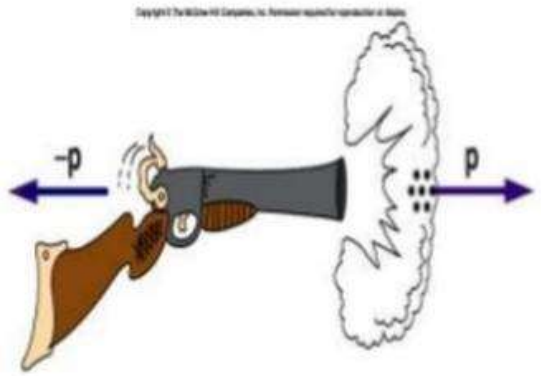
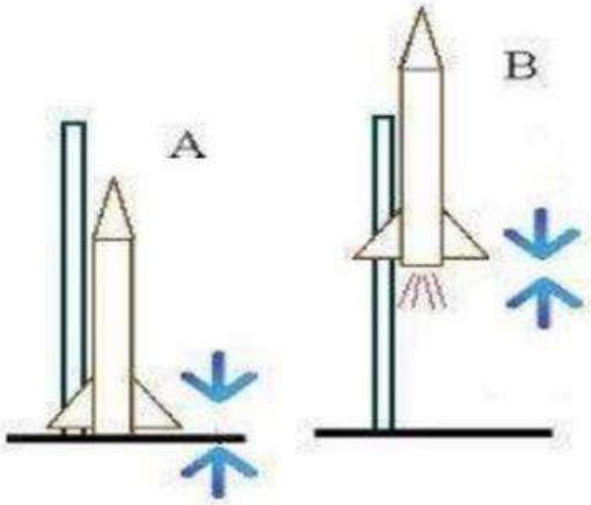
GUIDING ABC

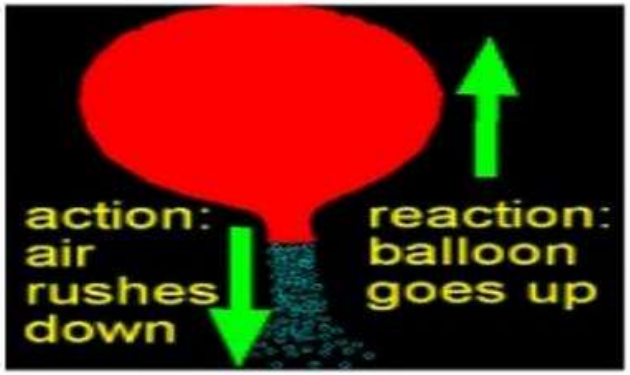
Dr Chan Ka Chun Alan

Queen Elizabeth Hospital

Newton's Third Law of Motion



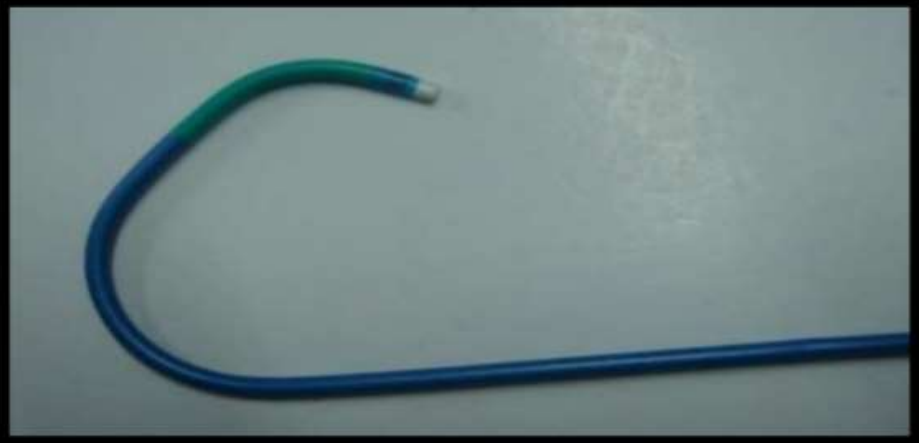


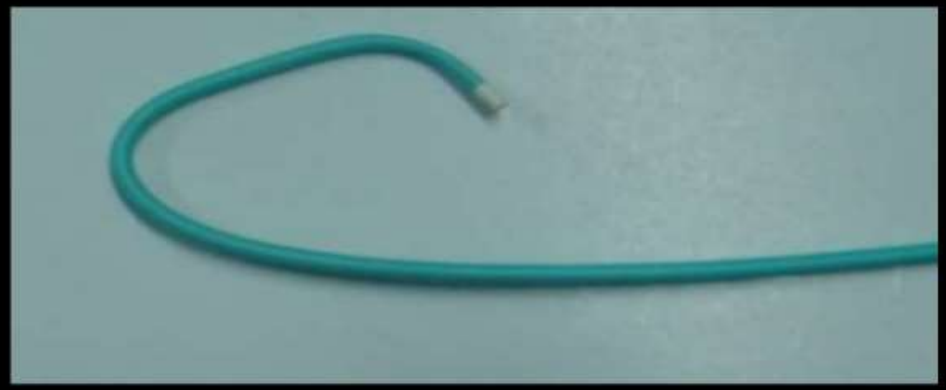


Guiding vs. Diagnostic catheters

A Guide has

- Stiffer shaft
- Re-enforced construction (3 vs. 2 layers)
- Larger internal diameter (ID)
- Shorter & more angulated, non tapering atraumatic tip





Guiding Catheters Provide:

- Conduit for device and wire transport
- Vehicle for contrast injection
- Pressure measurement
- Support for device advancement

Importance of GC

- ☐ Shaft Linearity
- ☐ Kink Resistance
- ☐ Torque Performance
- ☐ Shape (Coaxial engagement)
- ☐ Shaft Support
- ☐ Shape (Supporting Point)
- ☐ Shape Memory
- ☐ Anti Heat Deformation
- ☐ Large Inner Lumen
- ☐ Lumen Retention
- ☐ Smooth Inner Layer
- ☐ Tip Flexibility
- ☐ Visibility
- ☐ Round Processed Tip

Strength

Support

Kink resistance

Flexibility

1:1 Torque

Kink resistance

Large lumen

Lubricious Material

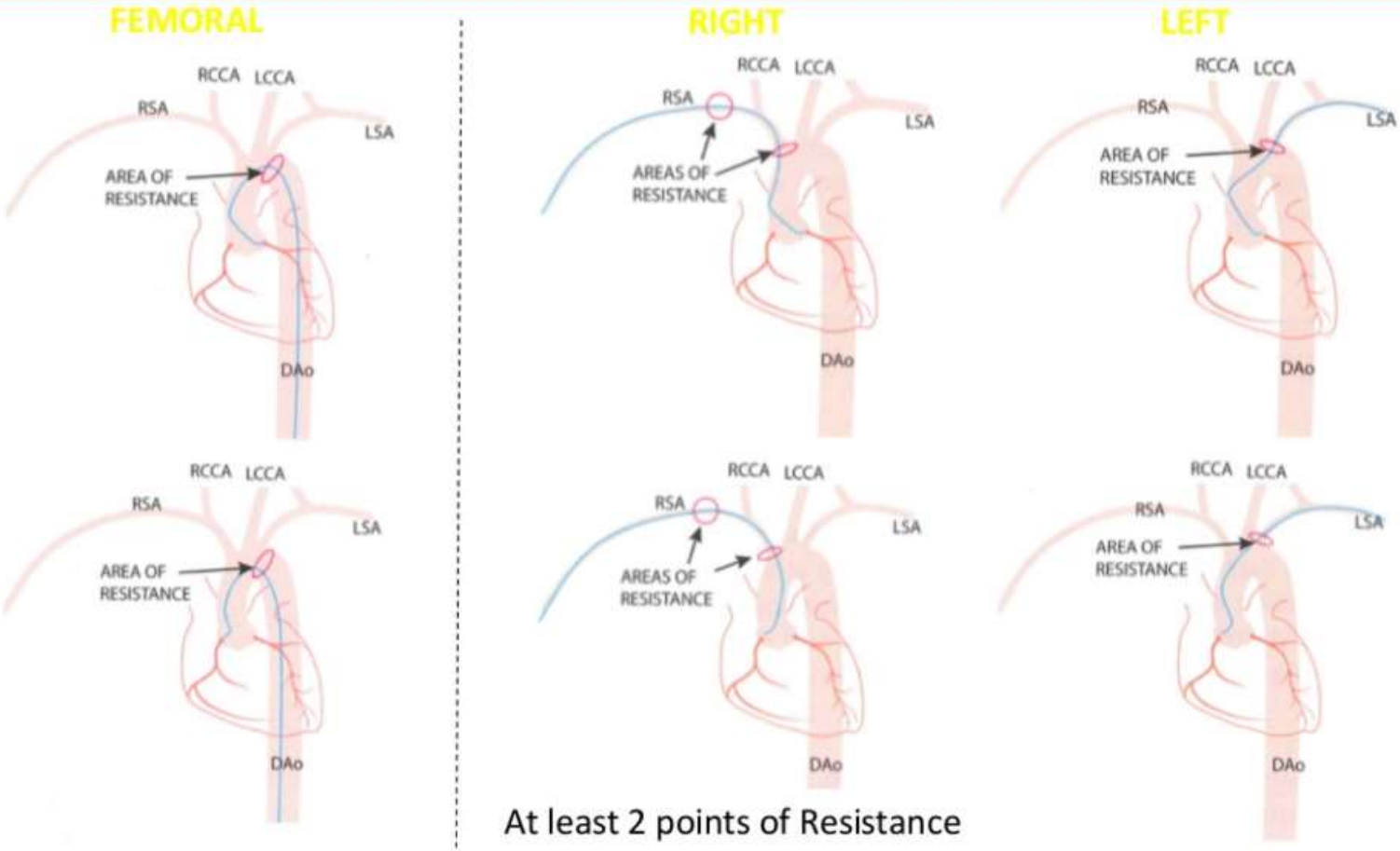
Device Compatibility

GUIDE SELECTION CONSIDERATIONS

- Location and complexity of Lesion
- Native Coronary vs Graft
- Coronary Anatomy
- French Size (6, 7, 8)

- Femoral, Radial
- User Style (Active vs Passive Placement)
- Aortic Width
- Operator's Familiarity with Specialty Curves

