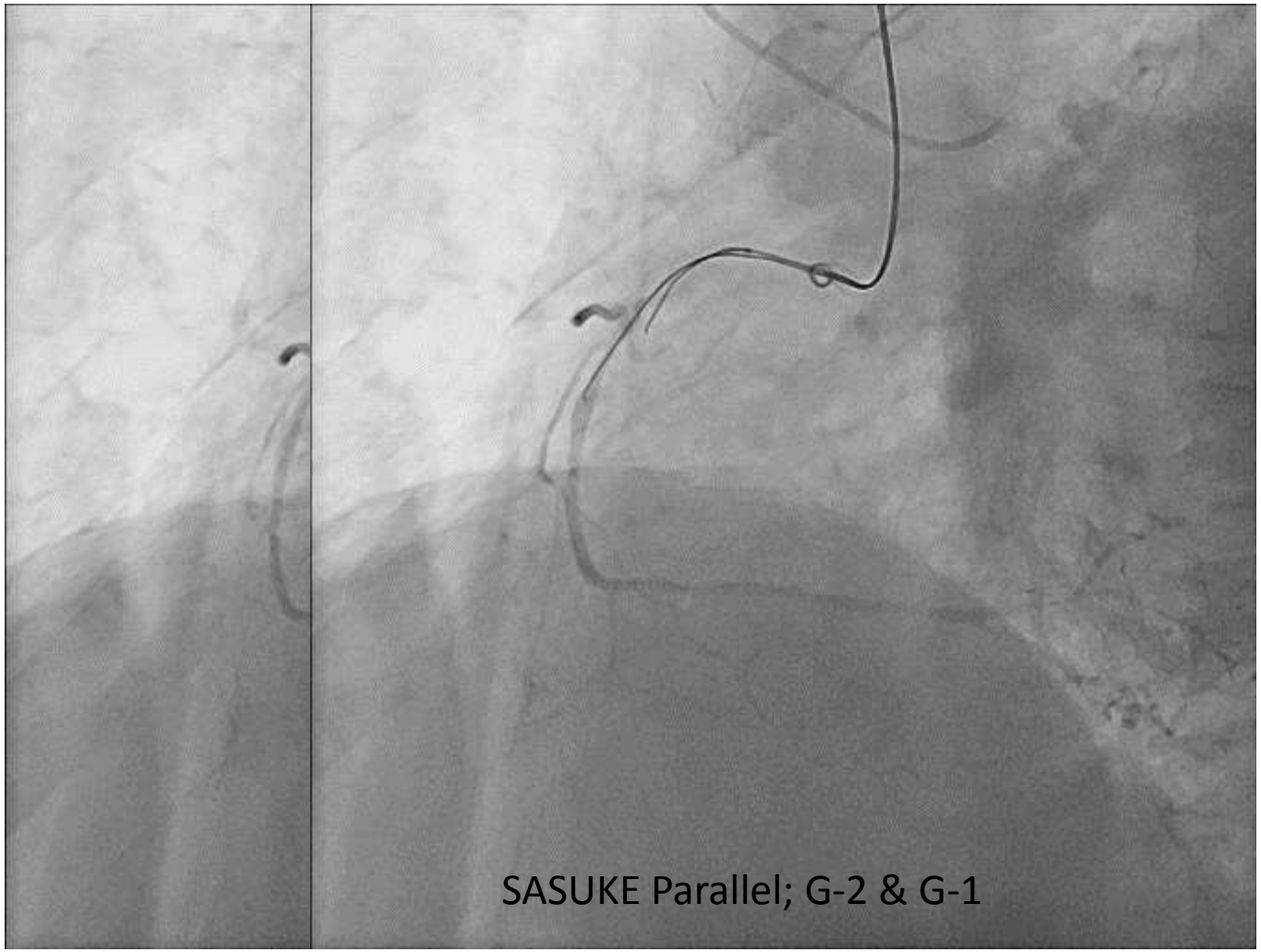
However, can not penetrate

Antegrade approach; Wire Based Strategy

	Visible micro channels	Tapered proximal cap	Blunt proximal cap
Proximal Cap	Low penetration force wire with polymer jacket and tapered tip	Low penetration force wire	Intermediate penetration force wire
	↓	↓	↓
	Intermediate penetration force wire	Intermediate penetration force wire	High penetration force wire
CTO body	Length <20 mm with unambiguous course	Reasonable to continue with wire used to cross proximal cap	
	Length >20 mm or ambiguous course	Step down to a low penetration force wire or intermediate non-tapered wire	
Distal Cap	Escalation from softer more steerable wire to a higher penetration-force wire may be required.		

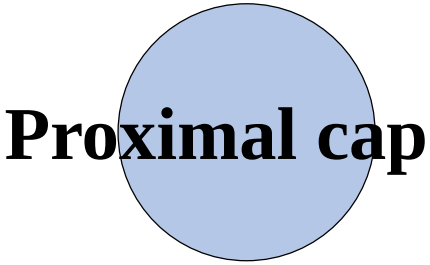
G1 or G2

Antegrade guidewire escalation



Antegrade approach

Needed GW performance



Proximal cap

Micro channel

CTO body

Tapered

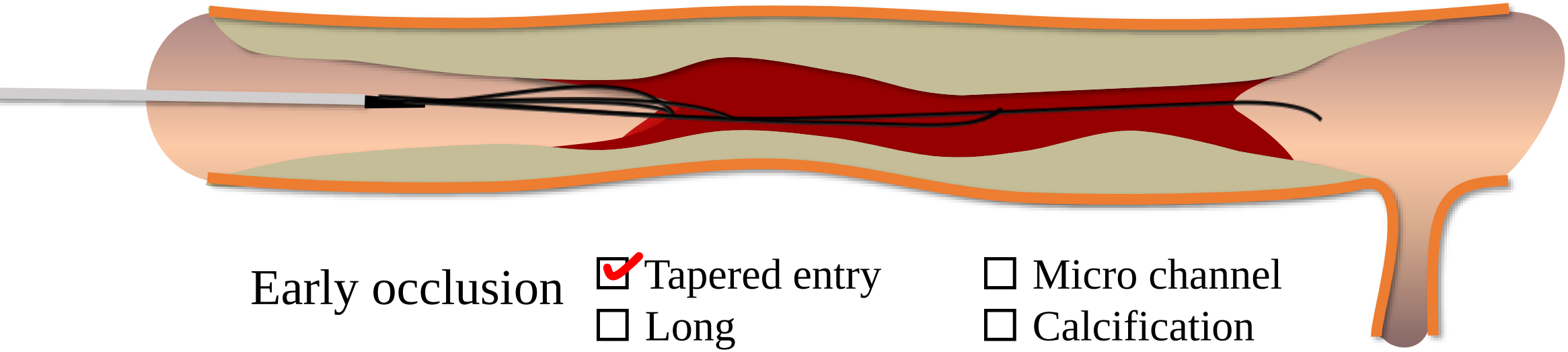
- **Lower tip profile**
- **1.0g< Softer tip <3.0g**
- **Lubricity**

Distal cap

Blunt

Antegrade Guide Wire Selection;

