

Importance of penetration plane method for CTO crossing

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Disclosure

- The presenter has nothing to disclose regarding this presentation.

Wire crossing is still challenging in CTO PCI

- **We need to control the wire 3-dimensionally** inside the CTO lesion to achieve wire crossing.
- **When a wire is advanced while changing the tip direction, the wire track curve becomes a complicated 3-dimensional curve with torsion,** which makes wire behavior unpredictable and uncontrollable.
- **There is a need for a novel wire manipulation method** to overcome this difficulty.

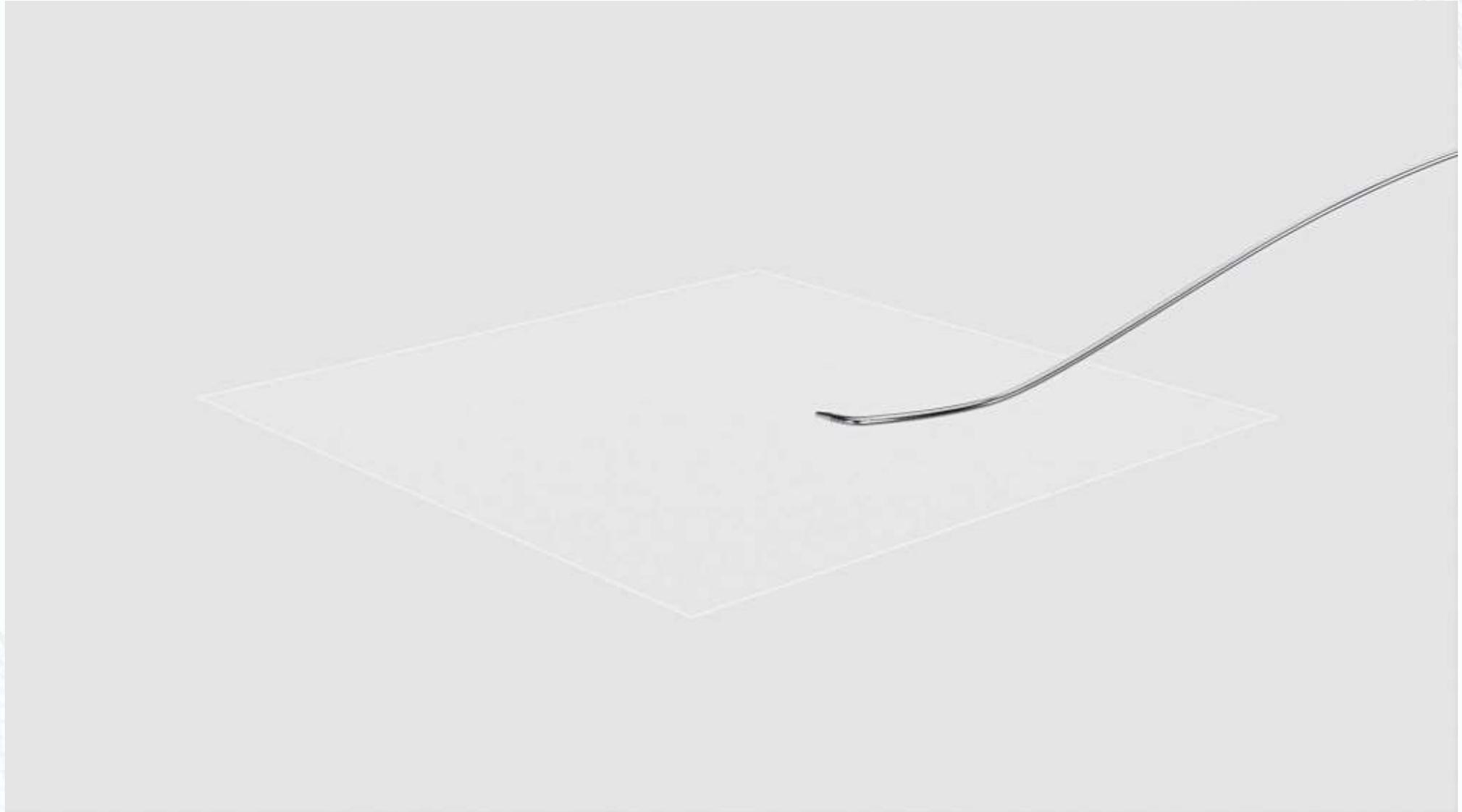
Penetration plane (PP) method

- Wire manipulation method **aiming to make a 3-dimensional wire control simpler, more reliable, and reproducible**