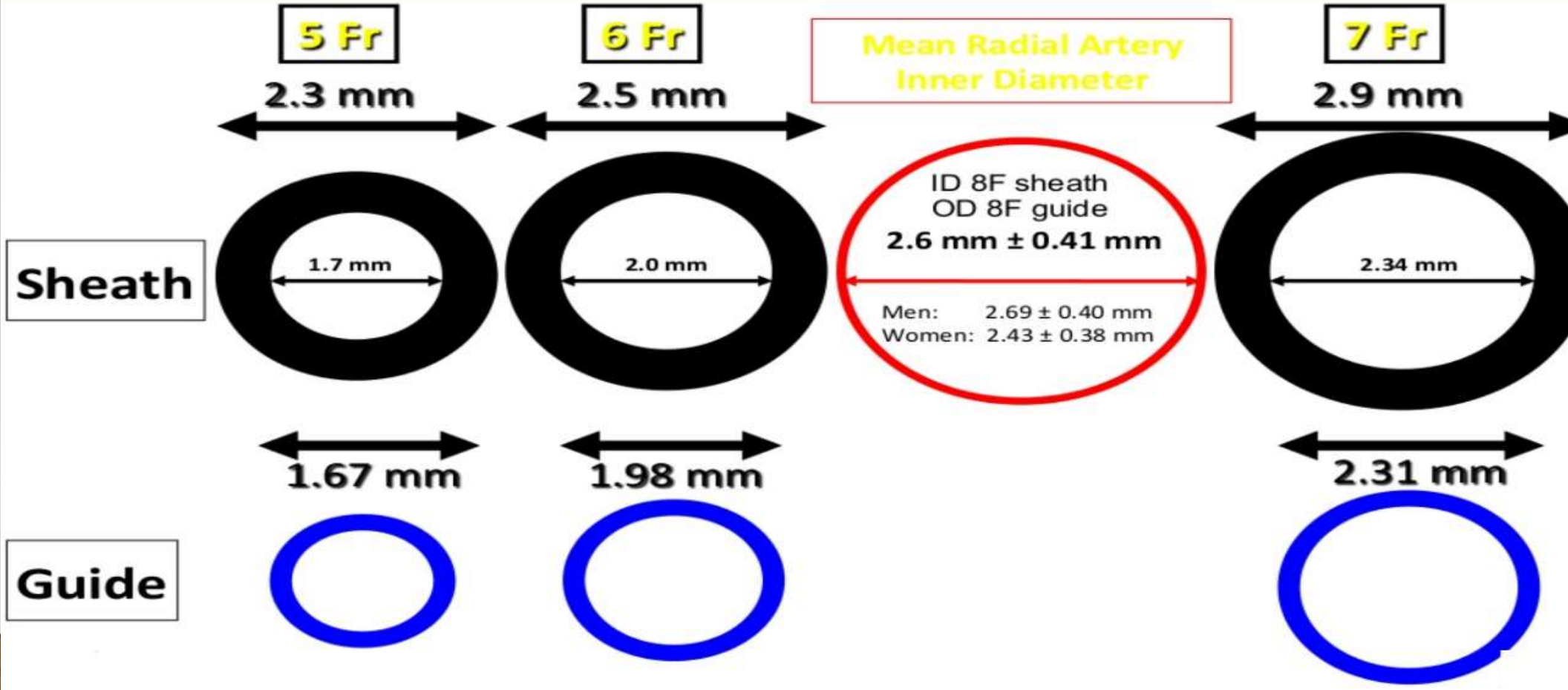
Femoral vs Right RA vs Left RA



Patel T, Shah S, Pancholy S. Patel's Atlas of Transradial Intervention: The Basics and Beyond 2012.

	6 FR Guides	7-8 FR Guides
PROS	■ Small arterial puncture ■ Brachial/radial access ■ Permit active support	■ Better passive support ■ Better visualization ■ Better torque response ■ More device options
CONS	■ Less torque response ■ Less visualization ■ Limited to PTCA & stents	■ Large arterial puncture ■ Pressure dampening ■ More contrast

Relative Size



Adapted from From AM, Gulati R, Prasad A, Rihal CS. CCI 2010. 76: 911-916

Commercial Sheathless Guide System

Sheathless Eaucath, Asahi Intecc®, Japan

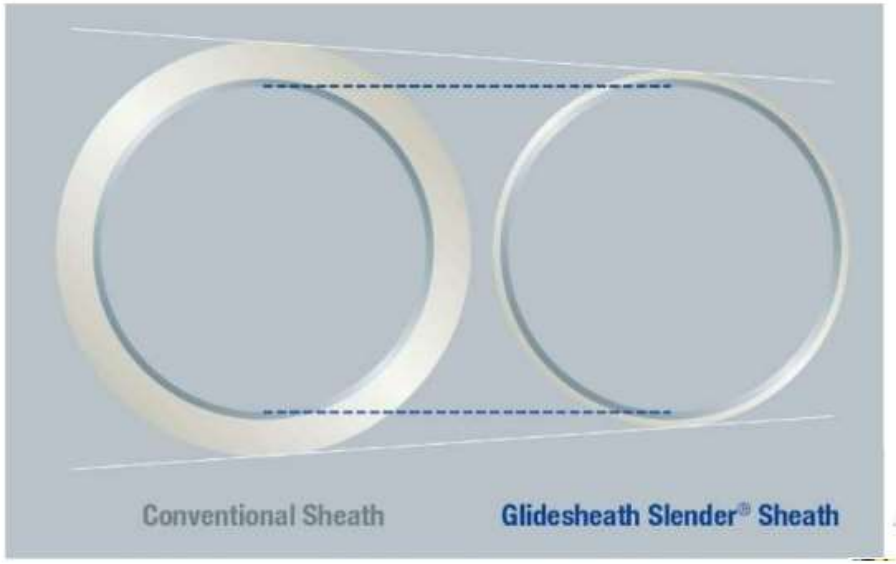
- ID of 7.5 Fr guide
- OD of 6 Fr sheath
- Tapered dilator
- Hydrophilic coated
- Smooth insertion, little spasm
- Tendency to slip
- Expensive

Courtesy Rajiv Gulati

MAJOR ADVANCEMENT OF TRI

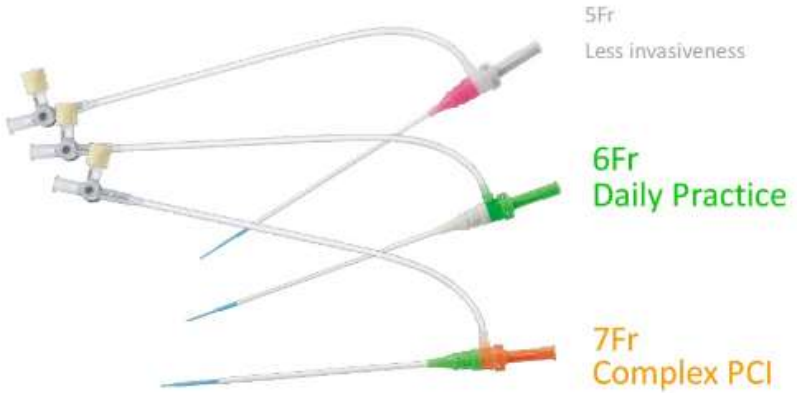
Design Concept

Thinner sheath wall thickness to make outer diameter smaller



Size variation

3 size variation to improve daily TRI practice



USER STYLE
PASSIVE PLACEMENT

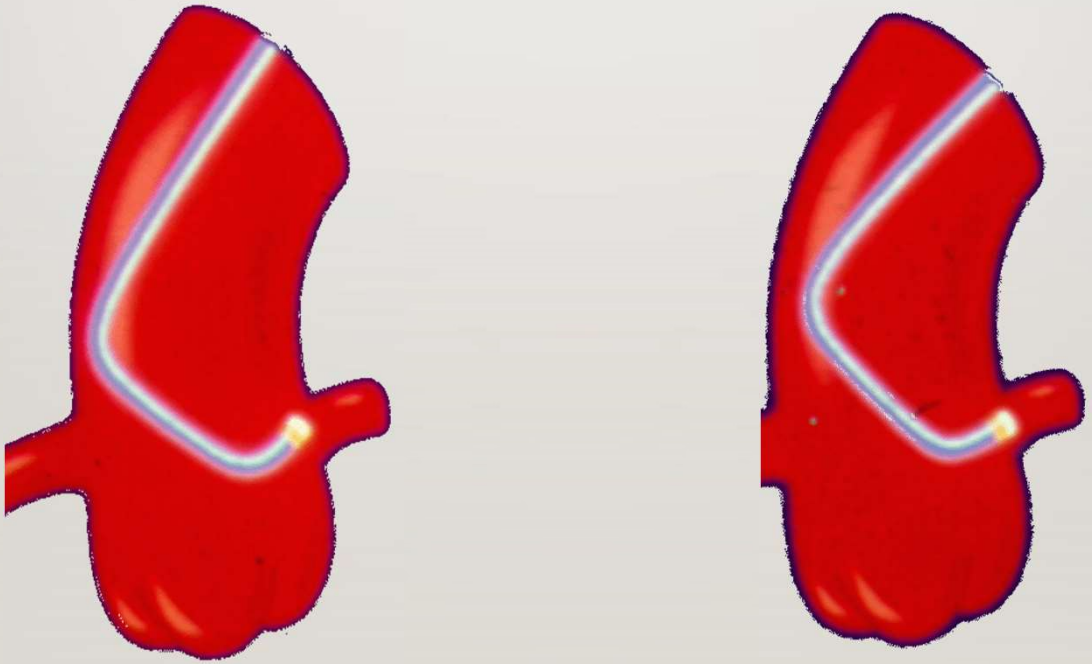
- Support provided by either anatomy or catheter composition/curve shape
- Minimal manipulation of the guide required
- Firm catheter is preferred over a soft catheter
- Uses shaft support/curve configuration to maintain ostial position
- Rarely deep-seat the catheter

USER STYLE
ACTIVE PLACEMENT

- Uses aortic root to form desired curve shape and provide backup support
- Comfortable with manipulation of catheter (active engagement)

- Prefers catheters that are flexible and can reshape in vivo
- Commonly used for deployment of stents or bulky devices

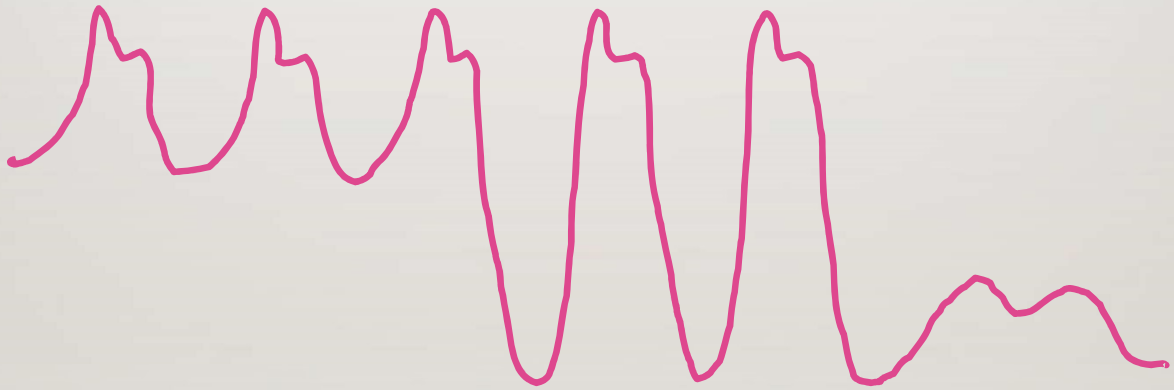
Co-Axial Alignment



Non-Coaxial

Coaxial

ARTERIAL PRESSURE TRACINGS FROM GUIDING CATHETER

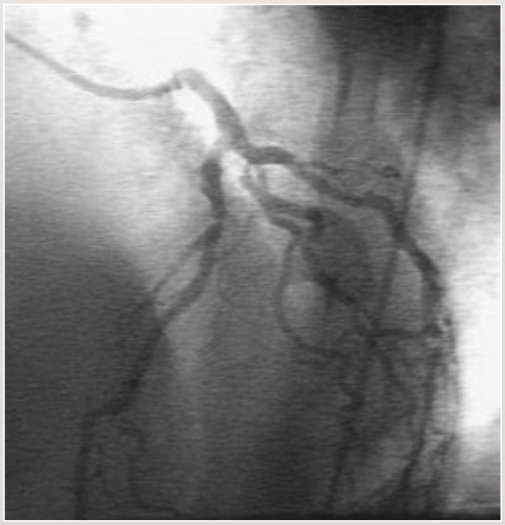


Normal **Ventricularization** **Damped**

Note: Side holes allow perfusion, but don't prevent guiding catheter injury to the ostium