for early occlusion with Tapered entry & without continuous micro channel



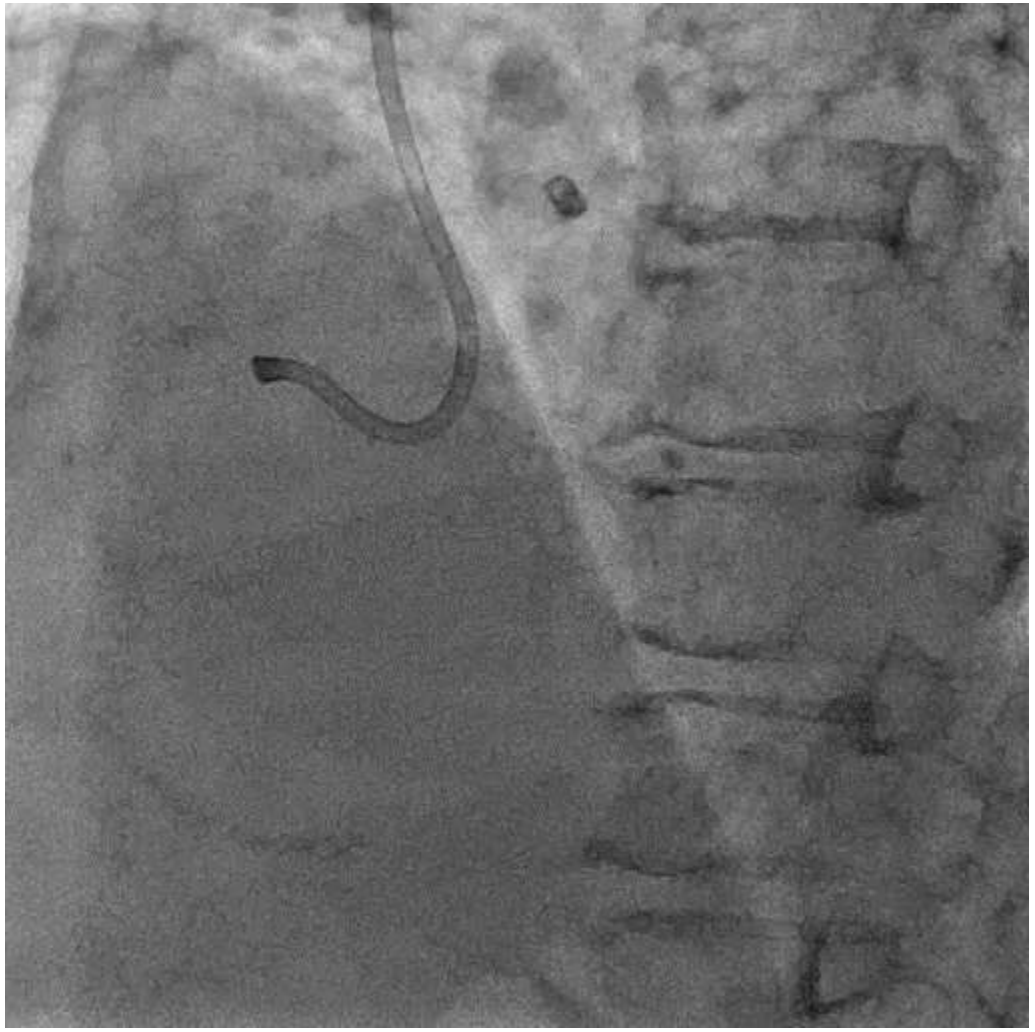
Early occlusion

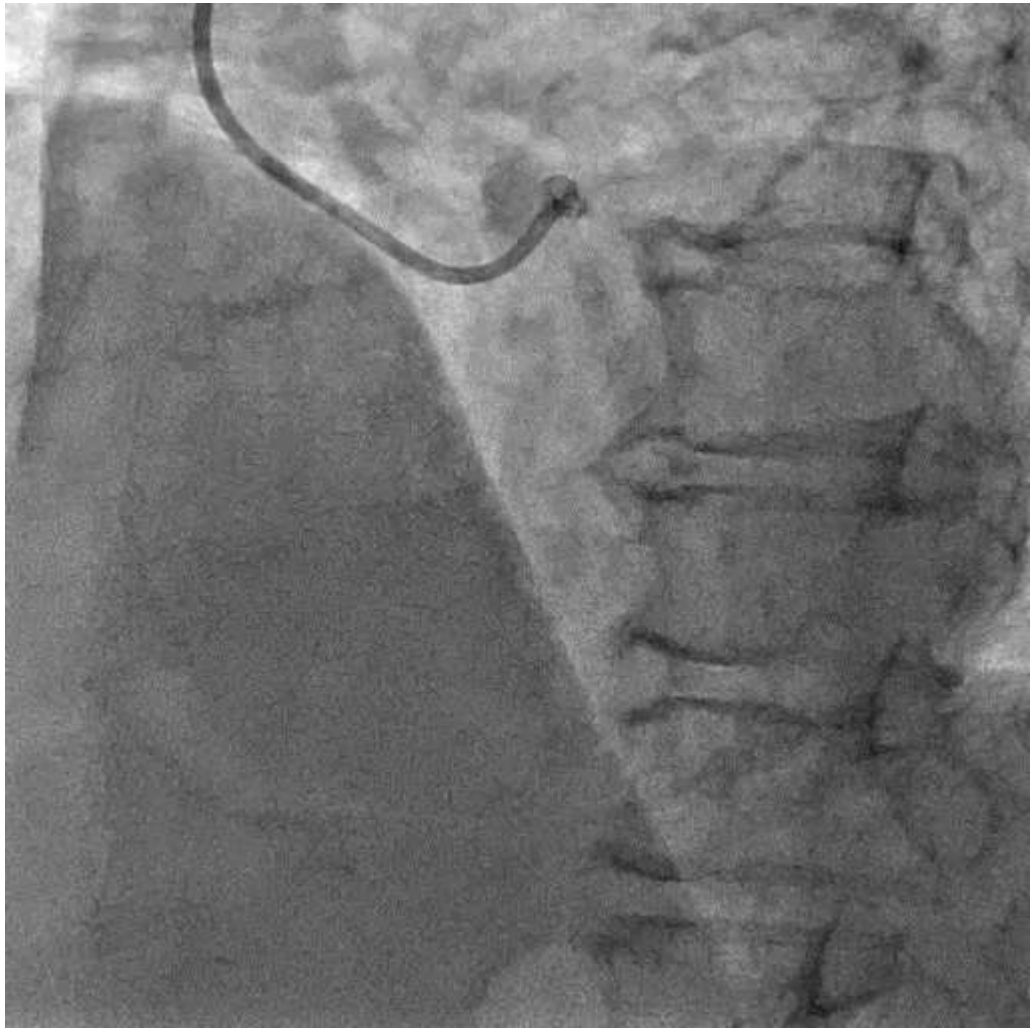
- ☑ Tapered entry
- ☐ Long
- ☐ Fibrous cap
- ☐ Micro channel
- ☐ Calcification
- ☐ Unclear vessel morphology

XT-A, Gaia Next 1

- ✓ Tapered tip, and stiffer than XT-R
  - ➢ to penetrate the proximal CTO exit

LAD CTO

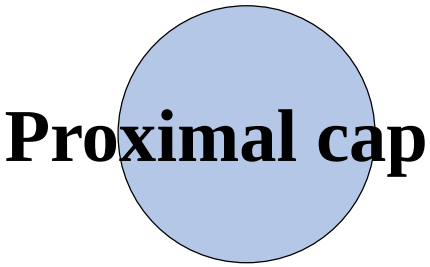




Tapered & without micro channel; XT-A or G-1

Tapered & without micro channel; XT-A

Antegrade approach



Needed GW performance

Micro channel

Tapered

CTO body

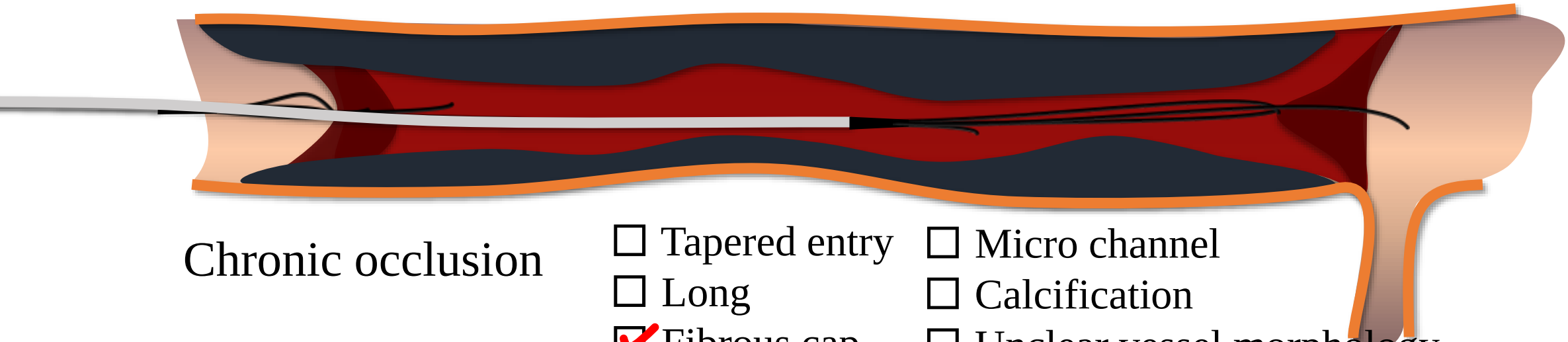
Distal cap

Blunt

- Lower tip profile
- Softer tip >3.0g
- Easy to enter lesion

Antegrade Guide Wire Selection;

for long chronic occlusion without calcification



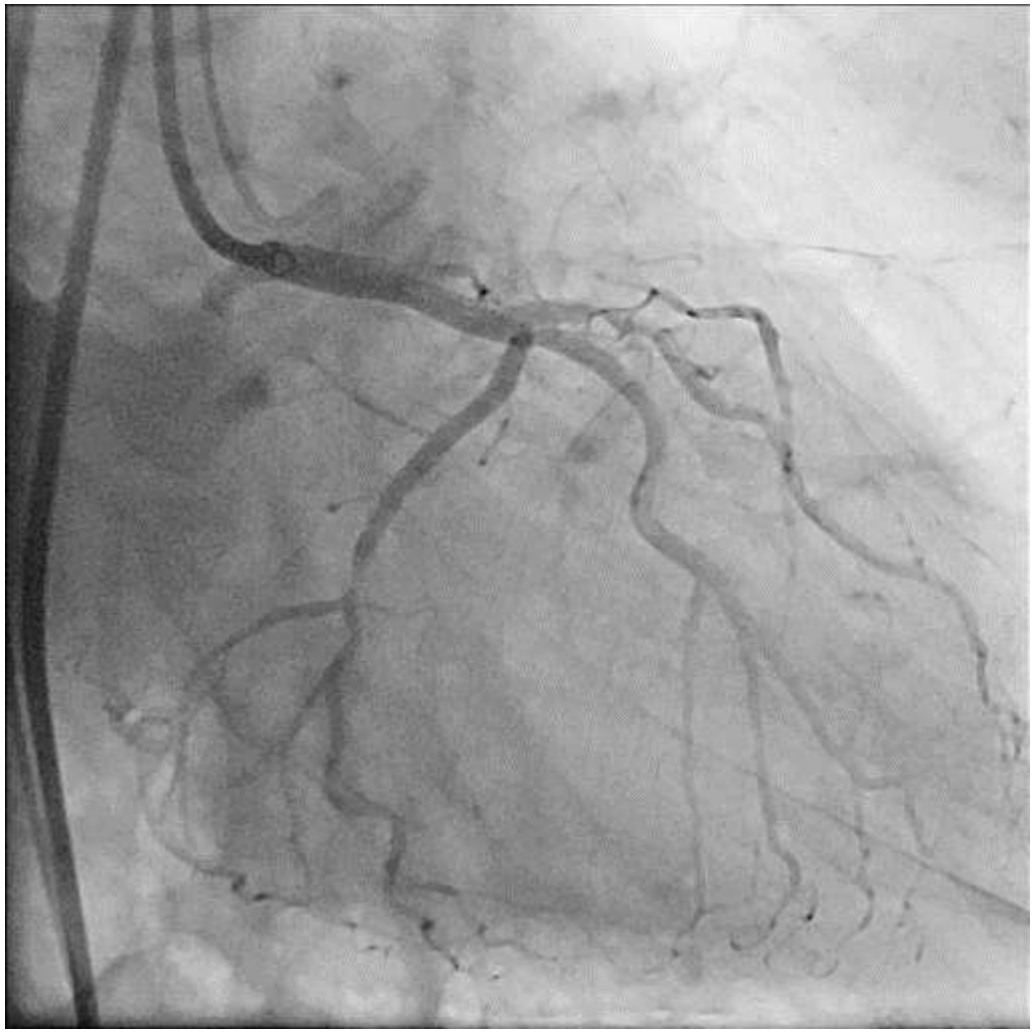
Chronic occlusion

- ☐ Tapered entry
- ☐ Long
- ☑ Fibrous cap
- ☐ Micro channel
- ☐ Calcification
- ☐ Unclear vessel morphology