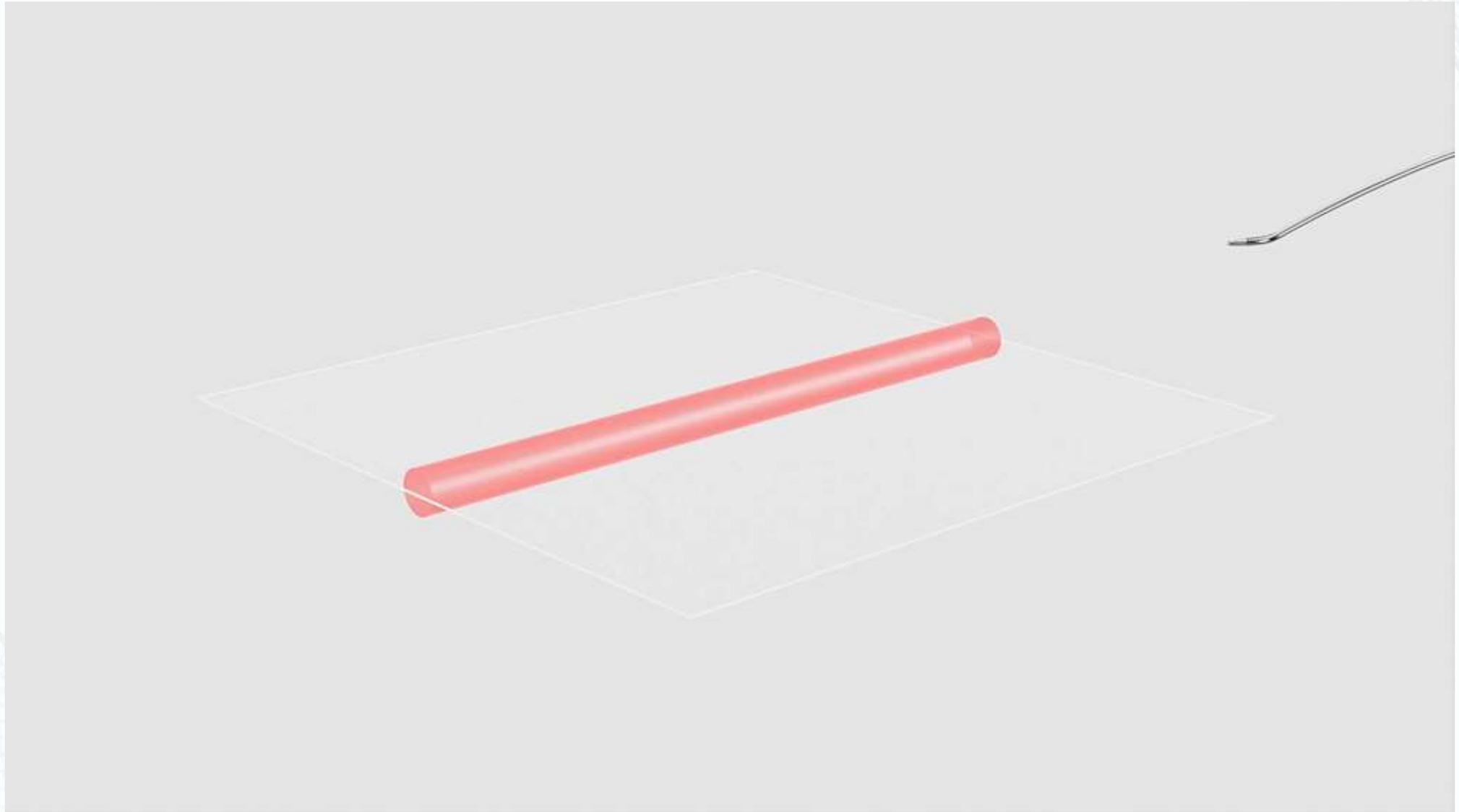
3 key points for mastering the PP method

- **Principle of wire control using tip deflection**
- **Definition of working views named PPV and OPV**
- **Wire manipulation method using PPV and OPV**

How does the wire advance by tip deflection?