COMMON TAKEOFFS OF LEFT CORONARY ARTERY

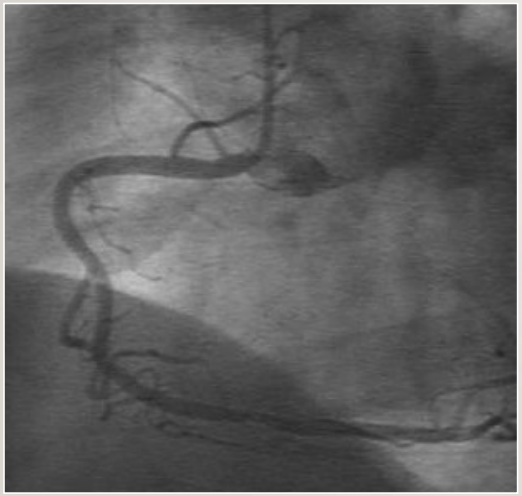
Horizontal



Inferior

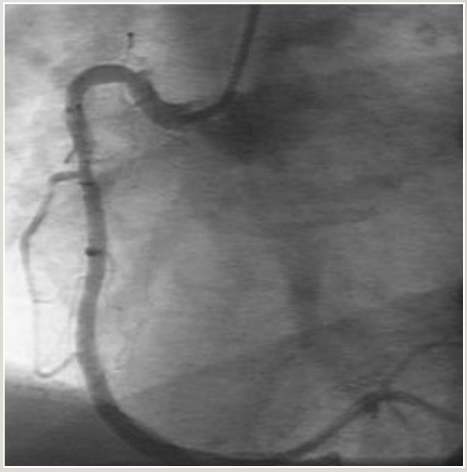
Superior

Common Takeoffs of Right Coronary Artery



Horizontal

Inferior

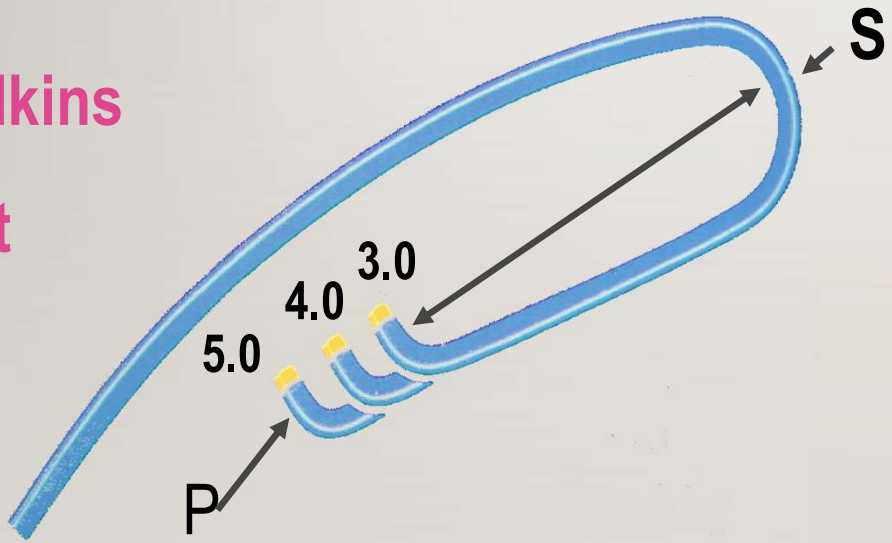


Superior

Curve/Tip Length

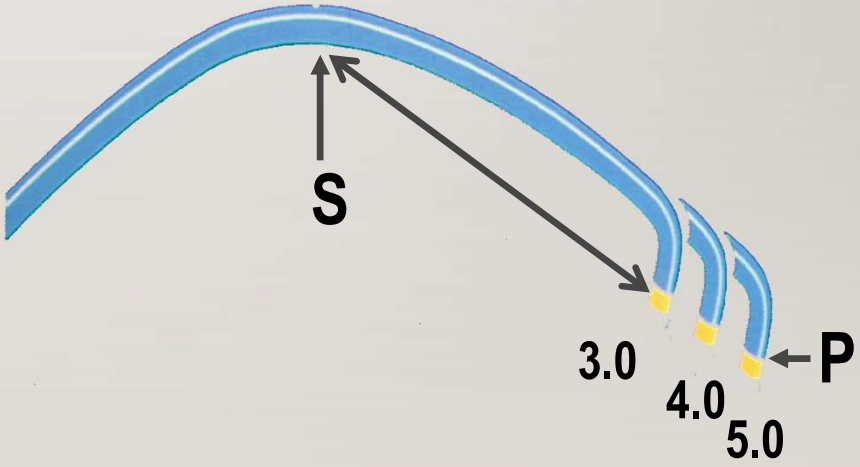
Judkins

Left



Judkins

Right

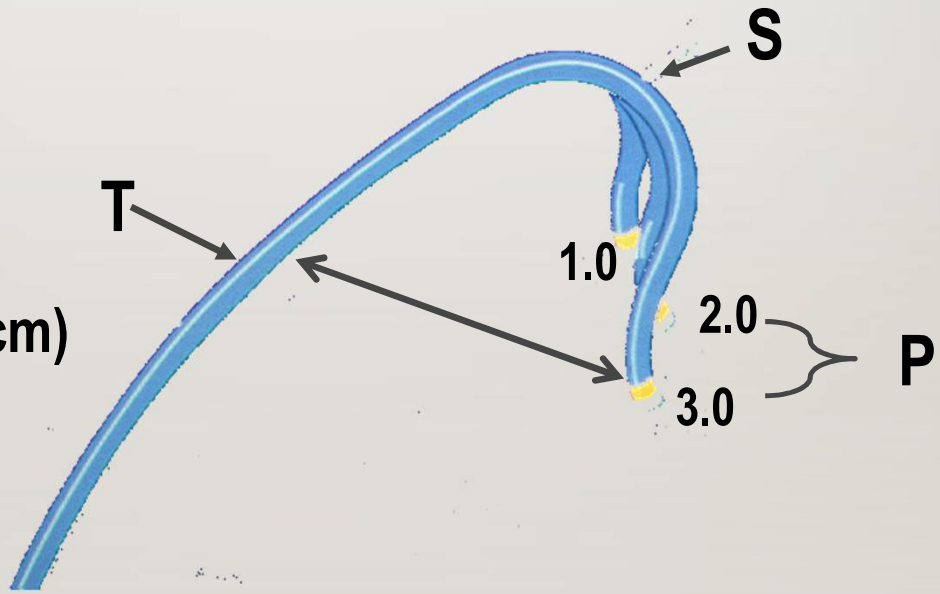


Tip Length = P-S distance (cm)

Curve/Tip Length

Amplatz

Left



Tip Length = P-S distance (cm)

P = Primary Curve

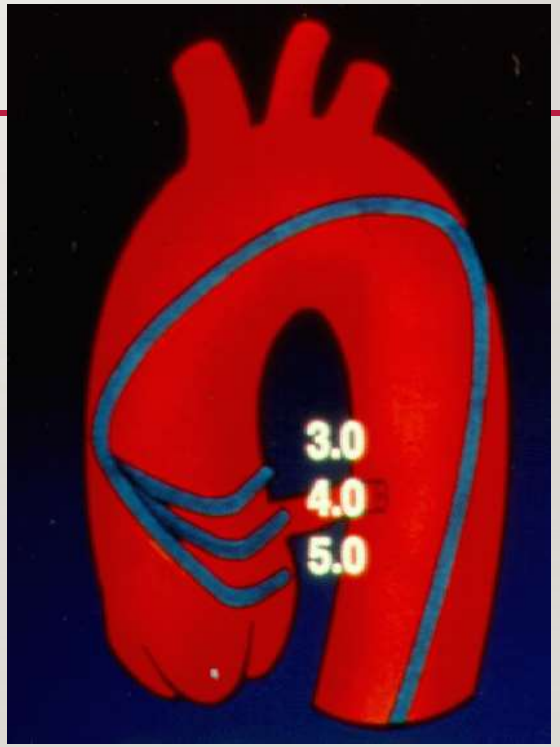
S = Secondary Curve

T = Tertiary Curve

CURVE LENGTH

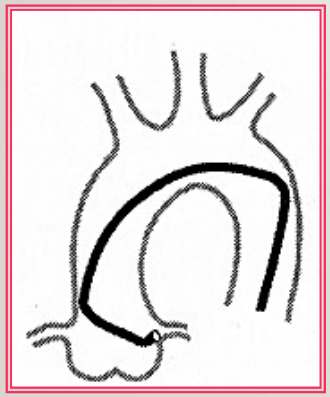
Shorter curve: **may be useful for superior orientation**

Longer curve: **May be useful for inferior orientation**

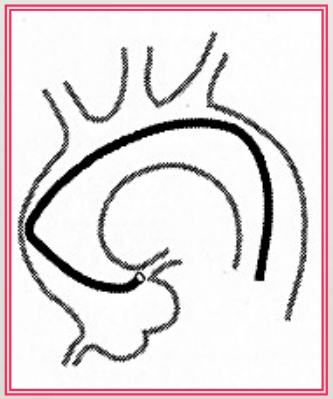


Tip Orientation

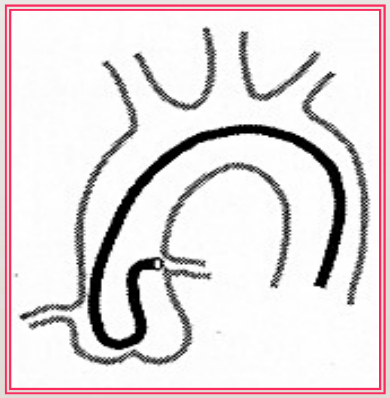
Guiding Catheter Selection - LCA



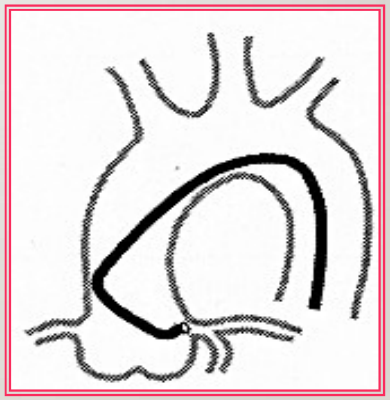
Normal
JL4,EBU3.5



Dilated Root
JL5, EBU4, AL



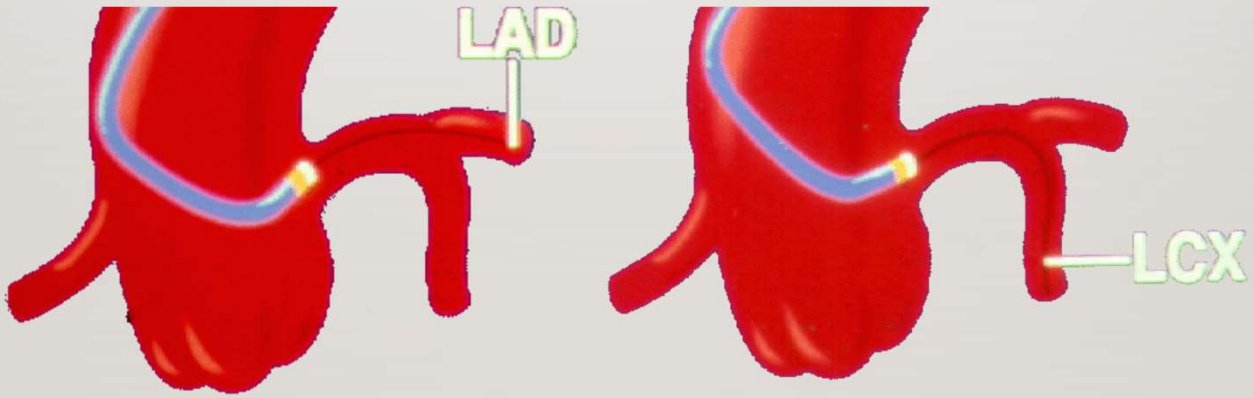
Superior Origin
AL, EBU



Short Left Main
JL4 Short Tip, JL3.5

Tip Rotation-JL Catheters

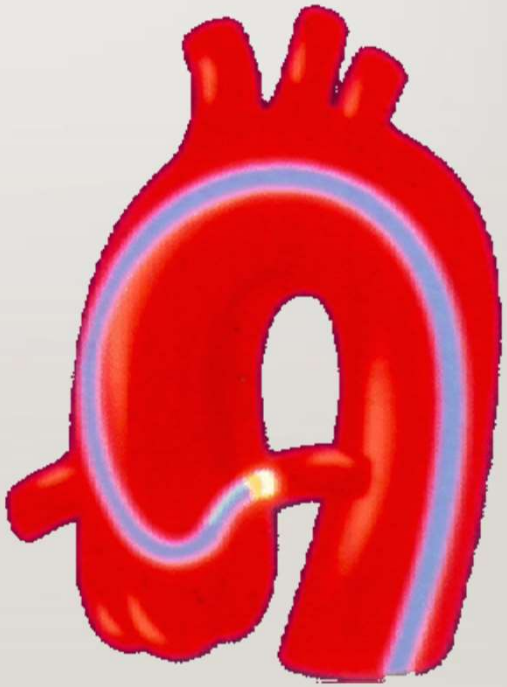
Counter-clockwise to LAD * **Clockwise to LCX ***