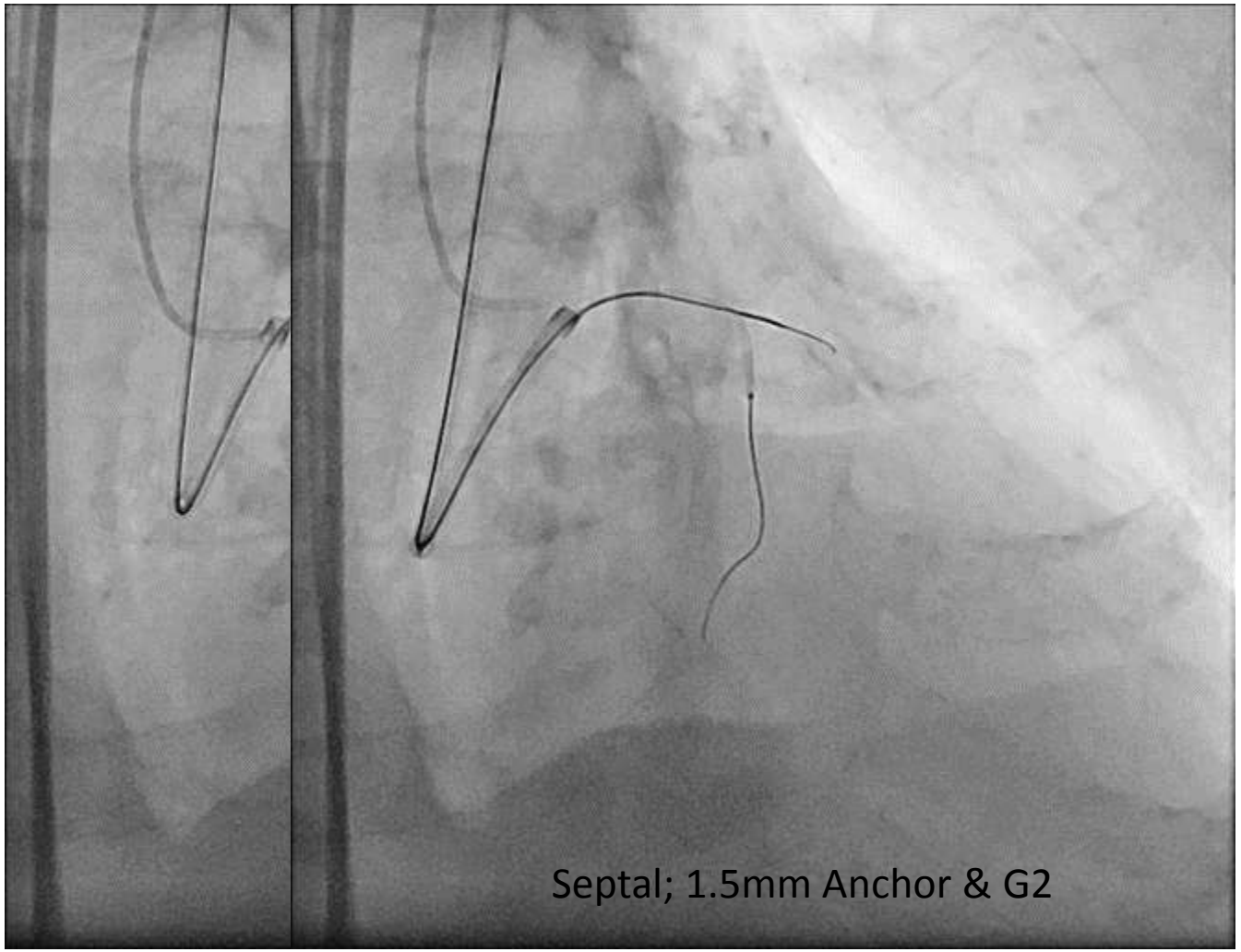
Gaia 2nd or 3rd

- ✓ Stronger push ability and penetration force than XT-A
- ✓ Deflection control in CTO lesion
  - ✓ to penetrate fibrous cap
  - ✓ to control direction of guide wire tip

LAD CTO



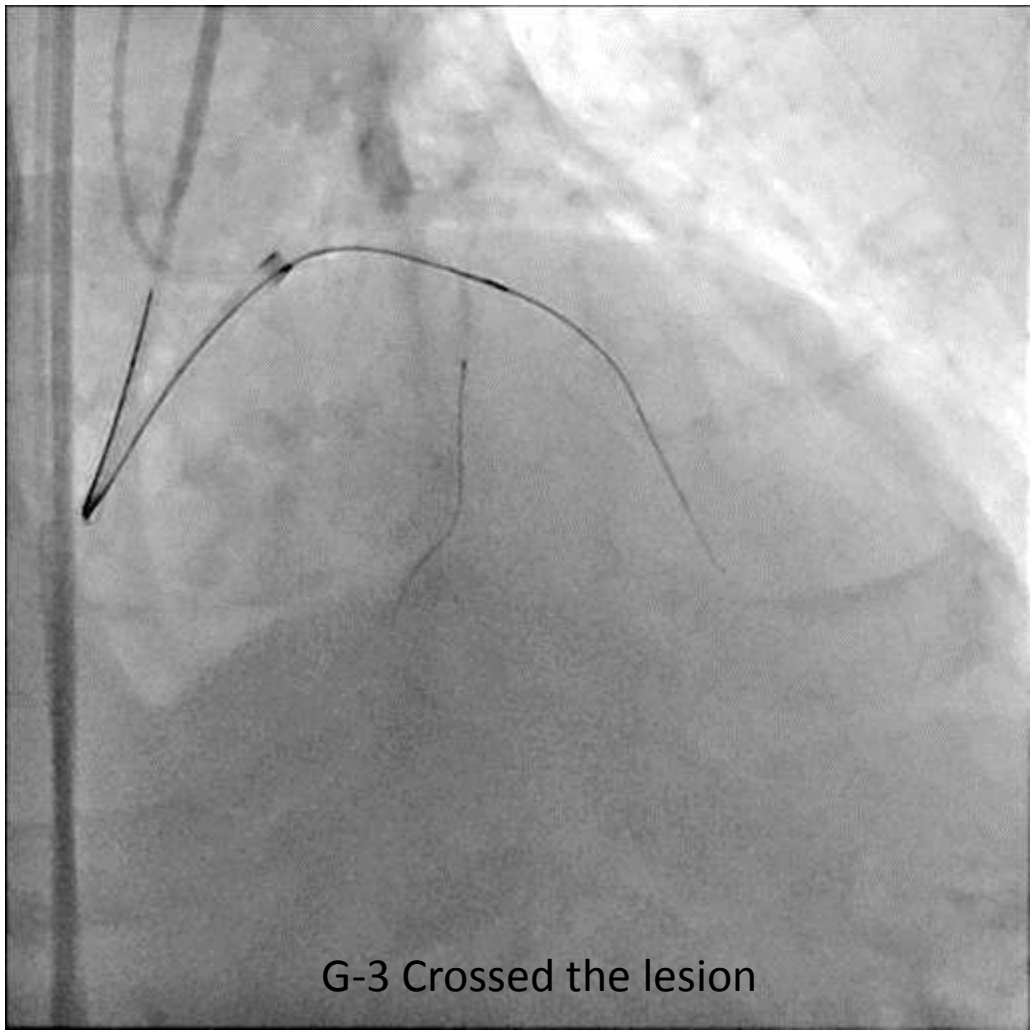
Blunt type


Septal; 1.5mm Anchor & G2

Antegrade approach; Wire Based Strategy

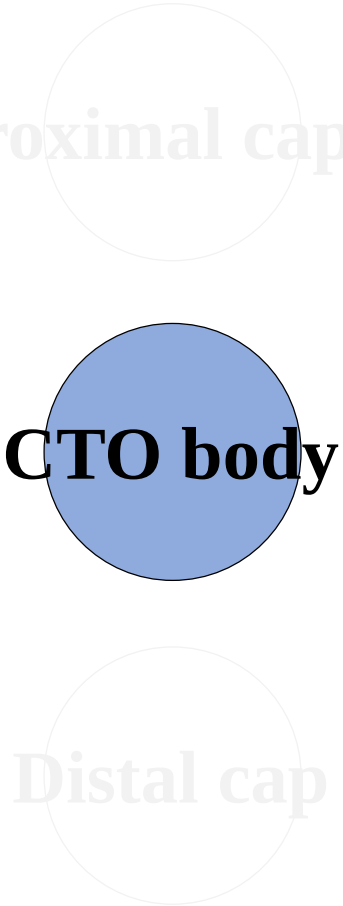
	Visible micro channels	Tapered proximal cap	Blunt proximal cap	
Proximal Cap	Low penetration force wire with polymer jacket and tapered tip ↓ Intermediate penetration force wire	Low penetration force wire ↓ Intermediate penetration force wire	Intermediate penetration force wire ↓ High penetration force wire	G2 G3or CP
CTO body	Length <20 mm with unambiguous course Length >20 mm or ambiguous course	Reasonable to continue with wire used to cross proximal cap Step down to a low penetration force wire or intermediate non-tapered wire		
Distal Cap	Escalation from softer more steerable wire to a higher penetration-force wire may be required.			

Antegrade guidewire escalation



G-3 Crossed the lesion

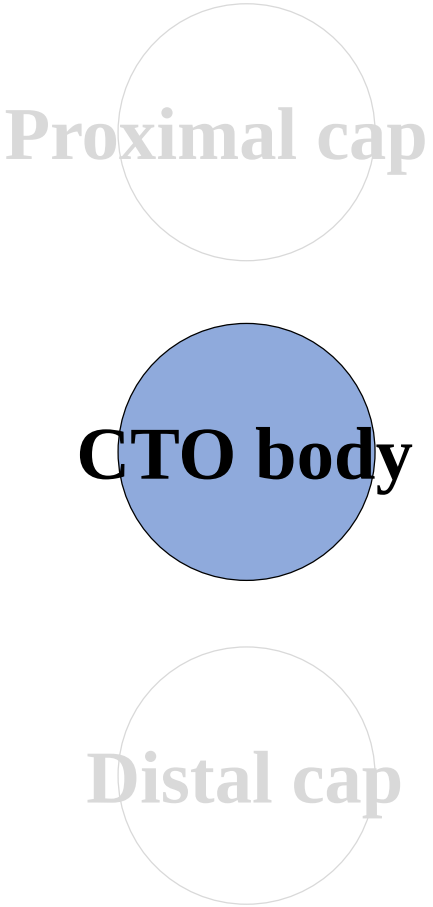
Antegrade approach



~20mm

20mm<

Antegrade approach



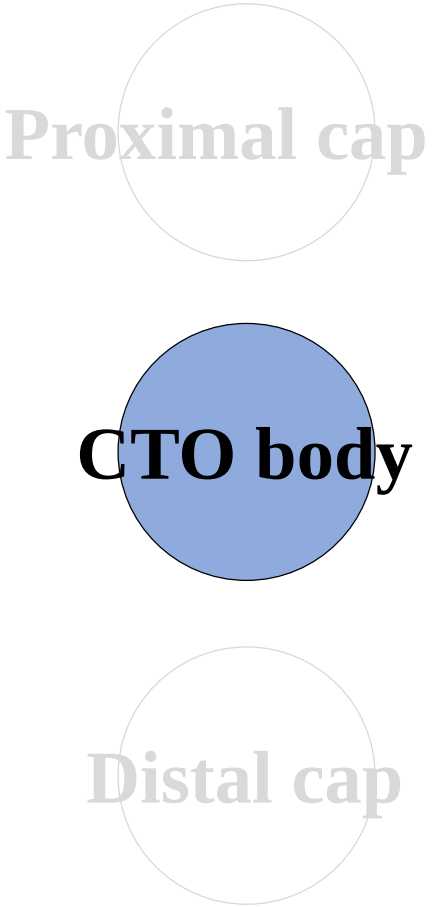
~20mm

- **Enter to lesion with 1st.GW**
- ⇩
- **Continue or step down to XT-A or Gaia Second**

20mm<

- **Enter to lesion with 1st.GW**
- ⇩
- **Continue with XT-A or step down to Miracle3 / UB3/ Pilot200**