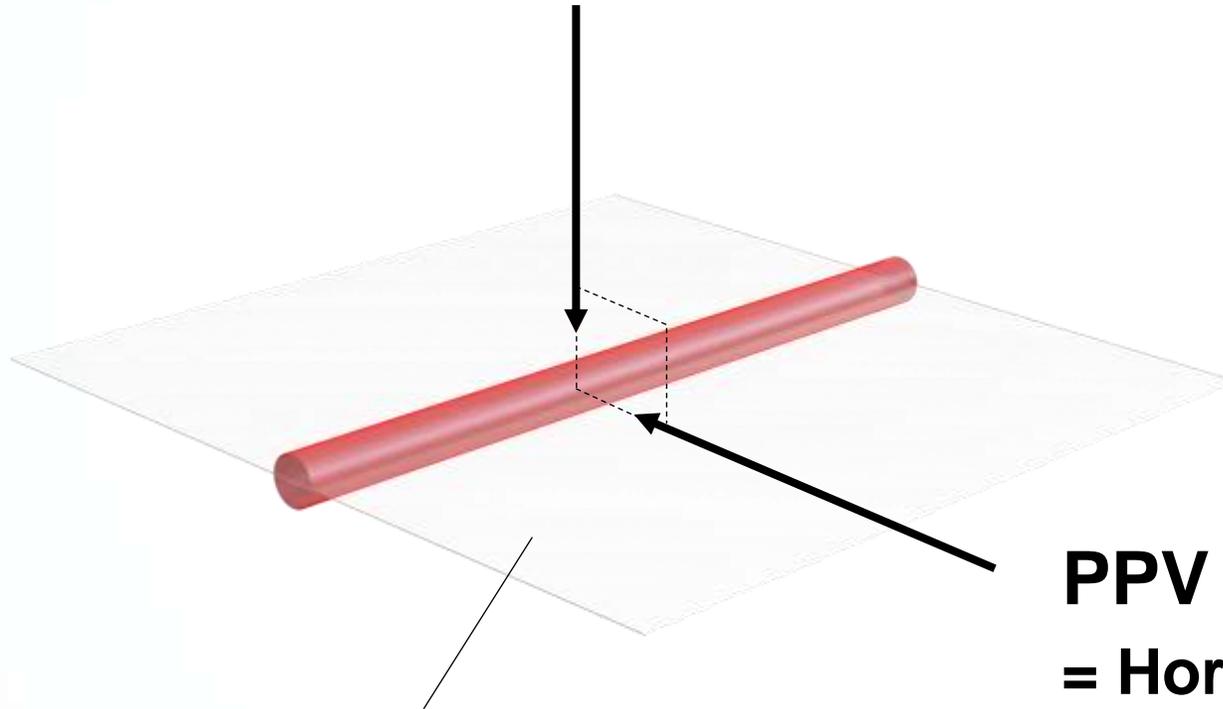


Rationale of the PP method



Setting of PPV and OPV as working views

OPV (objective perpendicular view)
= Vertical view of the PP



PPV (penetration plane view)
= Horizontal view of the PP

Penetration plane (PP)

How to manipulate the wire using PPV and OPV

PPV



↓ 90deg rotation
(same direction)



↓ Wire advancement



Switching
view



OPV



or



↓ 90deg rotation



Issues for clinical application of the PP method

- Calculated view angles can be out of the movable range of the C-arm or can cause an overlap of the operation area with other structures.

⇒ **Concept of oblique PPV and OPV**

- Movement of the fluoroscopic images due to cardiac, respiratory, and body motion makes it challenging to understand the tip direction accurately.