*Assumes tip is engaged in left main; clockwise rotation will turn primary curve anteriorly, and the tip will point posteriorly

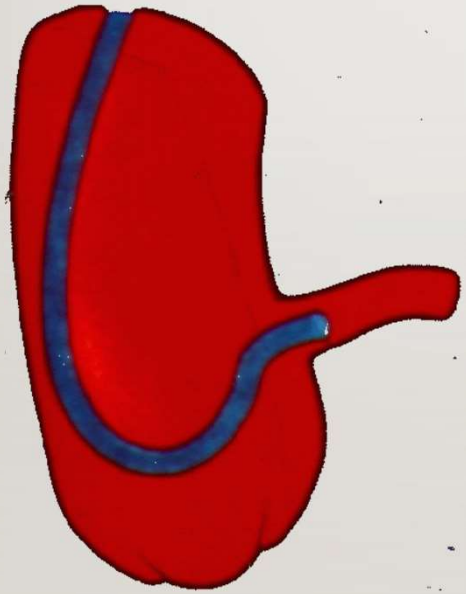
Amplatz Left

Standard

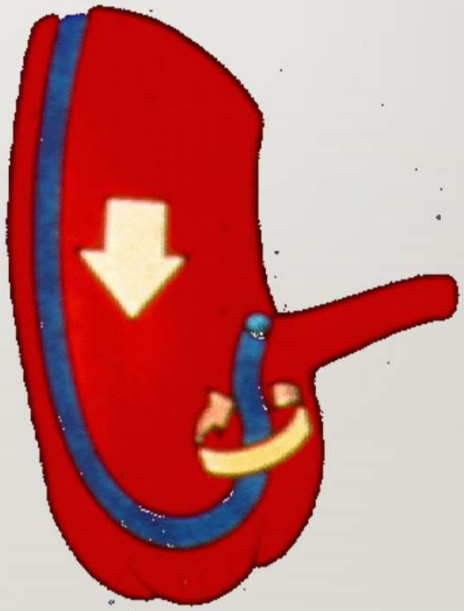


Short-tip

Amplatz Removal

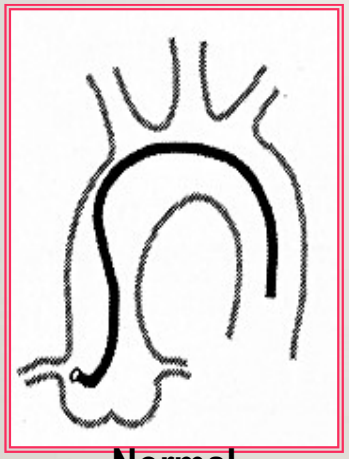


Advance catheter

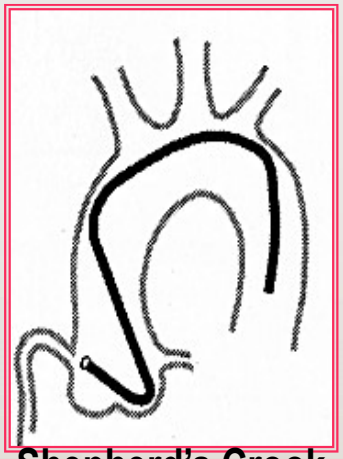


Rotate tip away from ostium

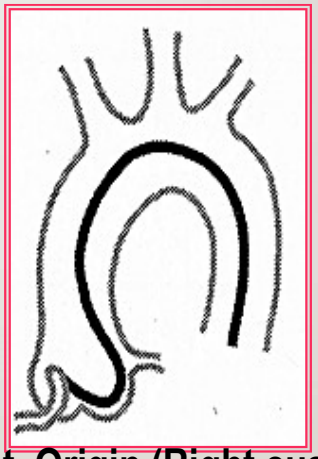
Guiding Catheter Selection: RCA



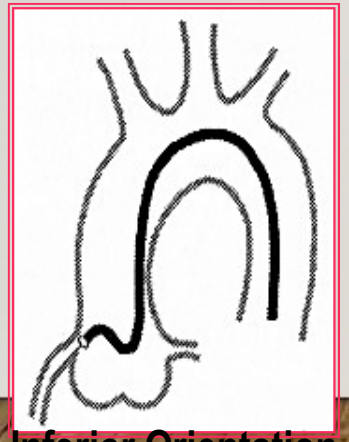
Normal
JR4



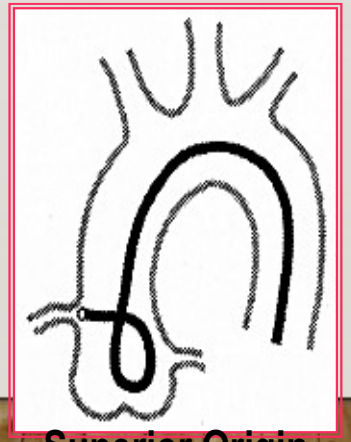
Shepherd's Crook
JR3.5,IMA, HS



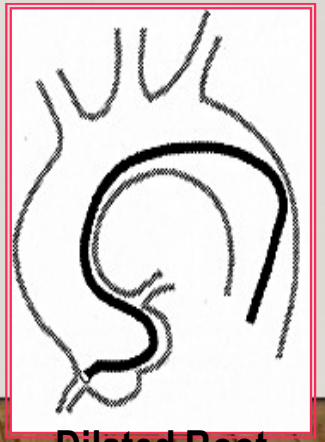
Ant. Origin (Right cusp)
AL



Inferior Orientation
AL, AR



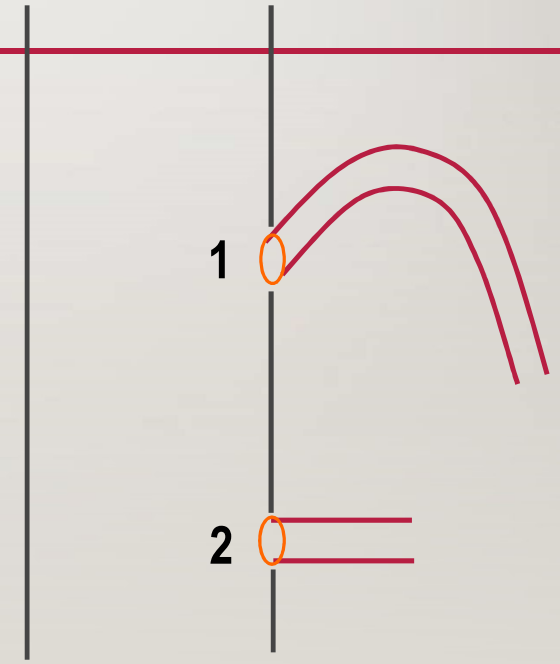
Superior Origin
Multipurpose



Dilated Root
JL5,AL

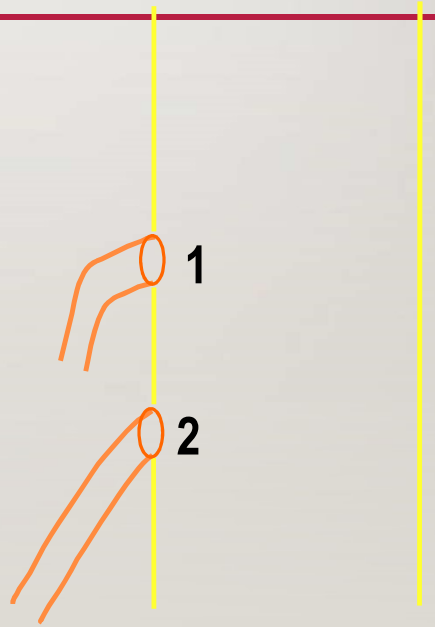
GUIDING CATHETER SELECTION: SVG TO LCA

1. **Superior - HS, LCB, AL,**
2. **Horizontal - JR, MP, AL**



GUIDING CATHETER SELECTION:
SVG TO RCA (OR LPDA)

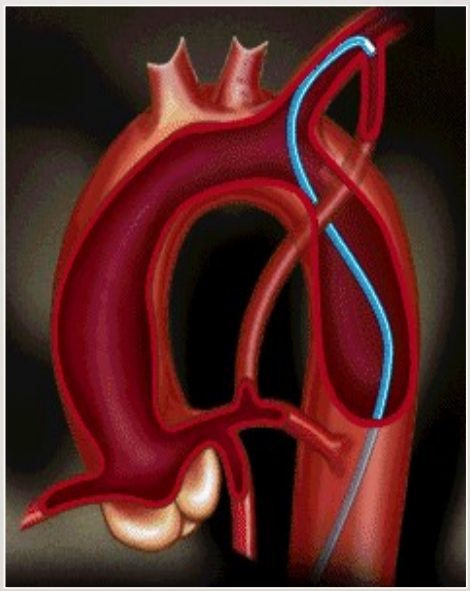
1. **Horizontal - JR4, RCB, AL, MP**
2. **Inferior - MP, AL**



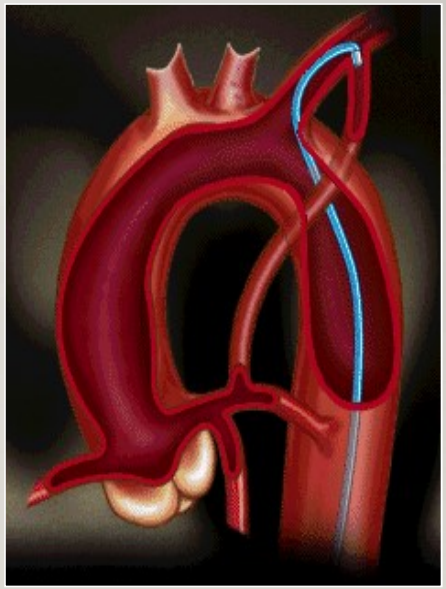
GUIDING CATHETER SELECTION: IMA

- **IMA catheter: standard**
- **JR: sometimes useful from radial/brachial approach**