Antegrade approach



~20mm

Enter to lesion with 1st.GW

⇩

Continue or step down to XT-A or Gaia Second

20mm<

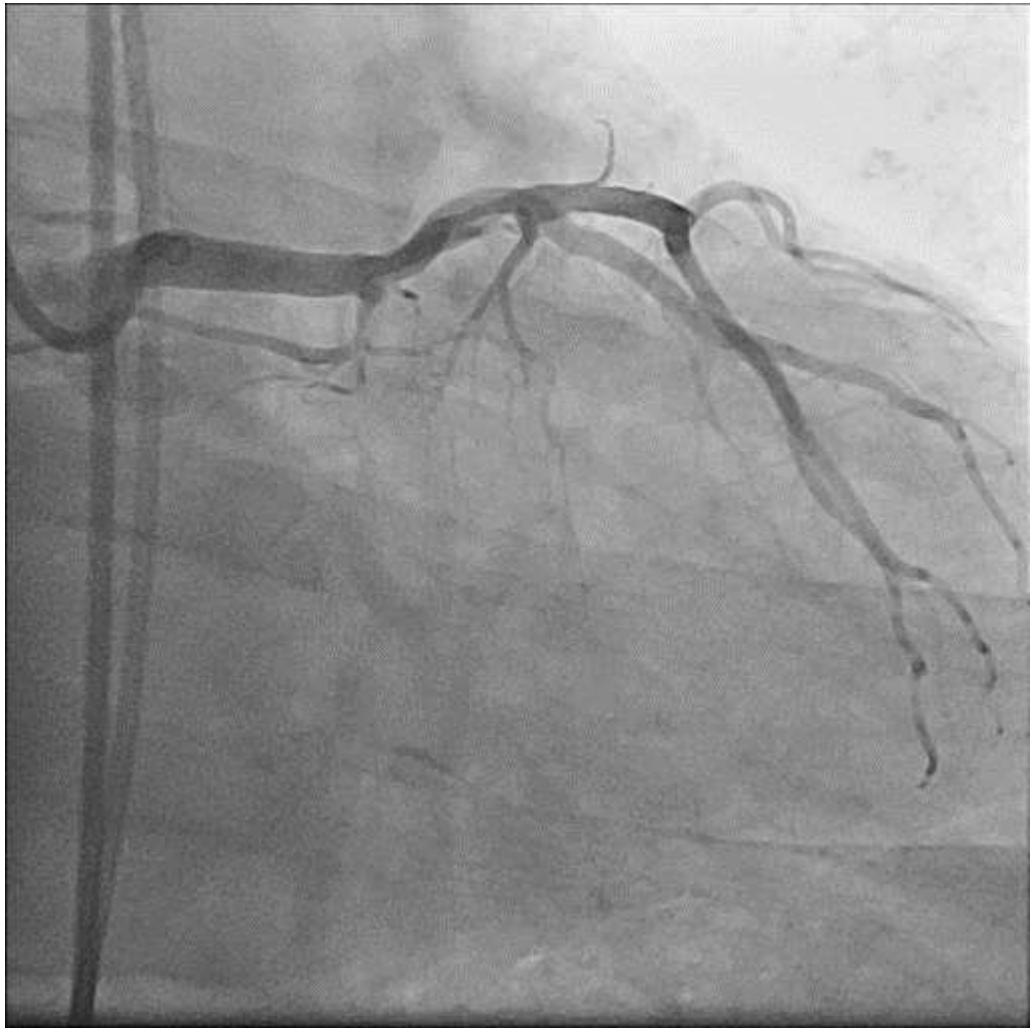
Enter to lesion with 1st.GW

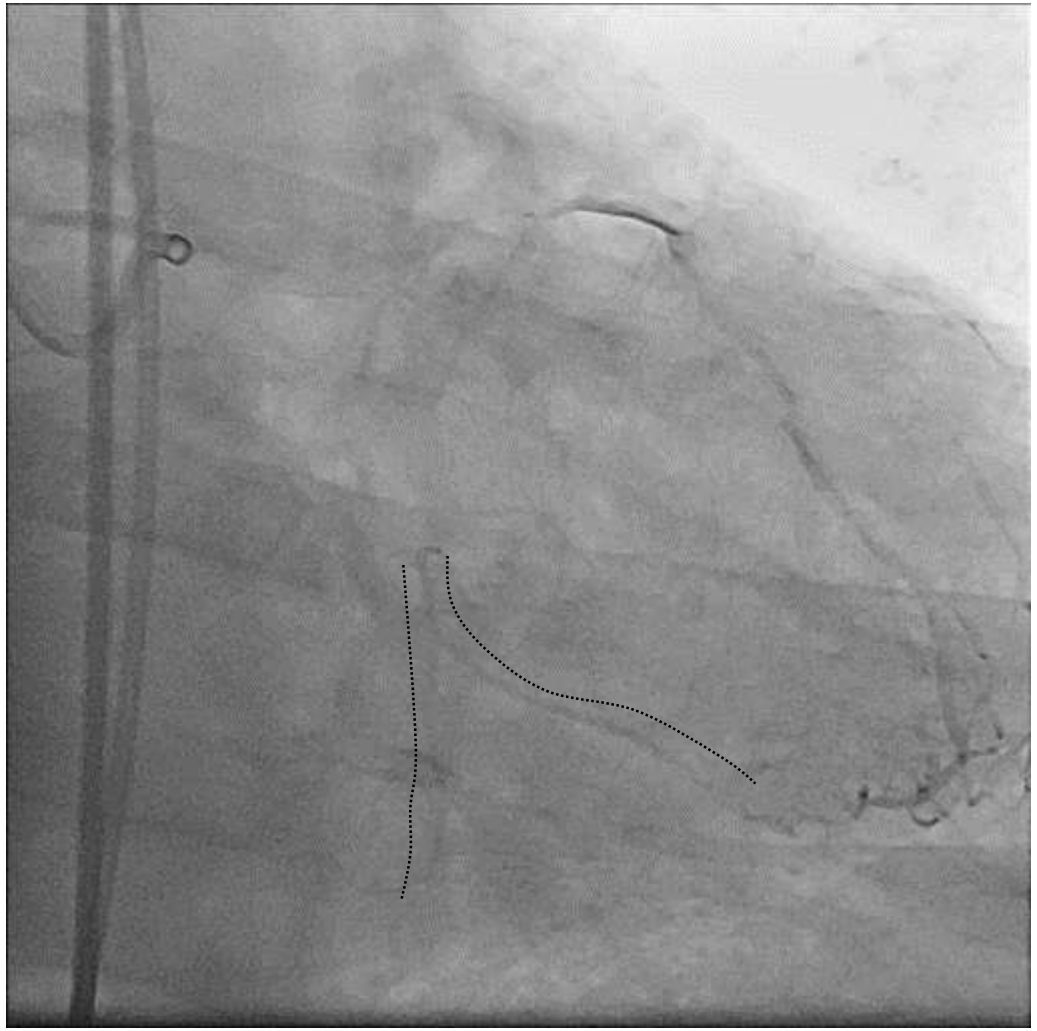
⇩

Continue with XT-A or step down to MiracleNeo3 / UB3/ Pilot200

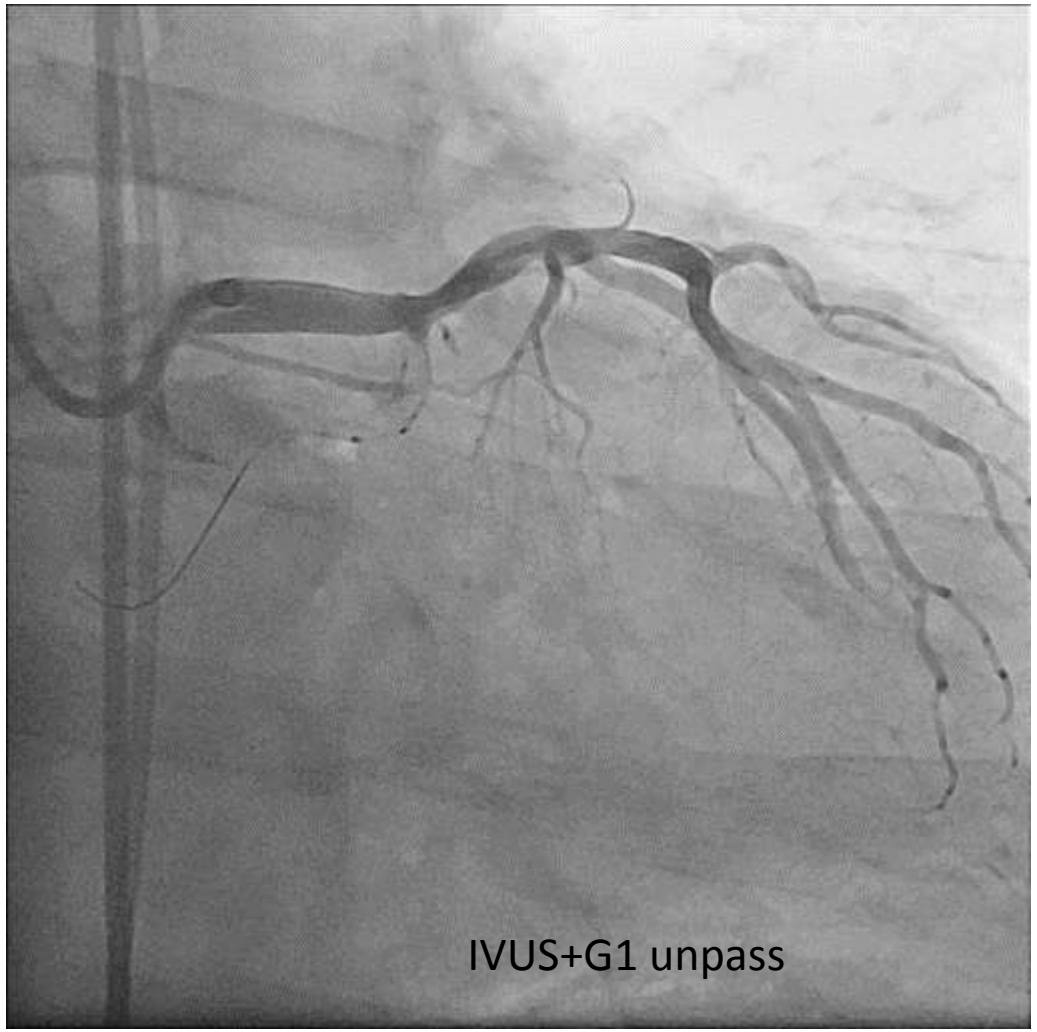
LCX CTO

Blunt type & >20mm



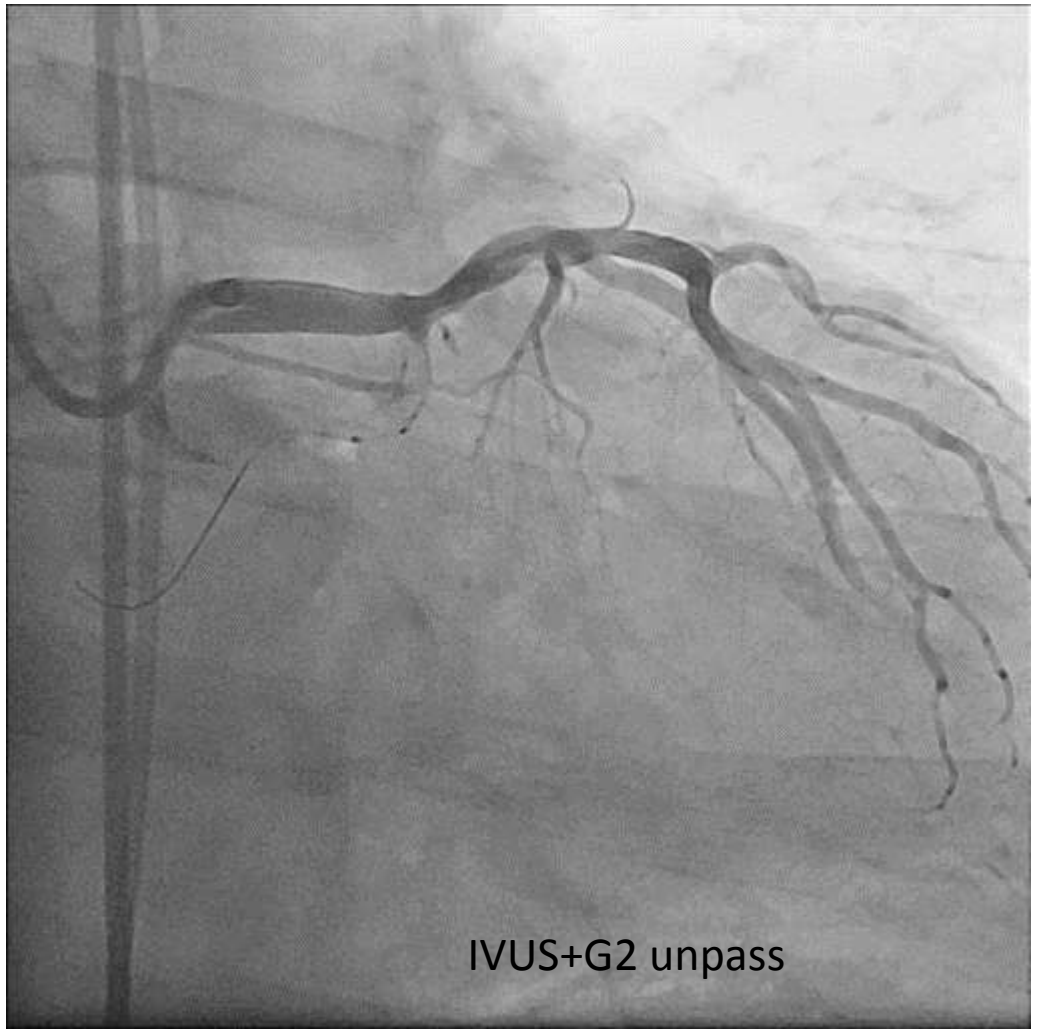


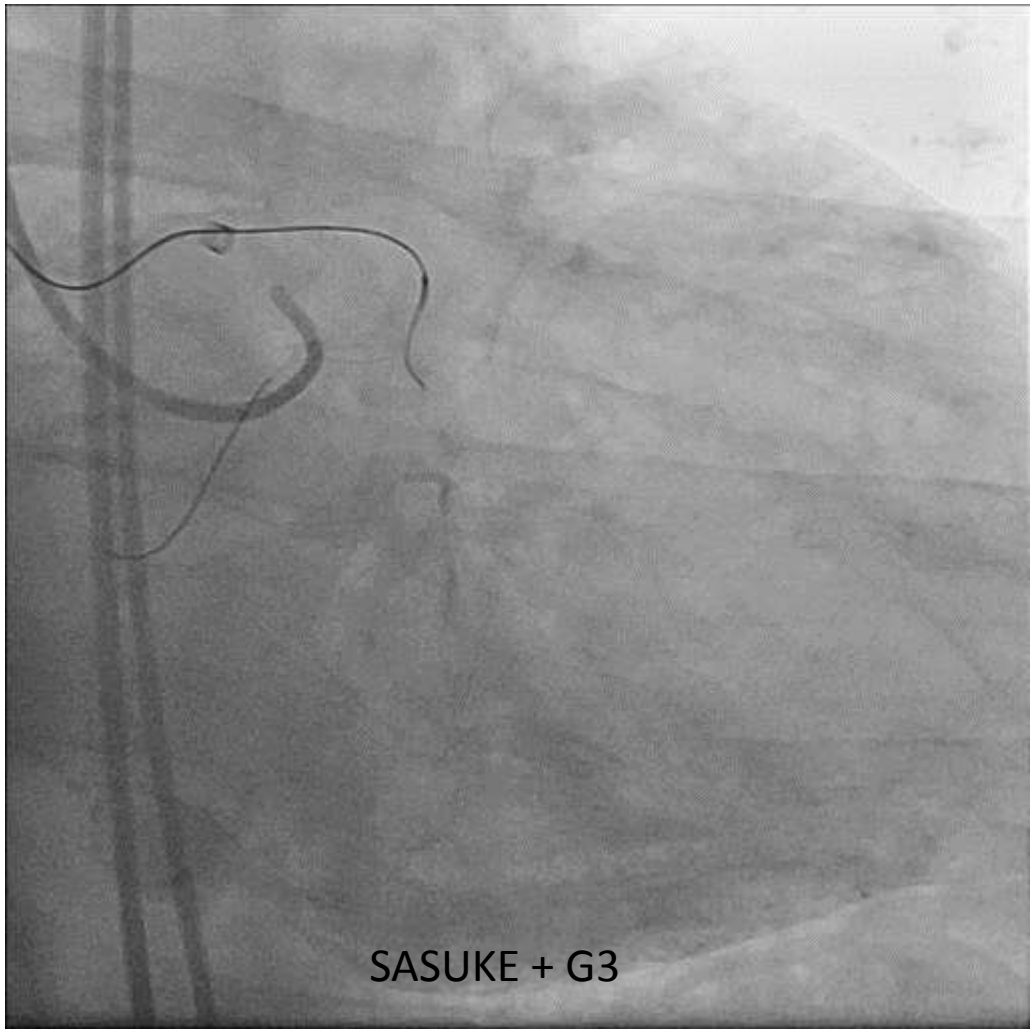
No interventional collateral

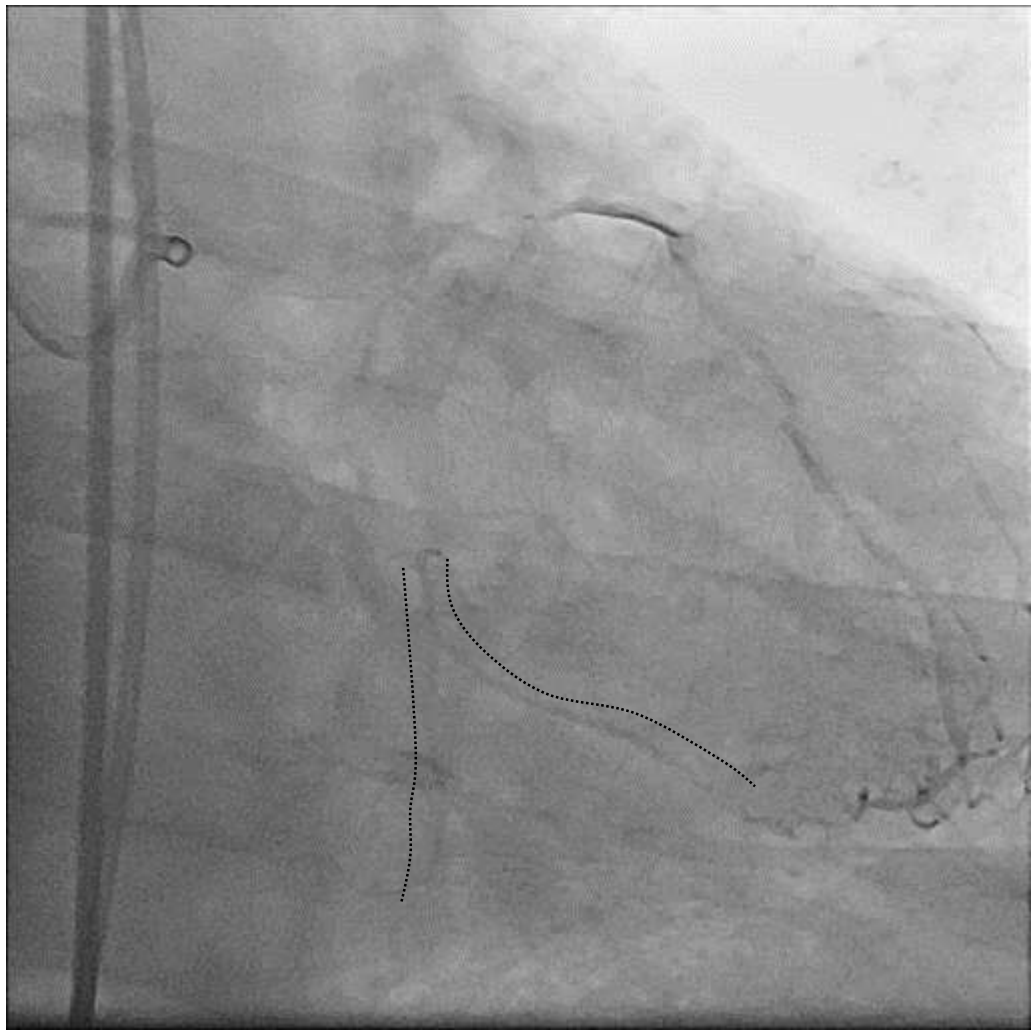

IVUS+G1 unpass

Antegrade approach; Wire Based Strategy

	Visible micro channels	Tapered proximal cap	Blunt proximal cap	
Proximal Cap	Low penetration force wire with polymer jacket and tapered tip	Low penetration force wire	Intermediate penetration force wire	G2
	↓ Intermediate penetration force wire	↓ Intermediate penetration force wire	↓ High penetration force wire	G3
CTO body	Length <20 mm with unambiguous course	Reasonable to continue with wire used to cross proximal cap		
	Length >20 mm or ambiguous course	Step down to a low penetration force wire or intermediate non-tapered wire		
Distal Cap	Escalation from softer more steerable wire to a higher penetration-force wire may be required.			