⇒ **ECG-synchronized fluoroscopy, template matching, and more**

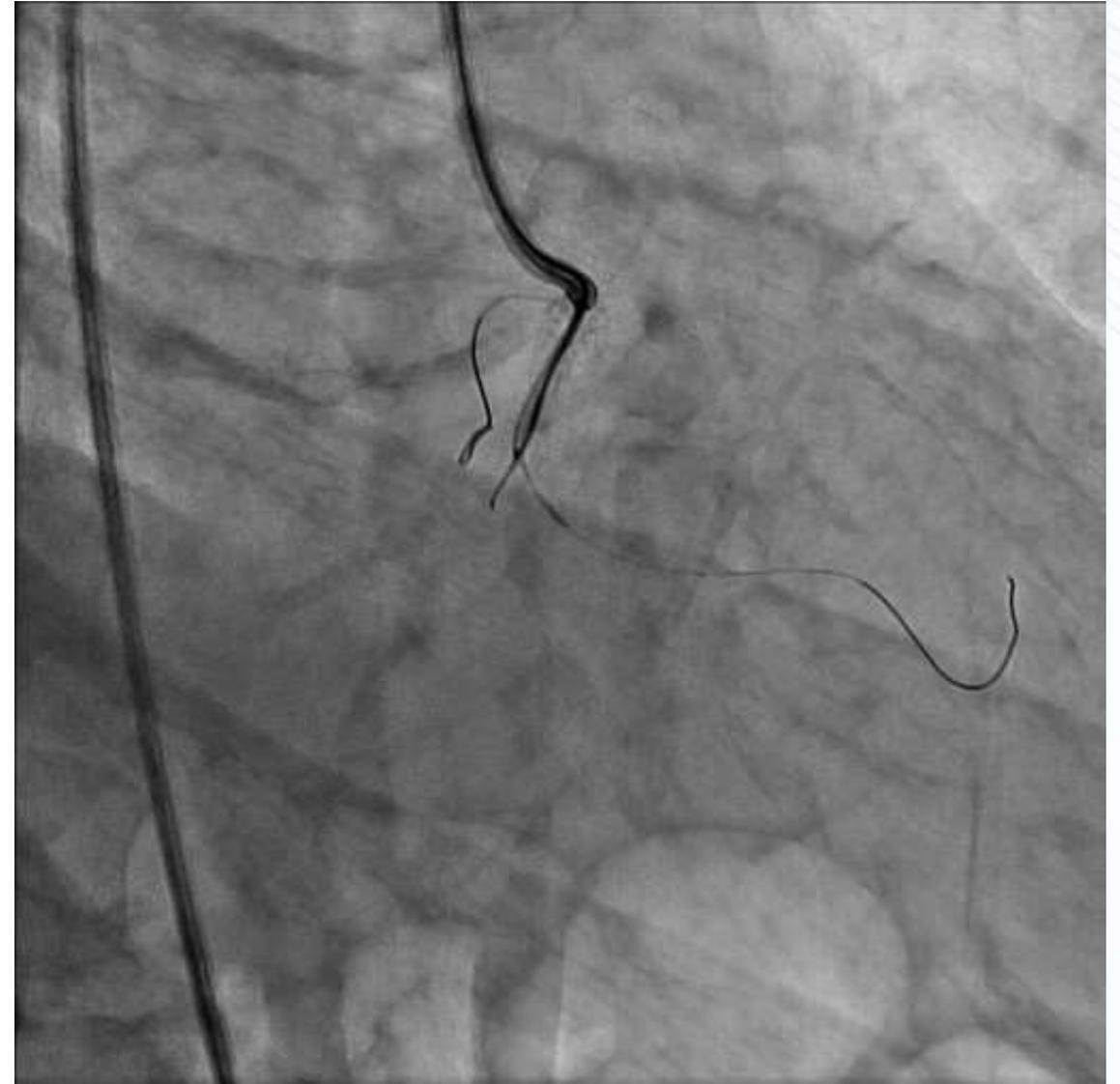
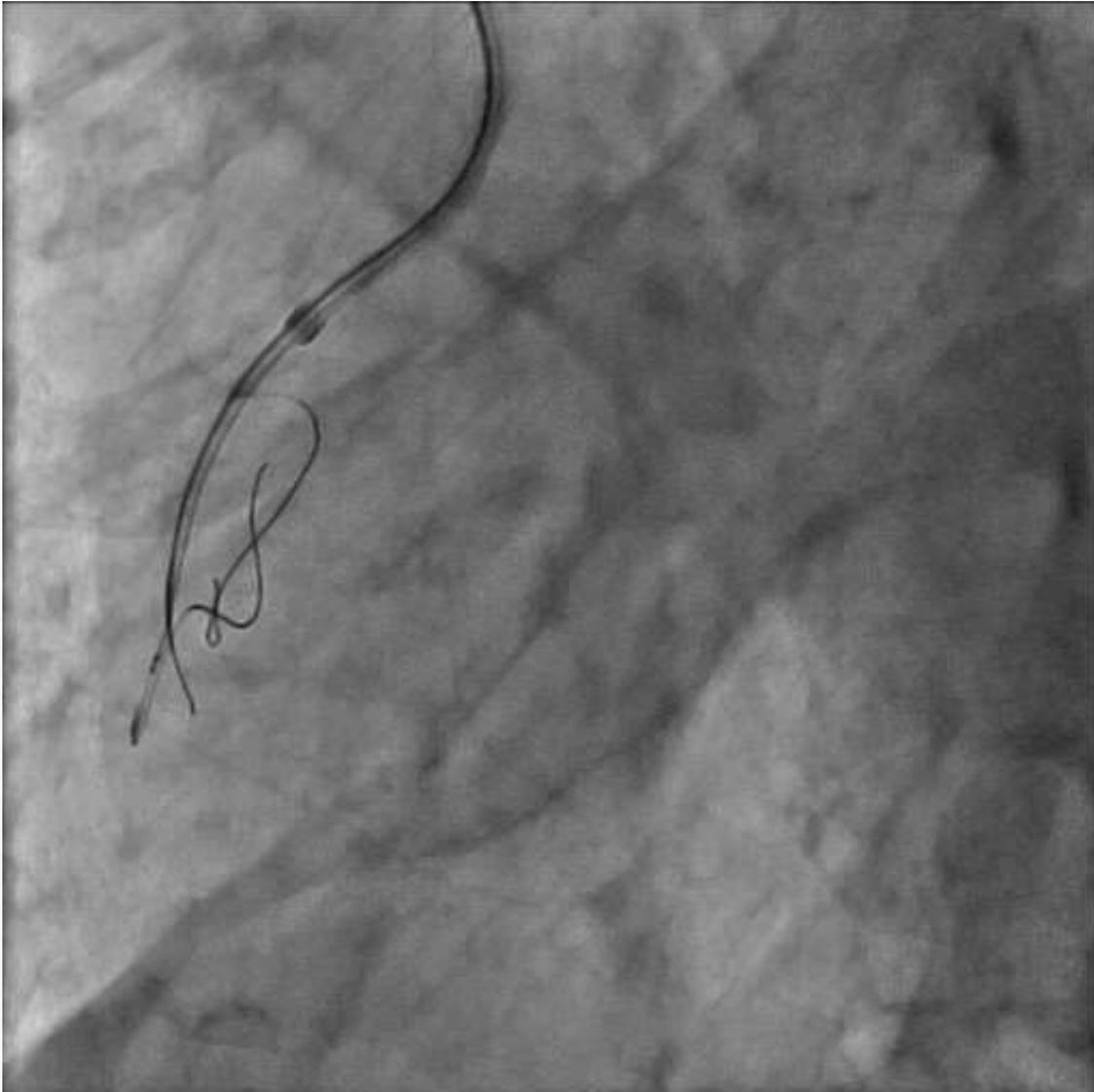
- Inability to keep the target visible during wire manipulation can impair the reliability and accuracy of the wiring.