*** Don't be "locked-in" to the AP projection**
Shallow RAO, LAO views are very useful in "tough cases"



LCB



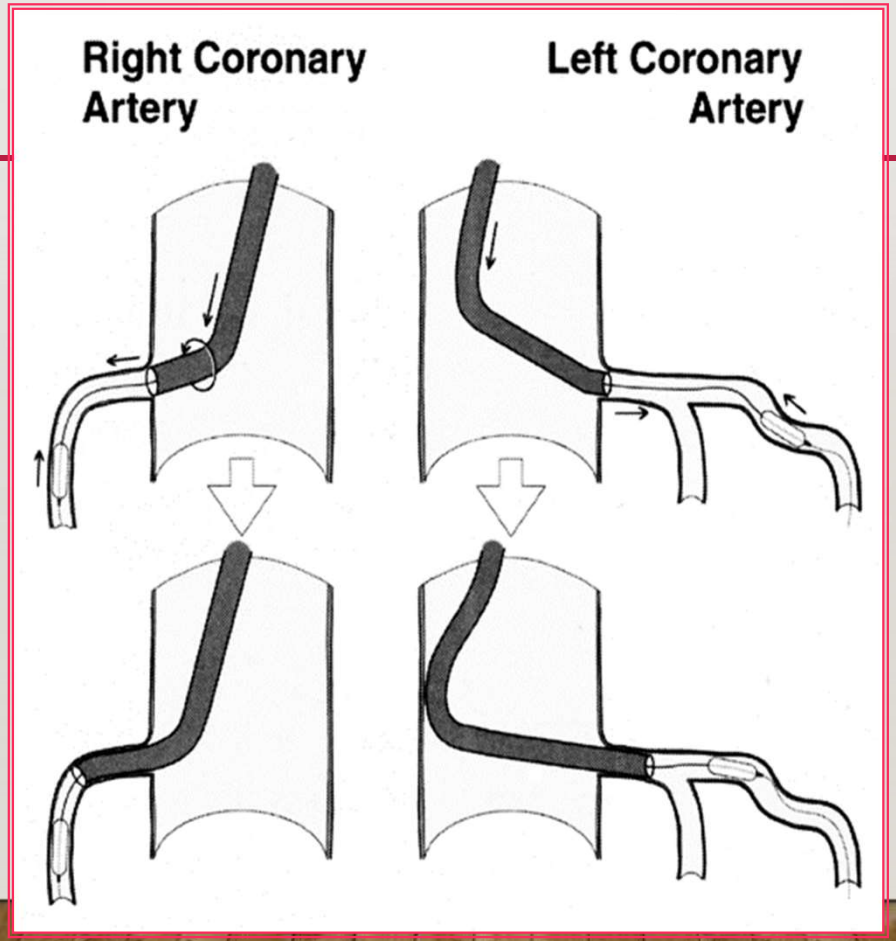
IMA

Back-Up Support

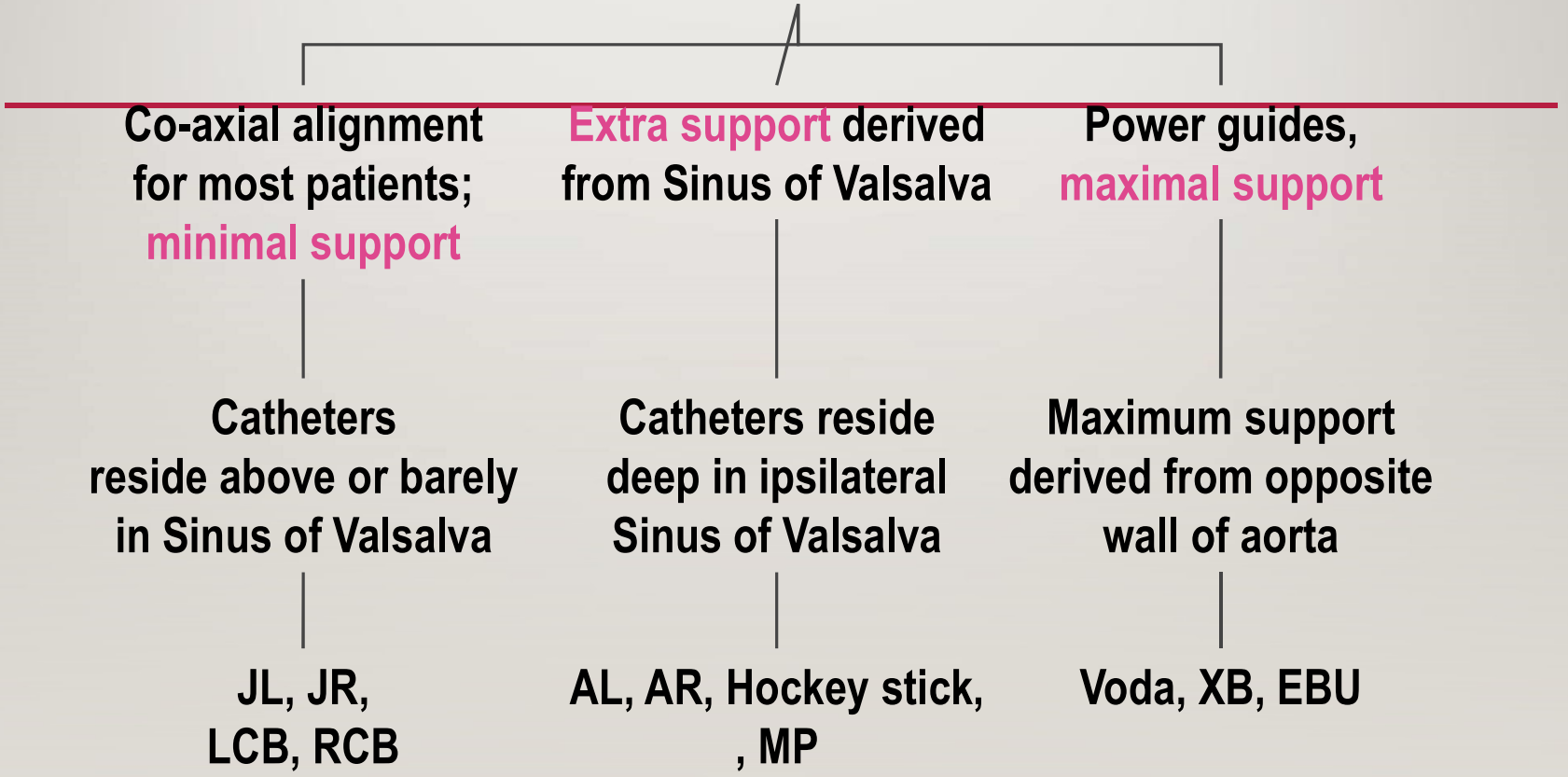
The ability of the guiding catheter to remain in position and provide a stable platform for the advancement of interventional equipment

- **Passive Support: Relies on properties of the shaft and tip to maintain position in the ostium**
- **Active Support: Relies on active manipulation of guiding catheter to gain support, by rotating the catheter and/or actively advancing the catheter (deep-seating maneuver)**

DEEP-SEATING MANEUVER

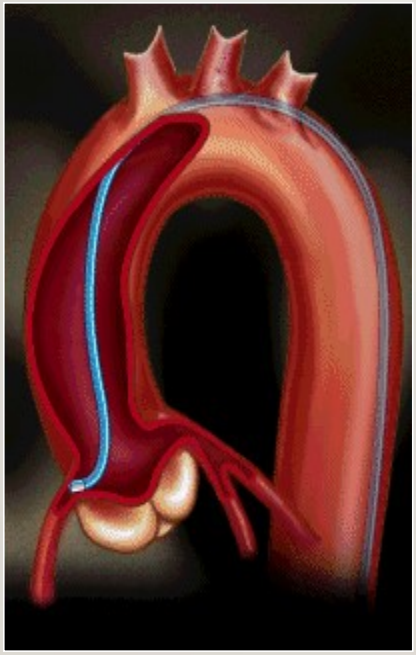


GUIDING CATHETER SELECTION AND SUPPORT



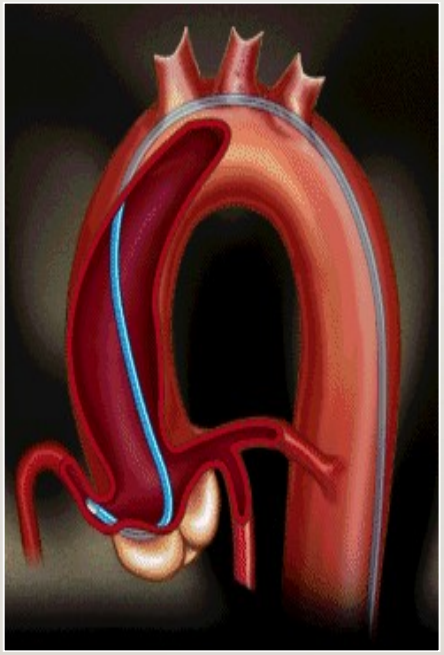
Guiding Catheter Support

JR4



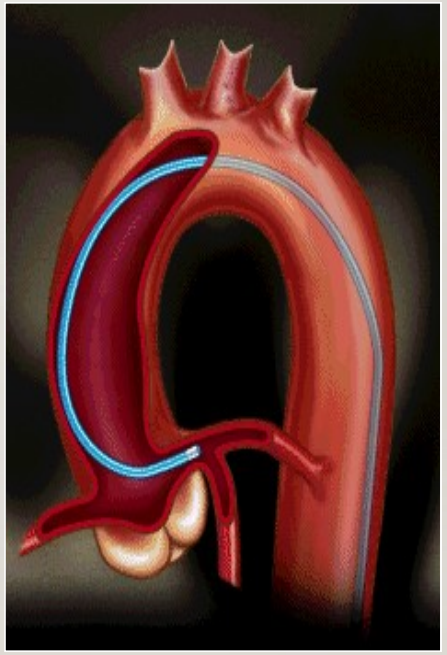
Simple coaxial alignment, without support

Hockey Stick



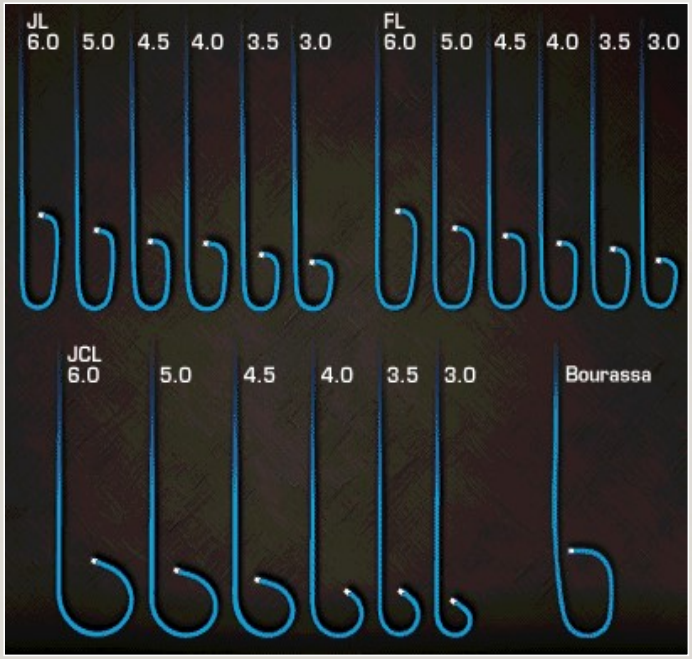
Coaxial alignment, with extra support from Sinus of Valsalva