IVUS+G2 unpass


SASUKE + G3



CTO length >20mm

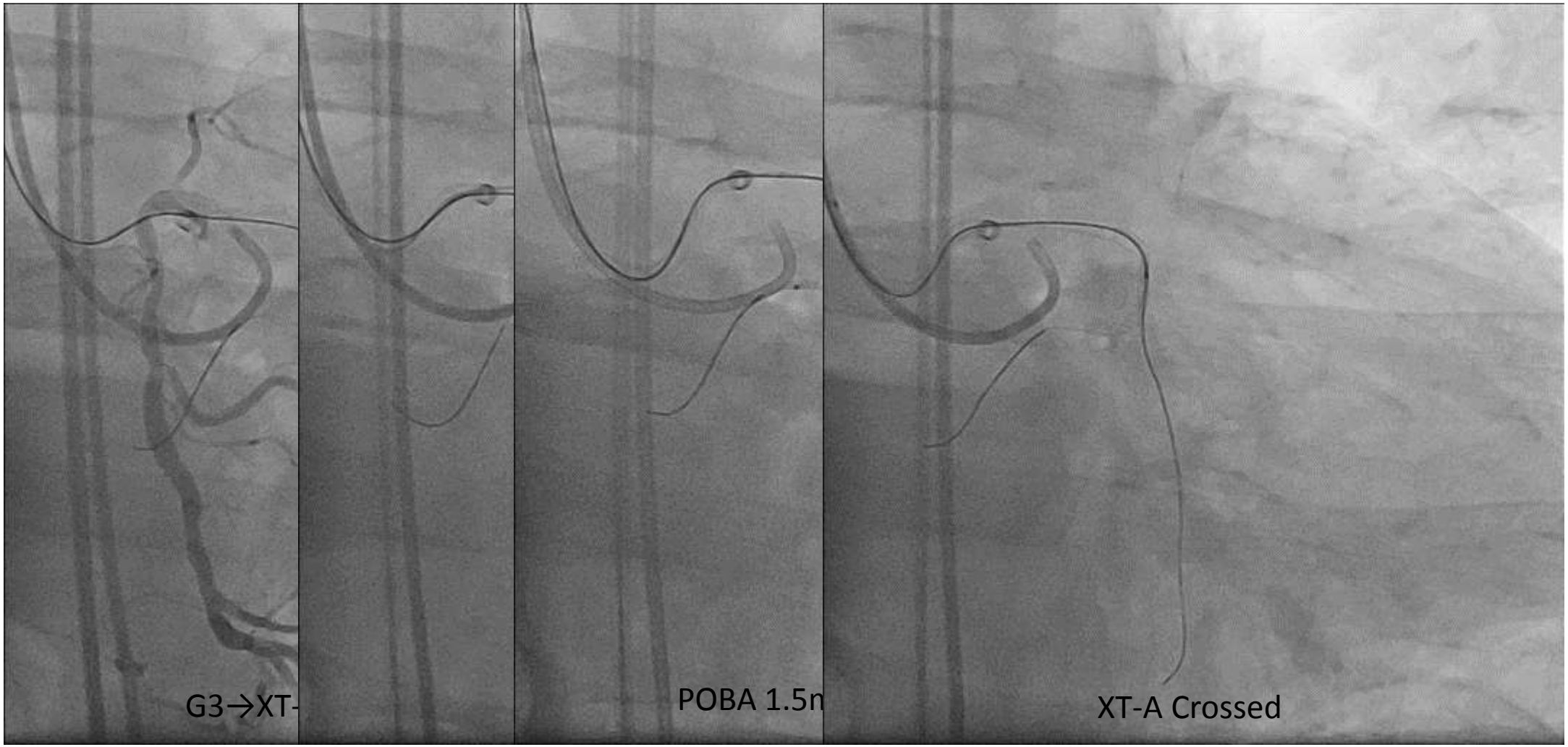
Vessel course is unknown

Distal vessel is unclear

Antegrade approach; Wire Based Strategy

	Visible micro channels	Tapered proximal cap	Blunt proximal cap
Proximal Cap	Low penetration force wire with polymer jacket and tapered tip ↓ Intermediate penetration force wire	Low penetration force wire ↓ Intermediate penetration force wire	Intermediate penetration force wire ↓ High penetration force wire
CTO body	Length <20 mm with unambiguous course	Reasonable to continue with wire used to cross proximal cap	
	Length >20 mm or ambiguous course	Step down to a low penetration force wire or intermediate non-tapered wire	
Distal Cap	Escalation from softer more steerable wire to a higher penetration-force wire may be required.		

XT-A or Neo3


G3→XT-
POBA 1.5m
XT-A Crossed

Antegrade Guide Wire Selection;

for long chronic occlusion

In a long occlusion,

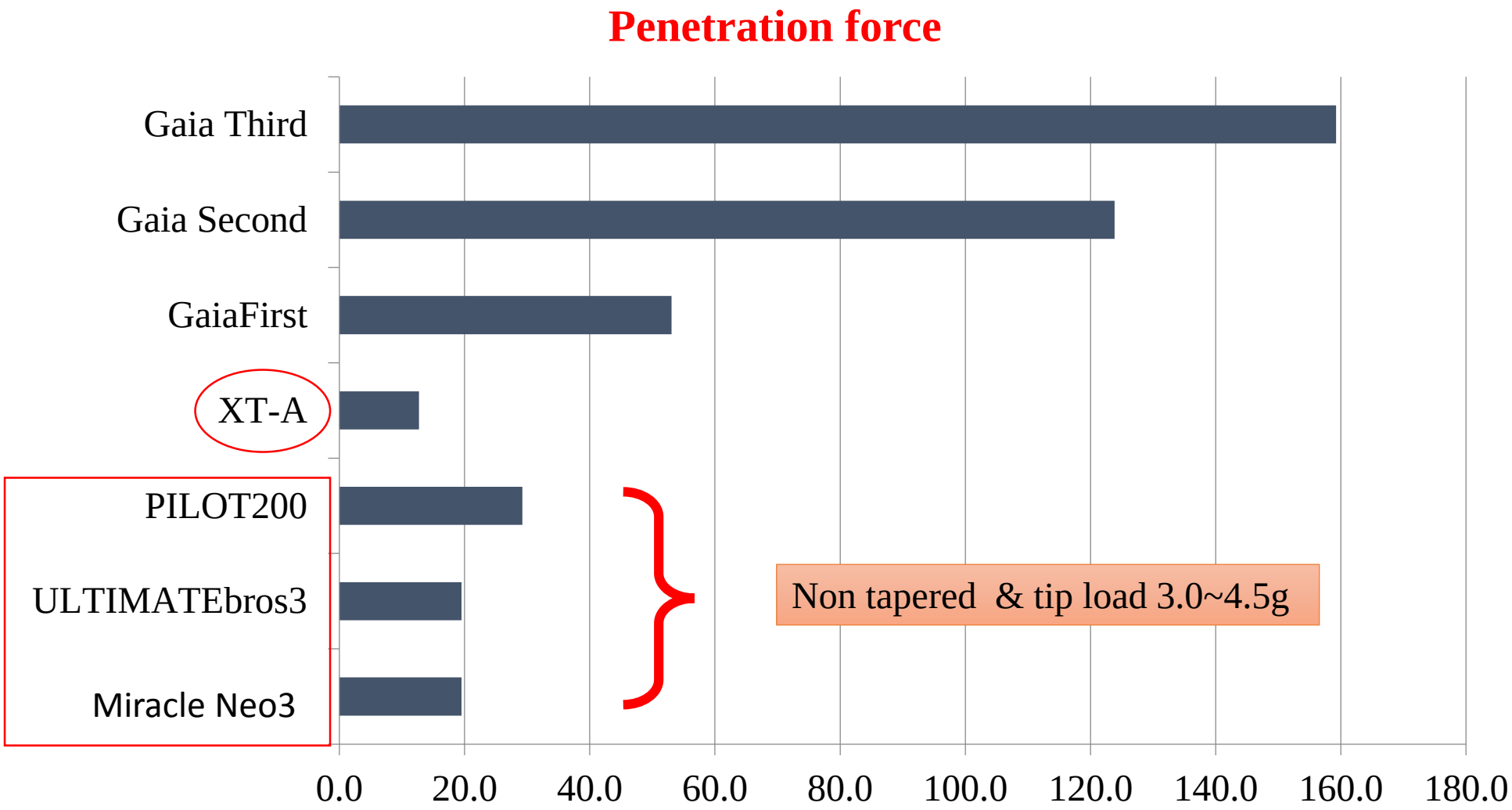
◆ Sometimes vessel course is ambiguous

→ Increased risk of vessel perforation

✓ Use a lower penetration force wire

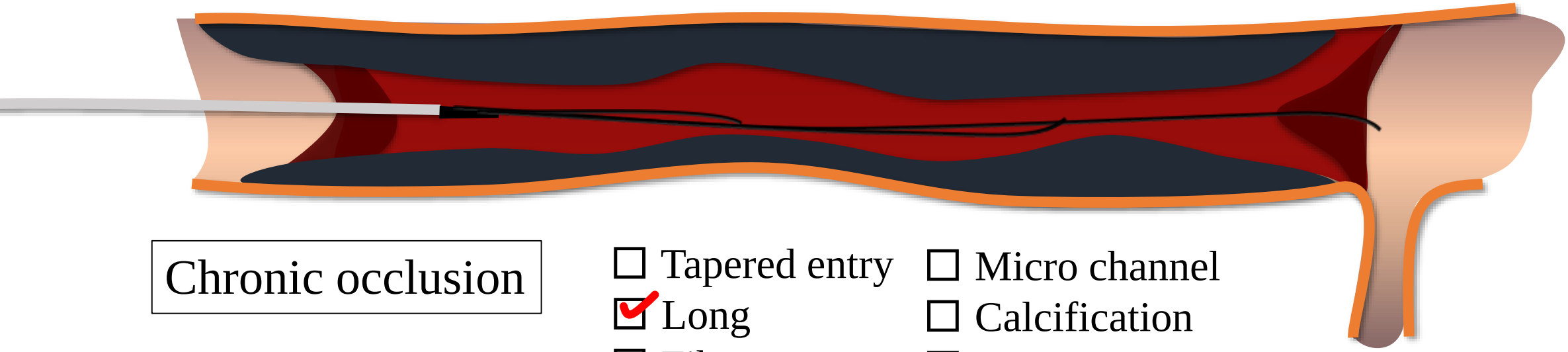
Antegrade Guide Wire Selection;

for long chronic occlusion; Lower penetration GW



Antegrade Guide Wire Selection;

for long chronic occlusion



Chronic occlusion

- ☐ Tapered entry
- ☑ Long
- ☐ Fibrous cap
- ☐ Micro channel
- ☐ Calcification
- ☐ Unclear vessel morphology

Miracle Neo3 / UB3, PILOT200

- ✓ Lower penetration force than Gaia
  - ✓ To avoid vessel perforation

Antegrade approach

Proximal cap

CTO body

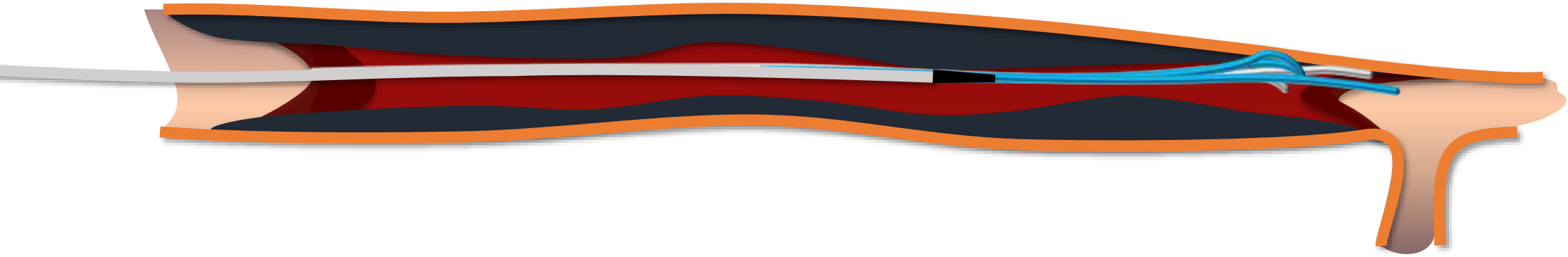
Distal cap

w/o fibrous cap

with fibrous cap

Antegrade Guide Wire Selection;