⇒ **Distal true lumen mapping**

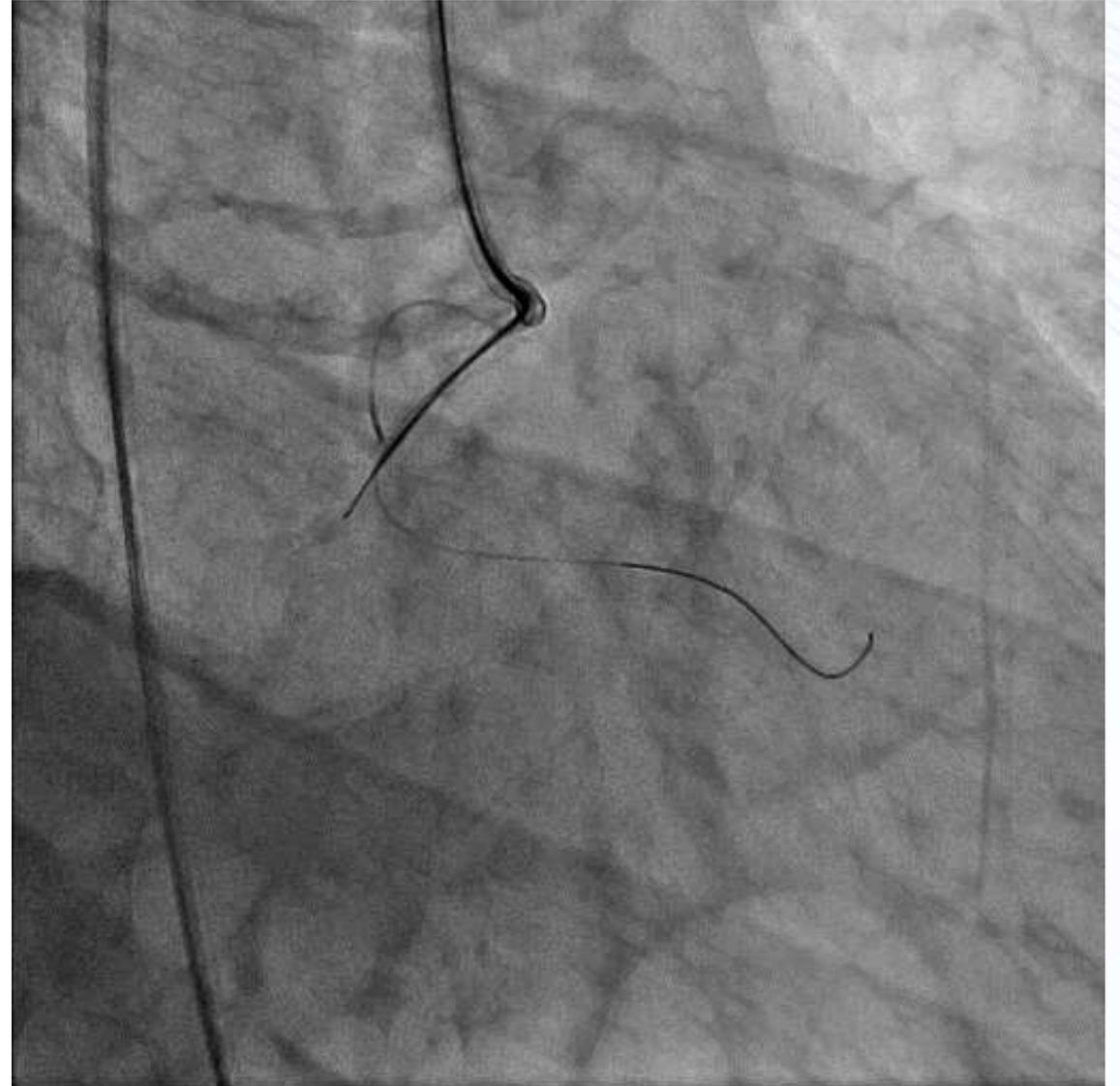
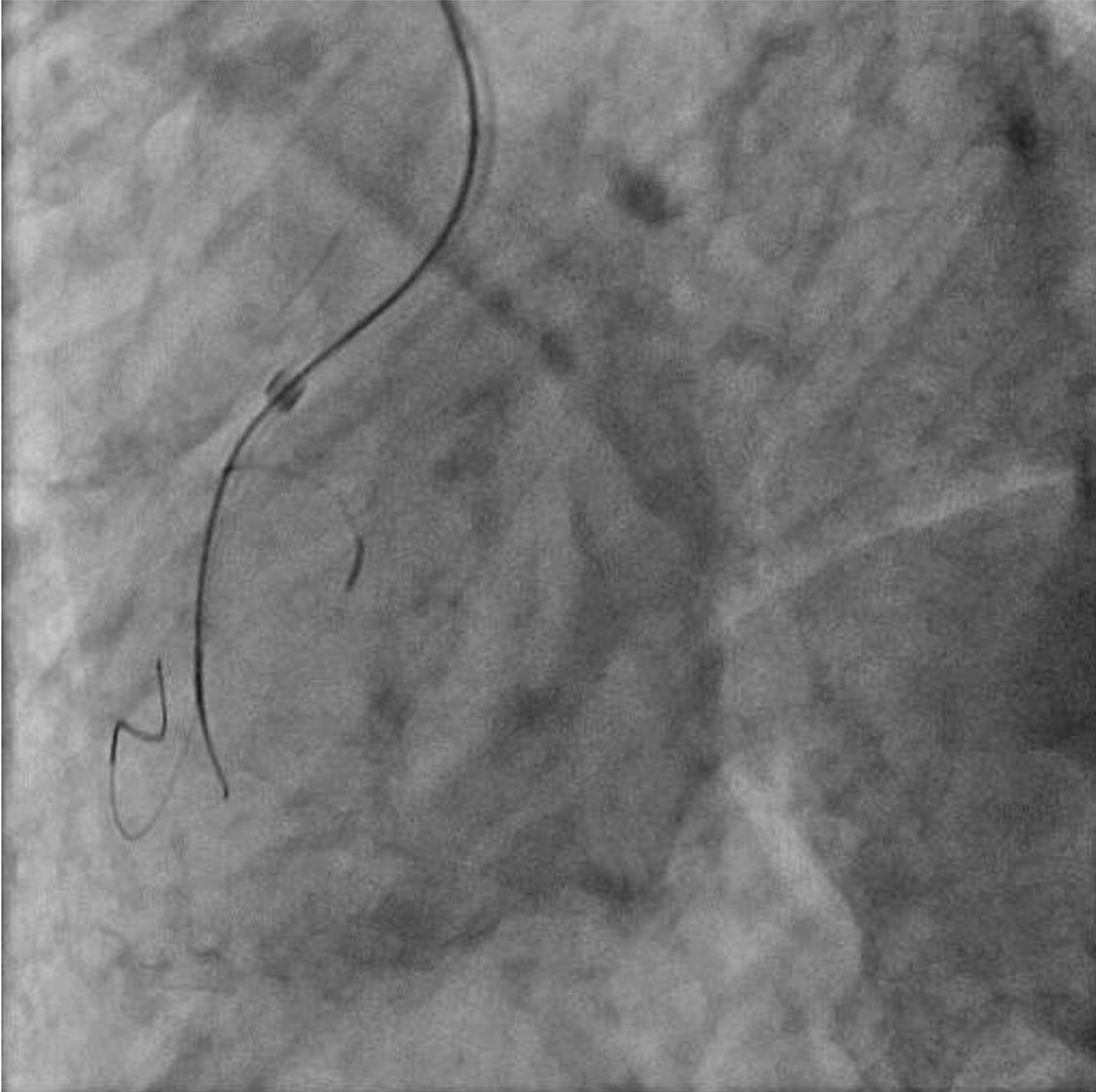
Clinical application of the PP method: RCA CTO