EBU

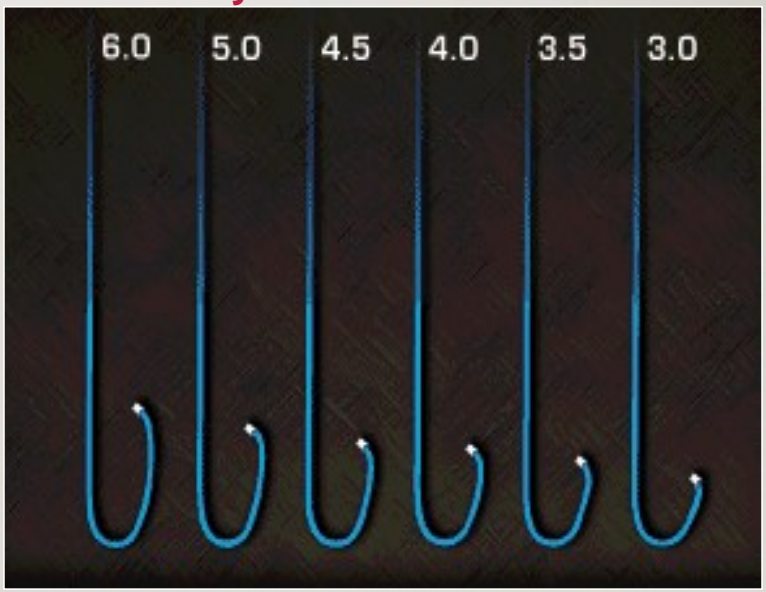


Coaxial alignment, with power support from opposite wall of aorta

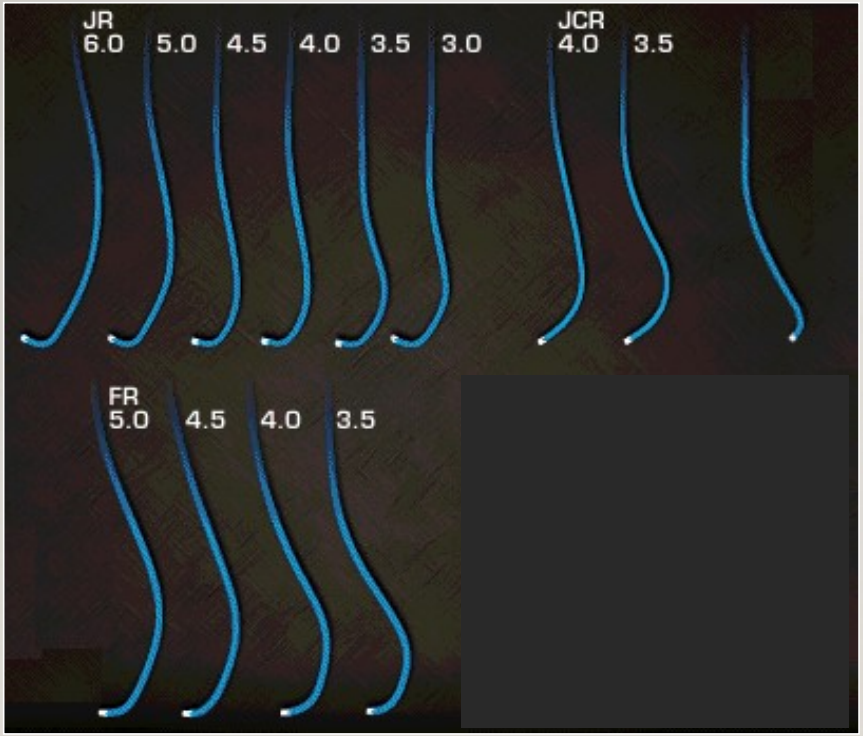
Left Coronary Curves



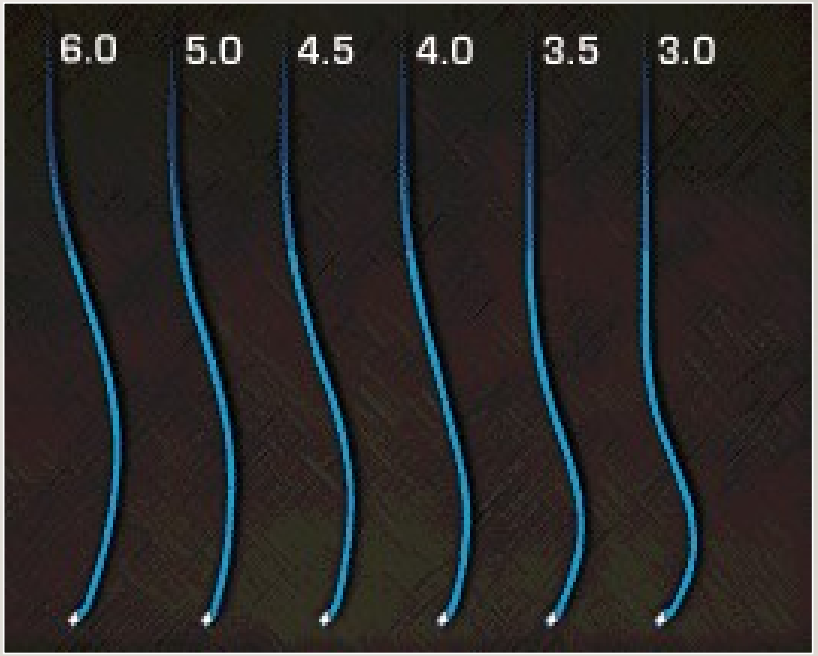
SHORT TIP JL



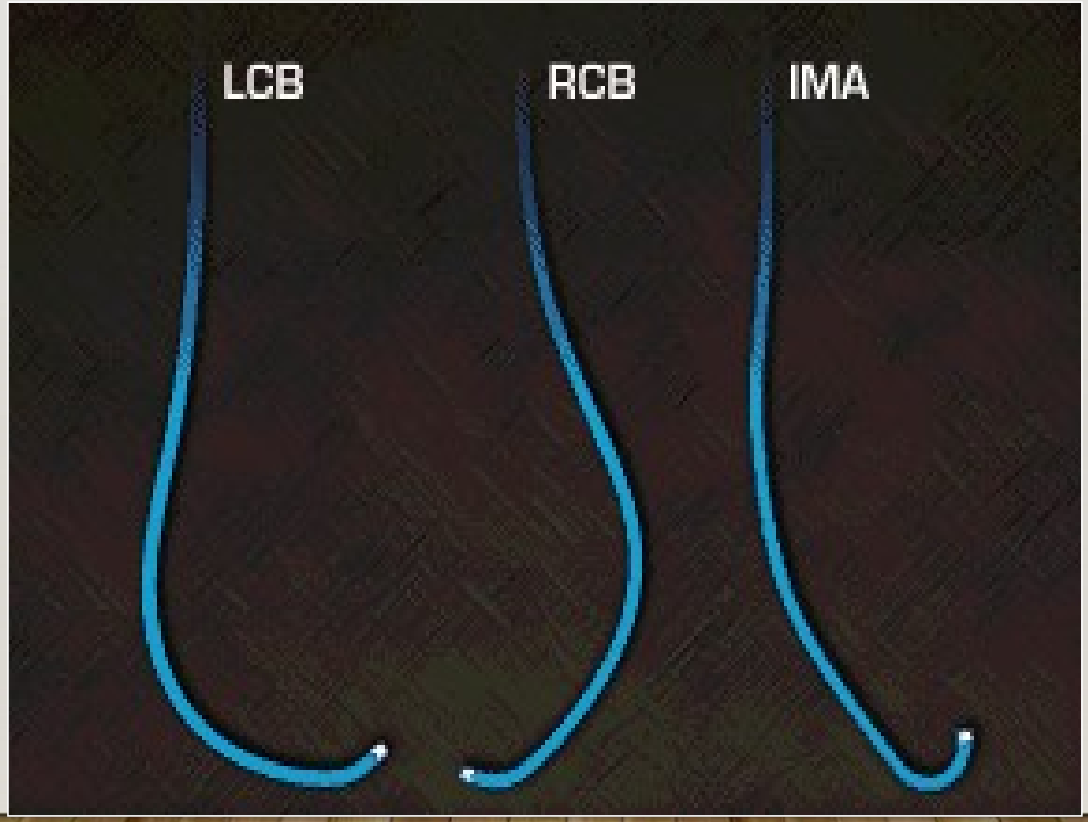
Right Coronary Curves



Short Tip JR



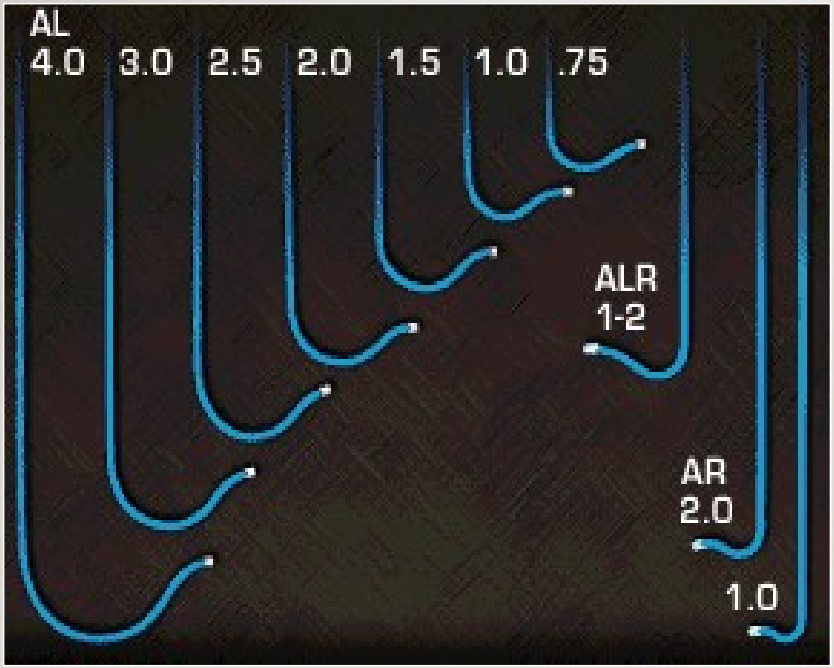
Bypass Graft Curves



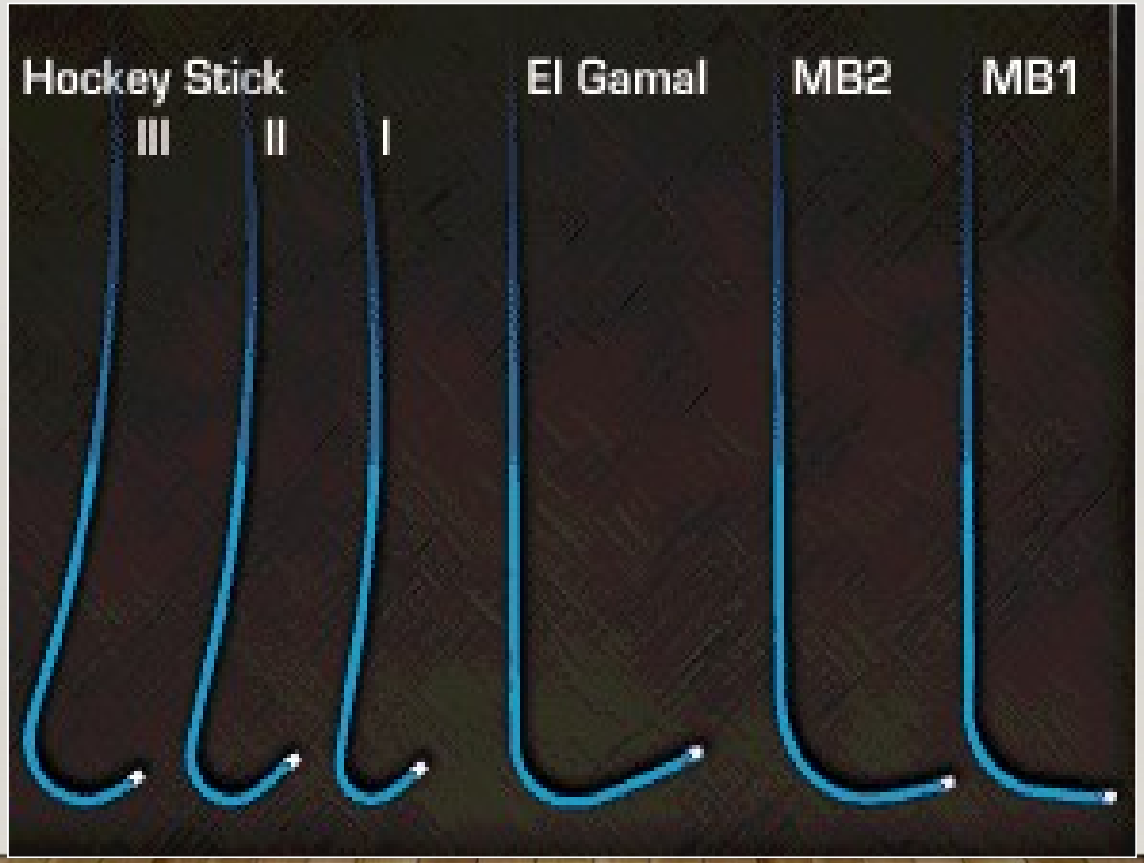
EXTRA-SUPPORT GUIDING CATHETERS:

Support from the Ipsilateral Sinus of Valsalva

Amplatz Coronary Curves



Multipurpose Curves



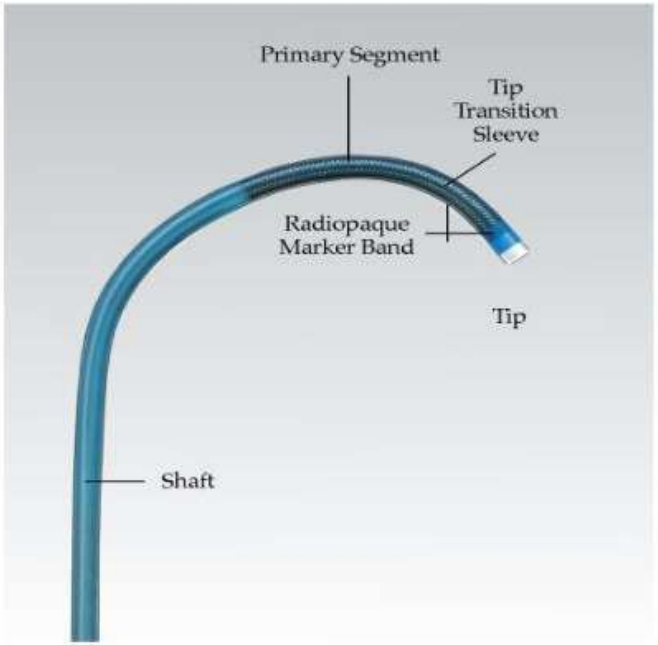
POWER GUIDES:

Maximum Support from Opposite Wall of Aorta

EBU (Extra Back Up) Curves

M.A.C.
Multi-Aortic Curve

For left and right coronaries, femoral or radial approach

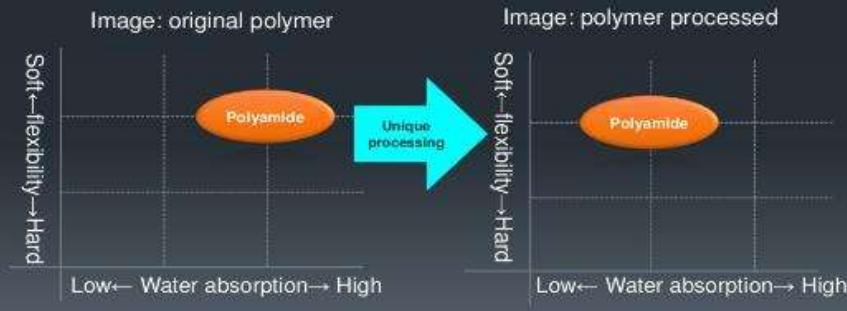


MAC3.0 and MAC3.5
Primarily used in the right coronary arteries and small aortic roots.

MAC4.0 and MAC4.5
Can be used in both left and right coronary system.

Backup Support - Hyper shaft

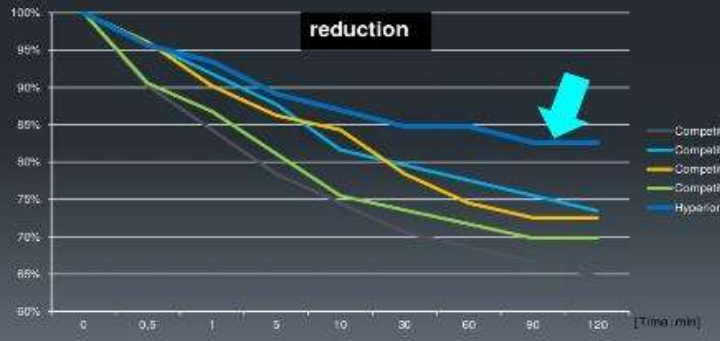
Focusing on flexibility of the tip, soft resin material is applied in Hyperion. While resin normally gets deformed due to heat, ASAHI's unique technology enables the catheter to have flexibility, back up support, and anti-heat deformation.



Backup Support ~anti- heat deformation~

Test Method:

The curve is extended in warm water to a shape as if it is engaged, and the catheter tip is fixed onto the axis of the force gauge. The back-up support is evaluated by measuring the change of force in certain time intervals (0-120 mins)

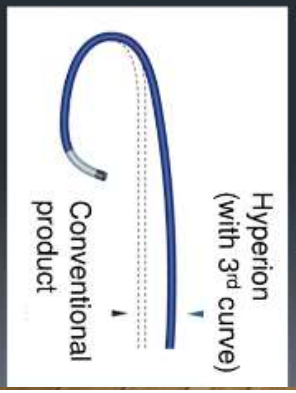


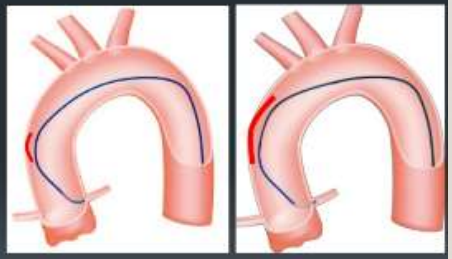
Backup Support ~2nd curve~

2nd curve with high rigidity provides good retention of the curve.

Backup Support ~3rd curve~

Unique curve proximal to 2nd curve provides stable backup support by increasing the area of the catheter in contact with the aorta wall.





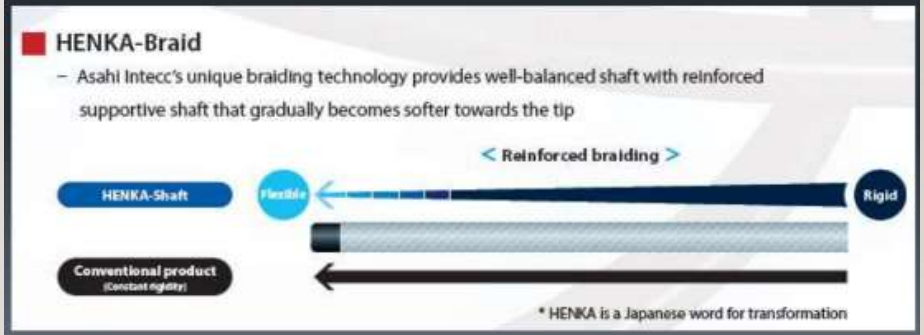
Conventional product

Hyperion
JL/AL shape

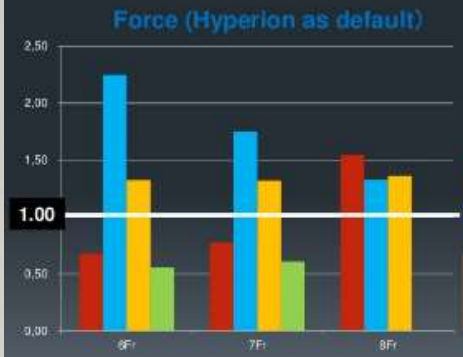
Maneuverability –HENKA-Braid

Unlike conventional guiding catheters, Hyperion's shaft is braided differently at the proximal and the distal area.

⇒ - enables transmission of the push force
- prevents backing out of the catheter



1st Curve Flexibility



Hyperion realizes good balance with optimal rigidity at the proximal shaft and flexibility at the distal

Flexible Tip -Material

Soft material & tungsten powder – same as that of the ASAHI Corsair

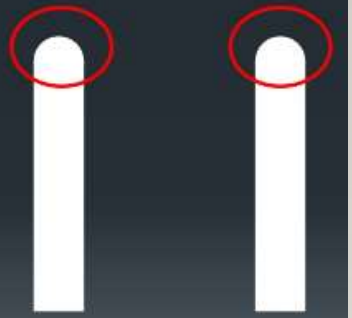
Facilitates safe engagement and precise positioning due to its flexibility and visibility.

All Round Processed Tip

All Round Processed Tip

Without sharp edges on the tip, the Hyperion can be maneuvered safely.