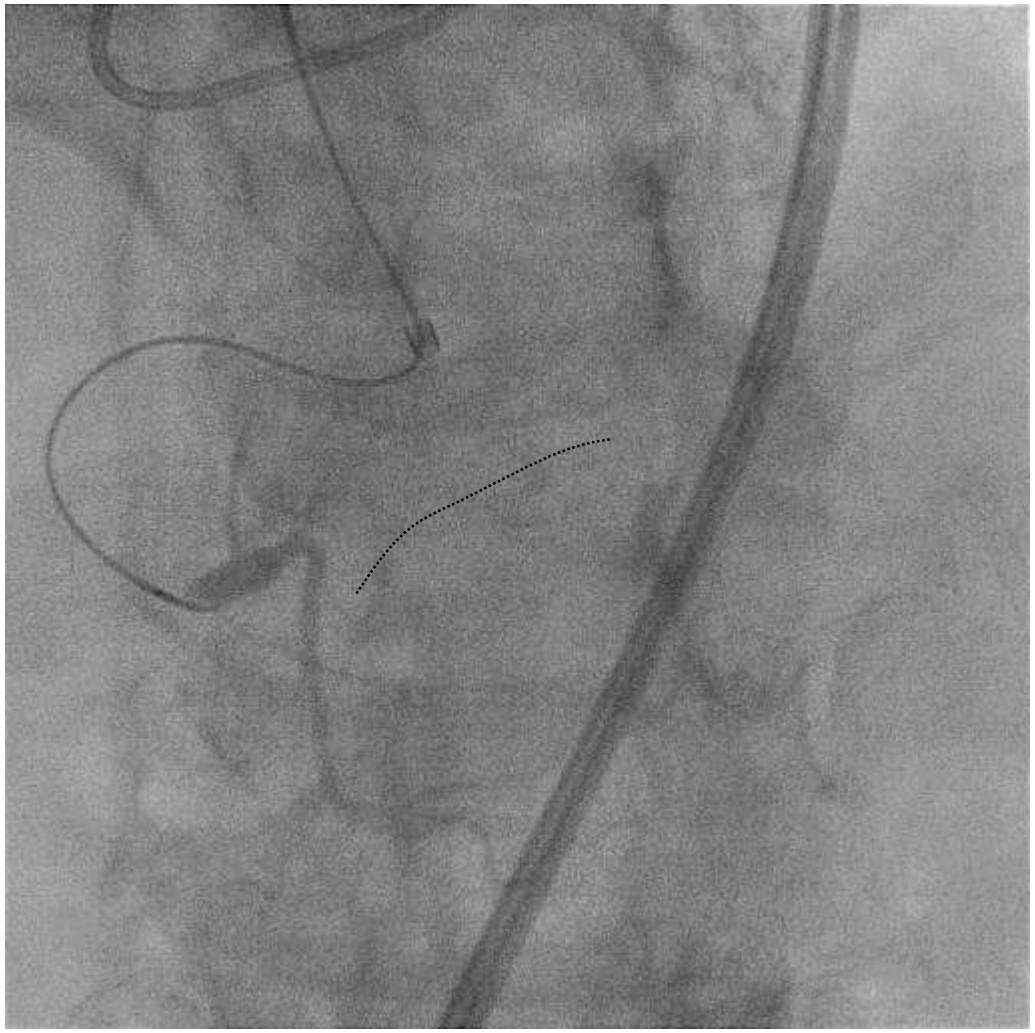
for penetration to distal cap

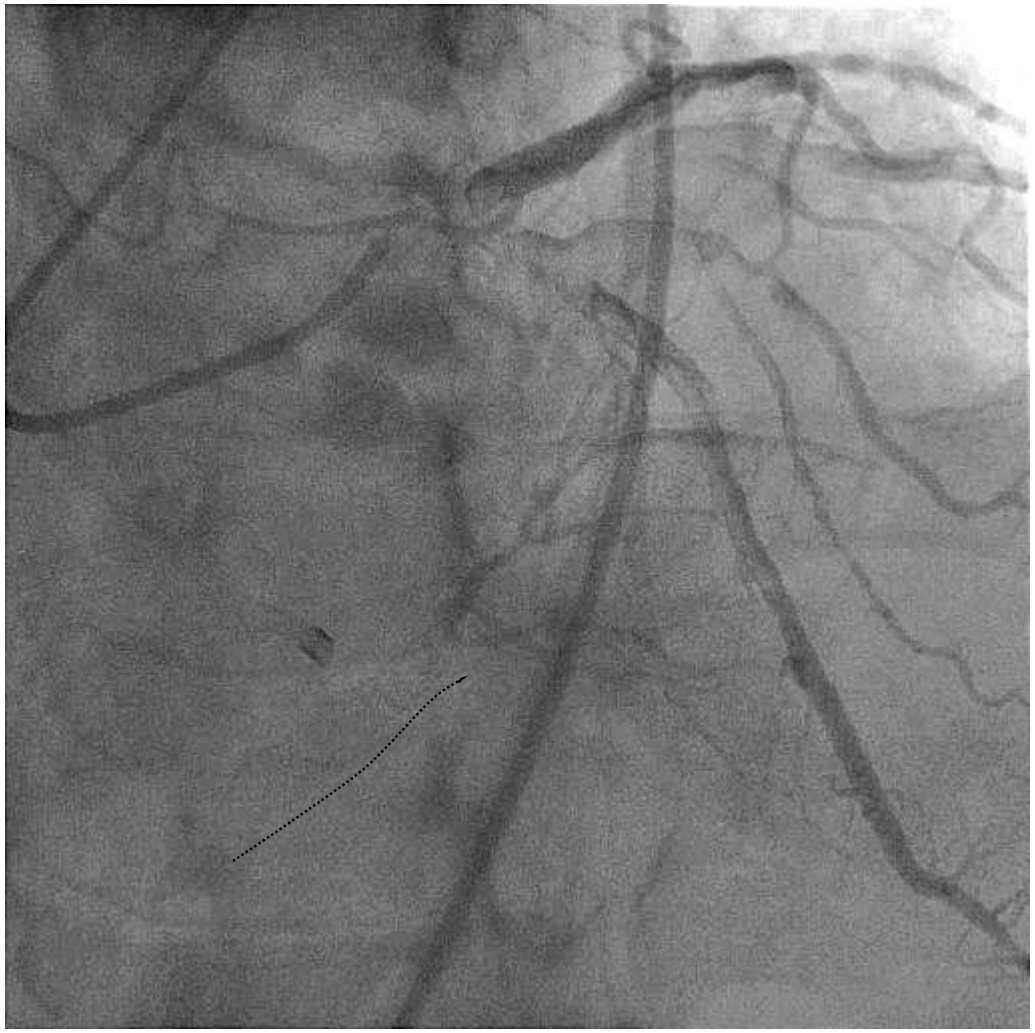


Conquest Pro

- ✓ Stronger push ability and penetration force than Gaia
  - ✓ to penetrate calcified lesion in CTO

RCA CTO





Antegrade approach; Wire Based Strategy

Proximal Cap	**Visible micro channels**	**Tapered proximal cap**	**Blunt proximal cap**
	Low penetration force wire with polymer jacket and tapered tip ↓ Intermediate penetration force wire	Low penetration force wire ↓ Intermediate penetration force wire	Intermediate penetration force wire ↓ High penetration force wire
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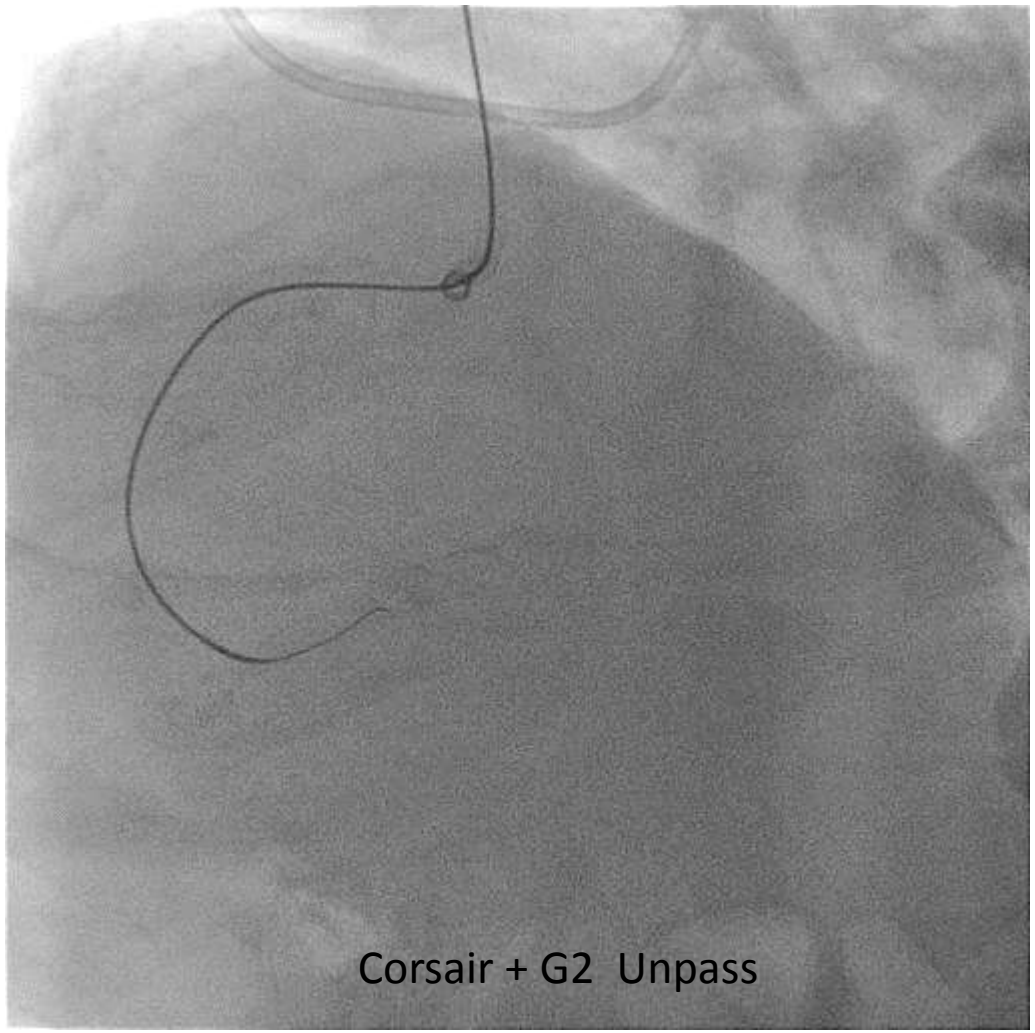
G2