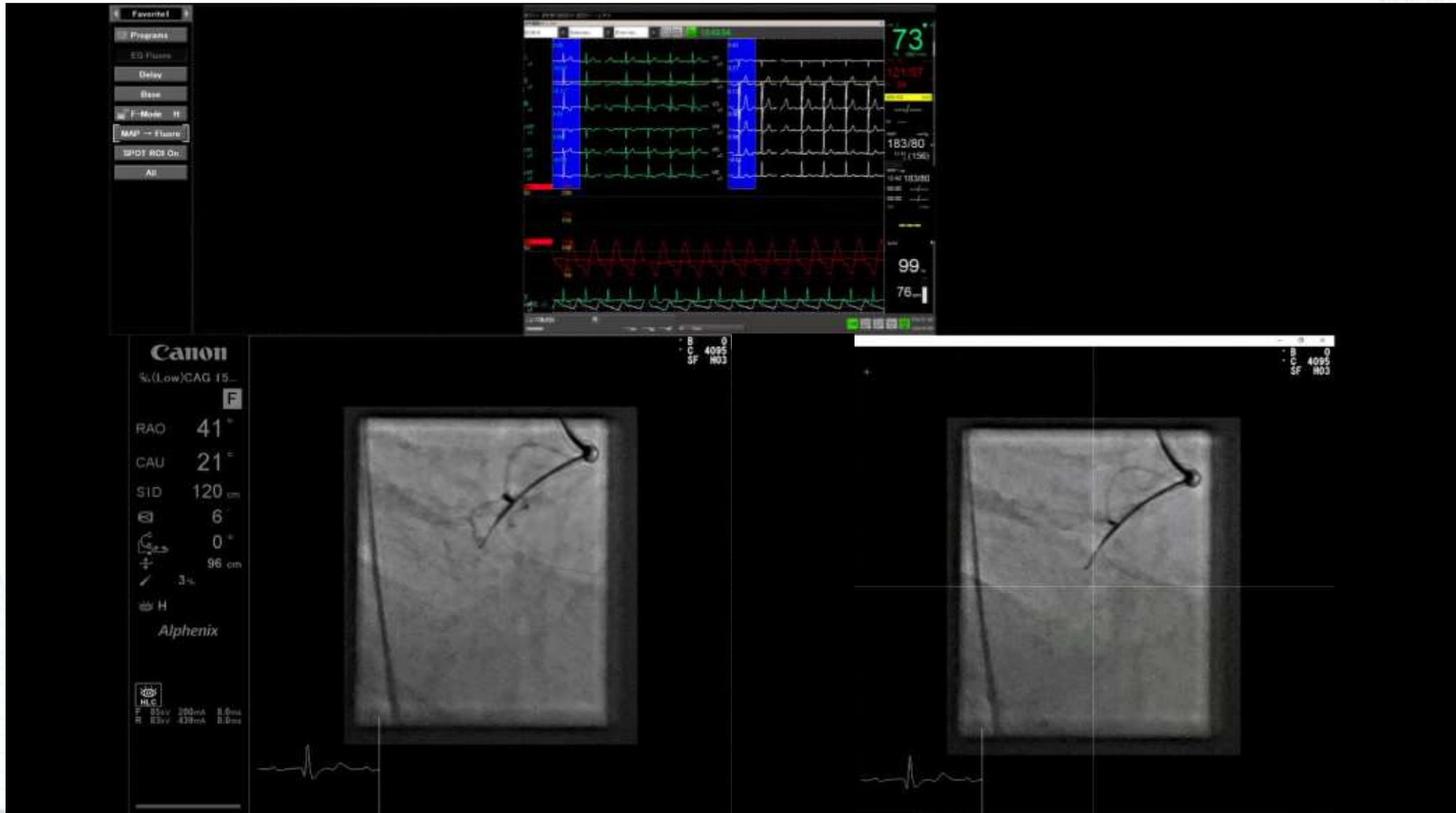
IVUS-guided entry w/ Gaia Next 4



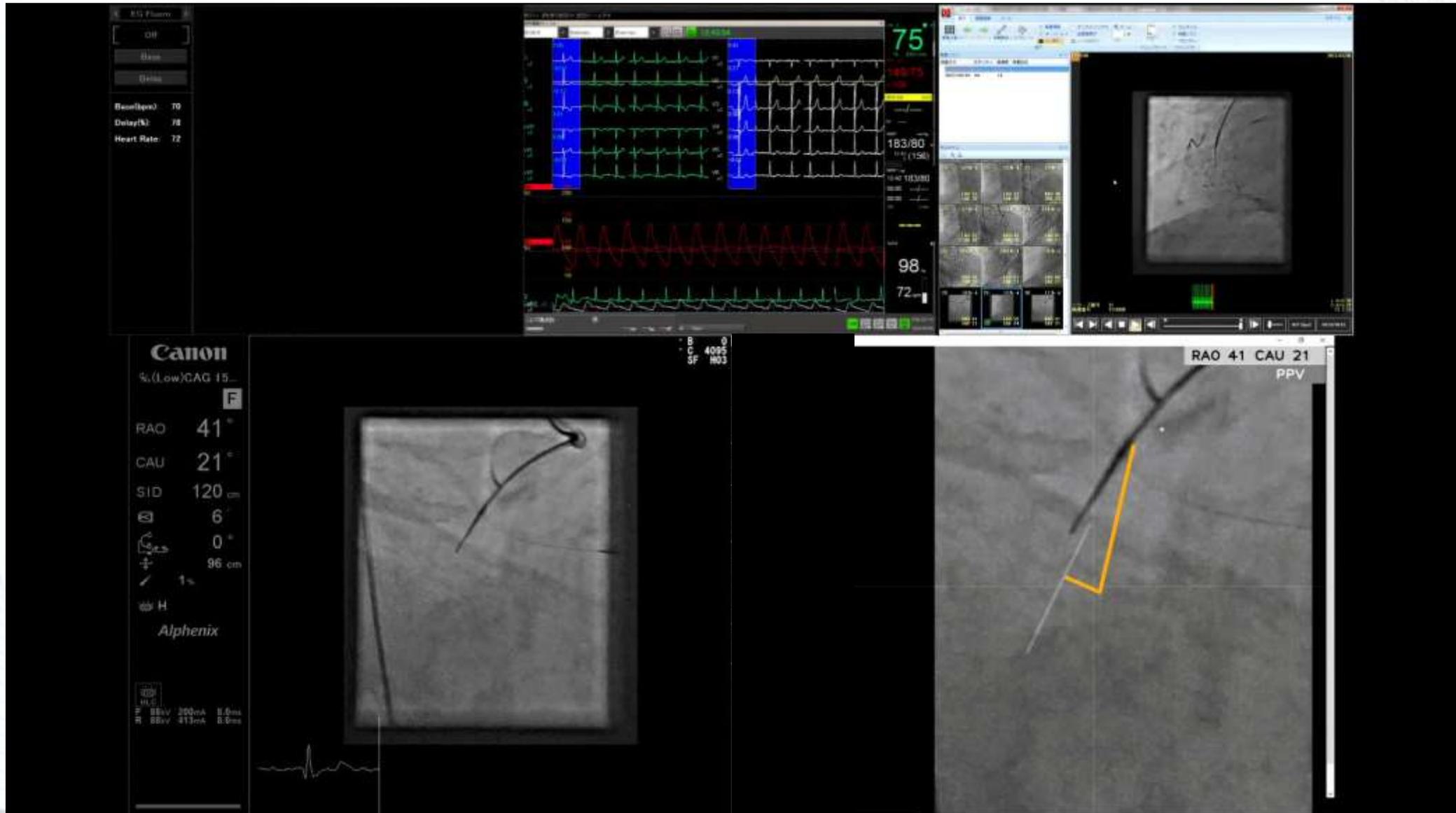
Angiography after IVUS-guided entry



Distal true lumen mapping



PP method wiring w/ Gaia Next 4



Successful wire crossing



Conclusion

- **Penetration plane method that keeps a wire track curve on a plane** makes a 3-dimensional wire control simpler, resulting in more reliable and reproducible antegrade wire crossing.