Corsair + G2 Unpass

Antegrade approach; Wire Based Strategy

	Visible micro channels	Tapered proximal cap	Blunt proximal cap
Proximal Cap	Low penetration force wire with polymer jacket and tapered tip ↓ Intermediate penetration force wire	Low penetration force wire ↓ Intermediate penetration force wire	Intermediate penetration force wire ↓ High penetration force wire G3
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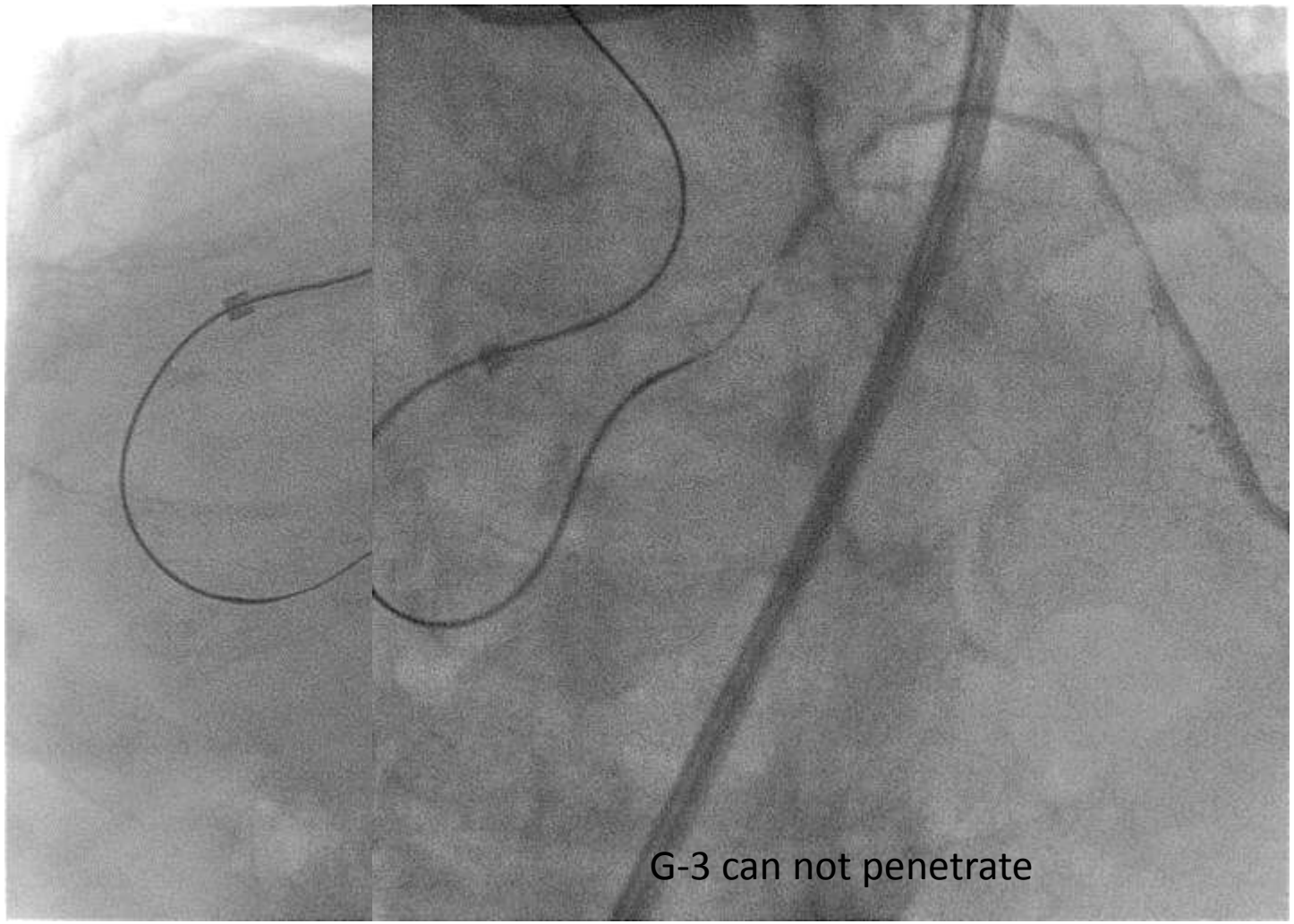
G-3 can not penetrate

Antegrade approach; Wire Based Strategy

	Visible micro channels	Tapered proximal cap	Blunt proximal cap
Proximal Cap	Low penetration force wire with polymer jacket and tapered tip ↓ Intermediate penetration force wire	Low penetration force wire ↓ Intermediate penetration force wire	Intermediate penetration force wire ↓ High penetration force wire G2
CTO body	Length <20 mm with unambiguous course	Reasonable to continue with wire used to cross proximal cap	
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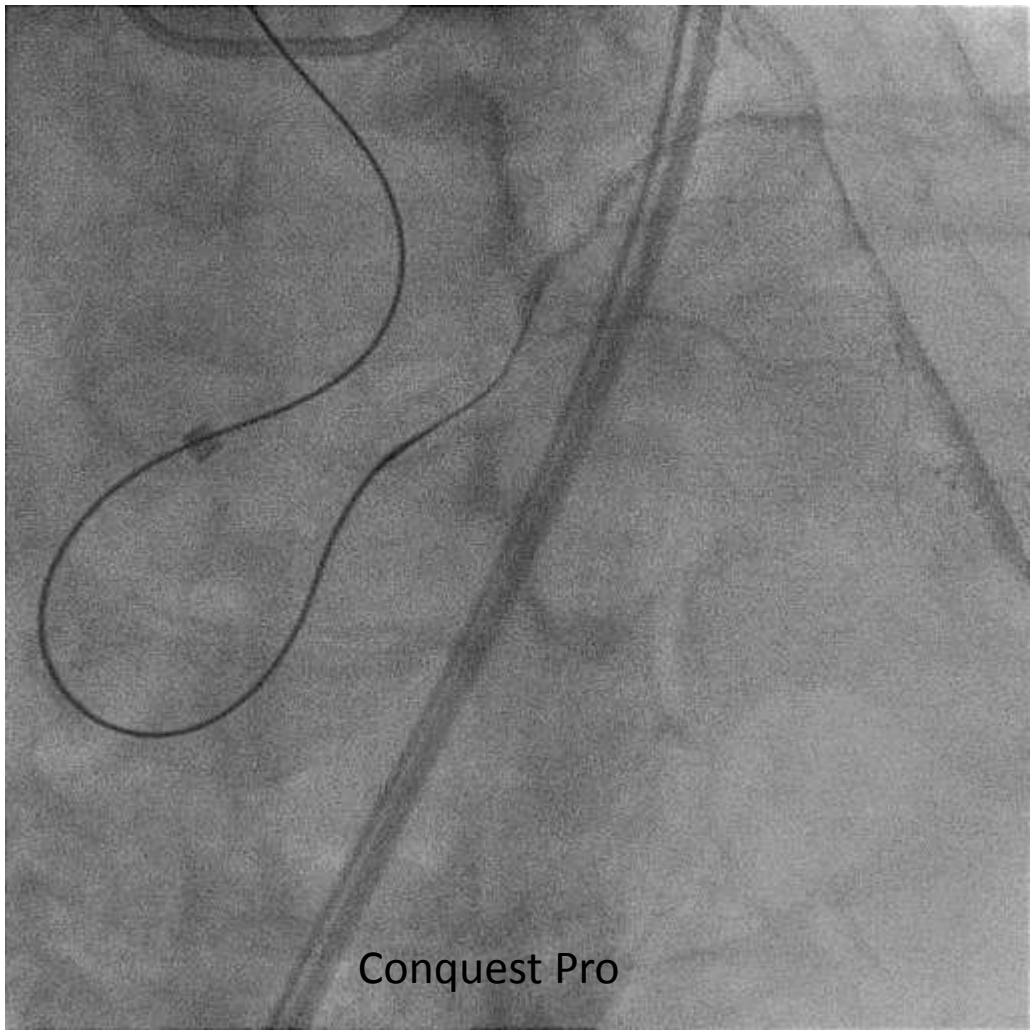
Conquest Pro

Antegrade approach; Wire Based Strategy

	Visible micro channels	Tapered proximal cap	Blunt proximal cap
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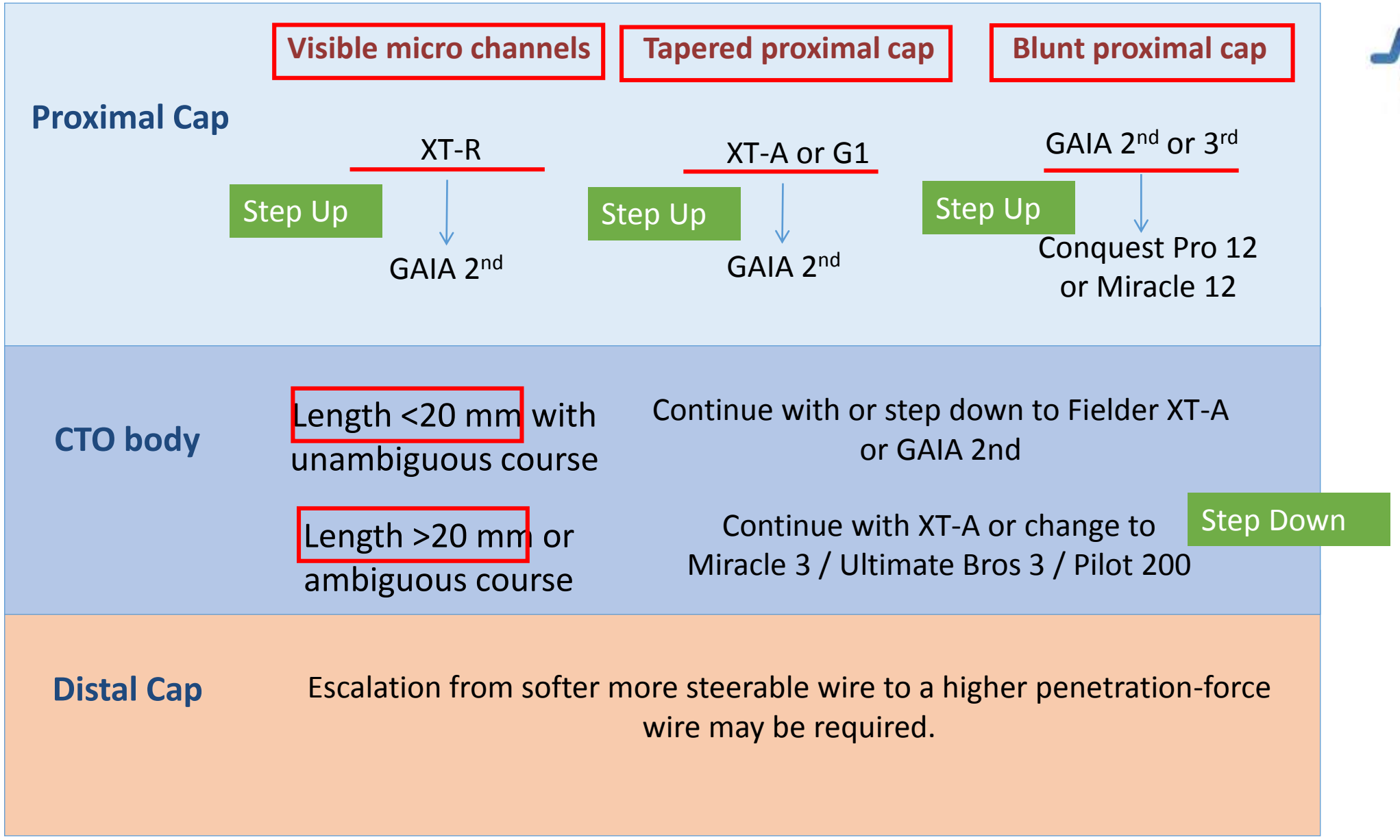
Antegrade approach; Wire Based Strategy



Conclusion

- Along with the CTO-PCI procedure, guidewires have developed over time as well.
- We need to deepen our knowledge in a part for which we considered less important compared to well-known information such as tip load or penetration force when to make a selection.
- We must also have a proper understanding for guidewire features brought by its component, new technologies and other information.