Round processed tip of the conventional products

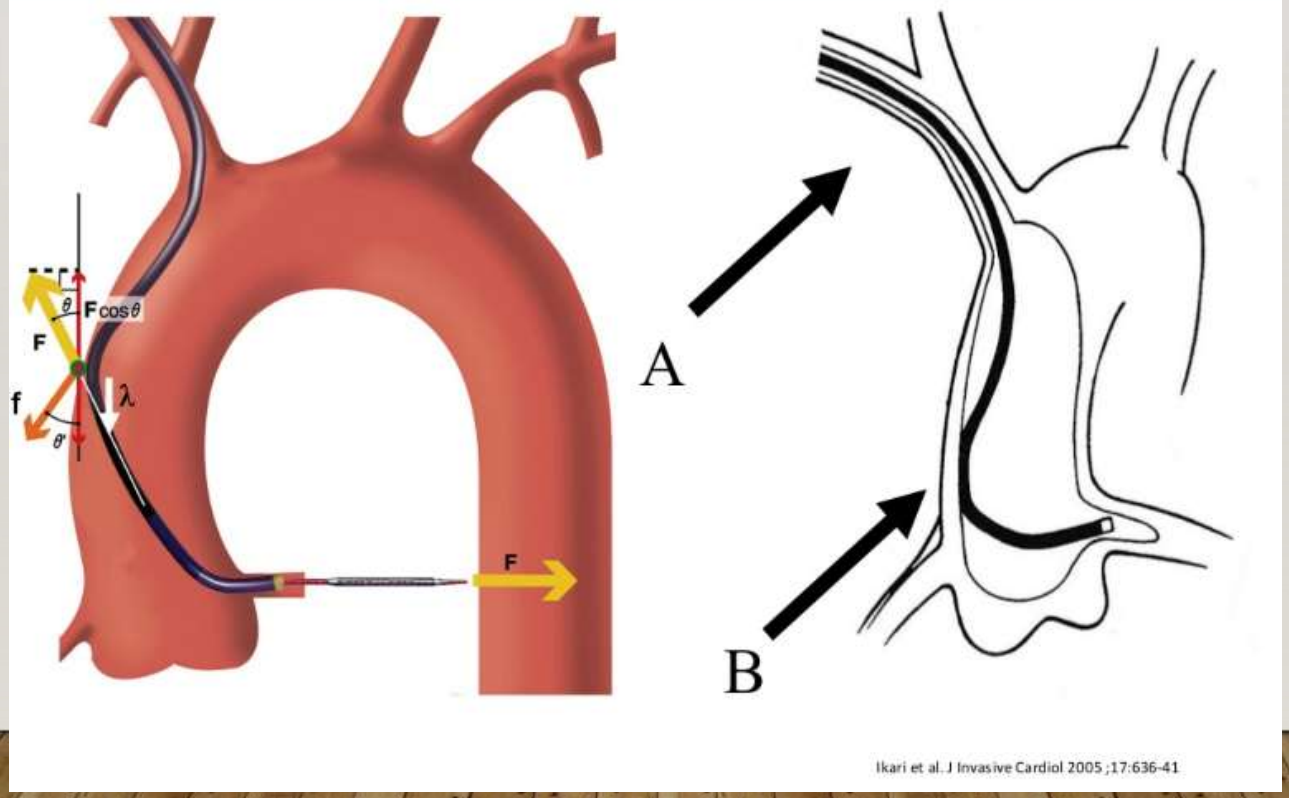


All round processed Tip of Hyperion

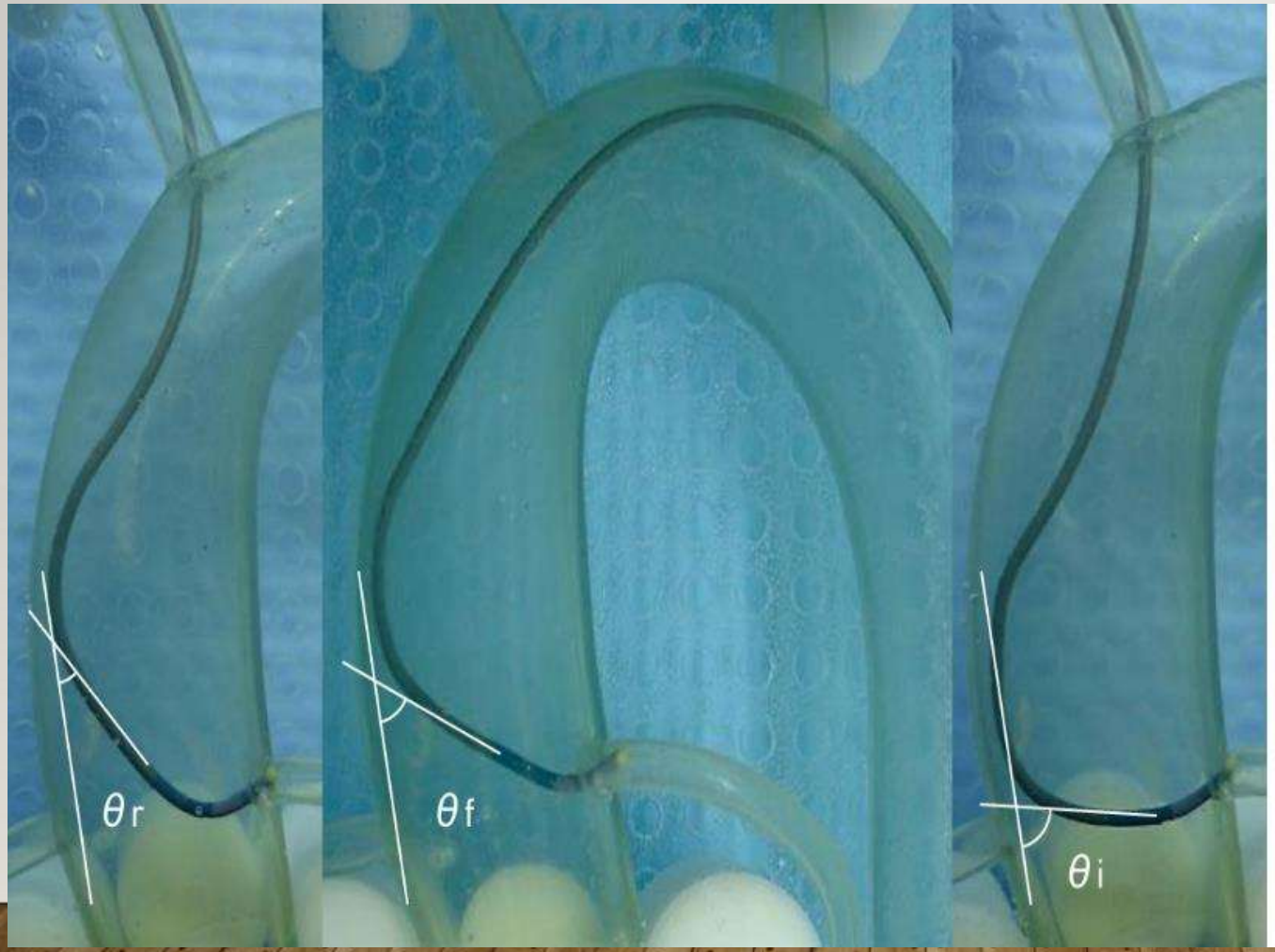
Shape Type	Shape Code	Usable Length	Catalog No. 6Fr	Catalog No. 7Fr	Catalog No. 8Fr
Judkins Left 	JL3.5	100cm	HJ60JL350P10000	HJ70JL350P10000	—
	JL3.5 ST	100cm	HJ60JL350P10001	HJ70JL350P10001	—
	JL3.5 SH	100cm	HJ60JL352P10000	HJ70JL352P10000	HJ80JL352P10000
	JL3.5 STSH	100cm	HJ60JL352P10001*	HJ70JL352P10001	HJ80JL352P10001
	JL4.0	100cm	HJ60JL400P10000	HJ70JL400P10000	—
	JL4.0 ST	100cm	HJ60JL400P10001	HJ70JL400P10001	—
	JL4.0 SH	100cm	HJ60JL402P10000	HJ70JL402P10000	HJ80JL402P10000
	JL4.0 STSH	100cm	HJ60JL402P10001*	HJ70JL402P10001	HJ80JL402P10001
Judkins Right 	JR3.5	100cm	HJ60JR350P10000	HJ70JR350P10000	—
	JR3.5 SH	100cm	HJ60JR352P10000	HJ70JR352P10000	HJ80JR352P10000
	JR4.0	100cm	HJ60JR400P10000	HJ70JR400P10000	—
	JR4.0 SH	100cm	HJ60JR402P10000	HJ70JR402P10000	HJ80JR402P10000
Amplatz Left 	AL0.75	100cm	HJ60AL070P10000	HJ70AL070P10000	—
	AL0.75 SH	100cm	HJ60AL072P10000	HJ70AL072P10000	HJ80AL072P10000
	AL1.0	100cm	HJ60AL100P10000	HJ70AL100P10000	—
	AL1.0 SH	100cm	HJ60AL102P10000	HJ70AL102P10000	HJ80AL102P10000
	AL1.5	100cm	HJ60AL150P10000	HJ70AL150P10000	—
	AL1.5 SH	100cm	HJ60AL152P10000	HJ70AL152P10000	HJ80AL152P10000
Short Amplatz Left 	SAL0.75	100cm	HJ60AL070P10002*	HJ70AL070P10002*	—
	SAL0.75 SH	100cm	HJ60AL072P10002*	HJ70AL072P10002*	HJ80AL072P10002*
	SAL1.0	100cm	HJ60AL100P10002	HJ70AL100P10002	—
	SAL1.0 SH	100cm	HJ60AL102P10002	HJ70AL102P10002	HJ80AL102P10002
	SAL1.5	100cm	HJ60AL150P10002	HJ70AL150P10002	—
	SAL1.5 SH	100cm	HJ60AL152P10002	HJ70AL152P10002	HJ80AL152P10002
Power Backup 	PB3.0	100cm	HJ60PB300P10000	HJ70PB300P10000	—
	PB3.0 SH	100cm	HJ60PB302P10000	HJ70PB302P10000	HJ80PB302P10000
	PB3.5	100cm	HJ60PB350P10000	HJ70PB350P10000	—
	PB3.5 SH	100cm	HJ60PB352P10000	HJ70PB352P10000	HJ80PB352P10000
	PB4.0	100cm	HJ60PB400P10000*	HJ70PB400P10000	—
	PB4.0 SH	100cm	HJ60PB402P10000*	HJ70PB402P10000	HJ80PB402P10000
Super Power Backup 	SPB3.0	100cm	HJ60SP300P10000	HJ70SP300P10000	—
	SPB3.0 SH	100cm	HJ60SP302P10000	HJ70SP302P10000	HJ80SP302P10000
	SPB3.5	100cm	HJ60SP350P10000	HJ70SP350P10000	—
	SPB3.5 SH	100cm	HJ60SP352P10000	HJ70SP352P10000	HJ80SP352P10000
	SPB3.75	100cm	HJ60SP370P10000	HJ70SP370P10000	—
	SPB3.75 SH	100cm	HJ60SP372P10000	HJ70SP372P10000	HJ80SP372P10000
	SPB4.0	100cm	HJ60SP400P10000	HJ70SP400P10000	—
	SPB4.0 SH	100cm	HJ60SP402P10000	HJ70SP402P10000	HJ80SP402P10000
Special Curve 	SC3.5	100cm	HJ60SC350P10000*	HJ70SC350P10000*	—
	SC3.5 SH	100cm	HJ60SC352P10000*	HJ70SC352P10000*	HJ80SC352P10000*
RCA Backup 	RB0.75	100cm	HJ60RB070P10000*	HJ70RB070P10000*	—
	RB0.75 SH	100cm	HJ60RB072P10000*	HJ70RB072P10000*	HJ80RB072P10000*
	RB1.0	100cm	HJ60RB100P10000*	HJ70RB100P10000*	—
	RB1.0 SH	100cm	HJ60RB102P10000*	HJ70RB102P10000*	HJ80RB102P10000*

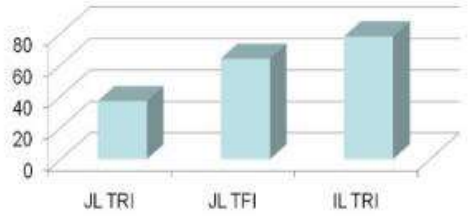
TRANS RADIAL INTERVENTION

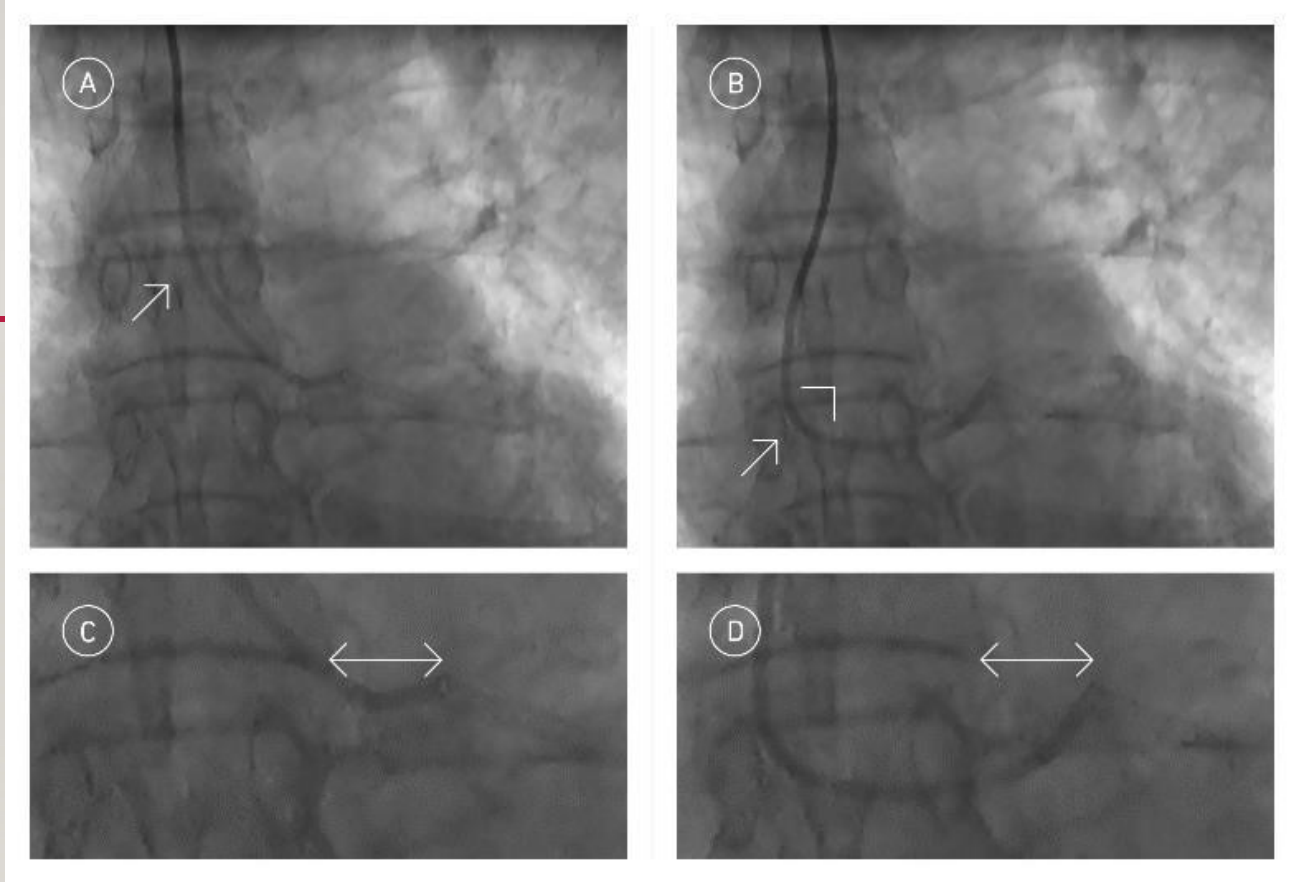
Ikari Guide Catheters



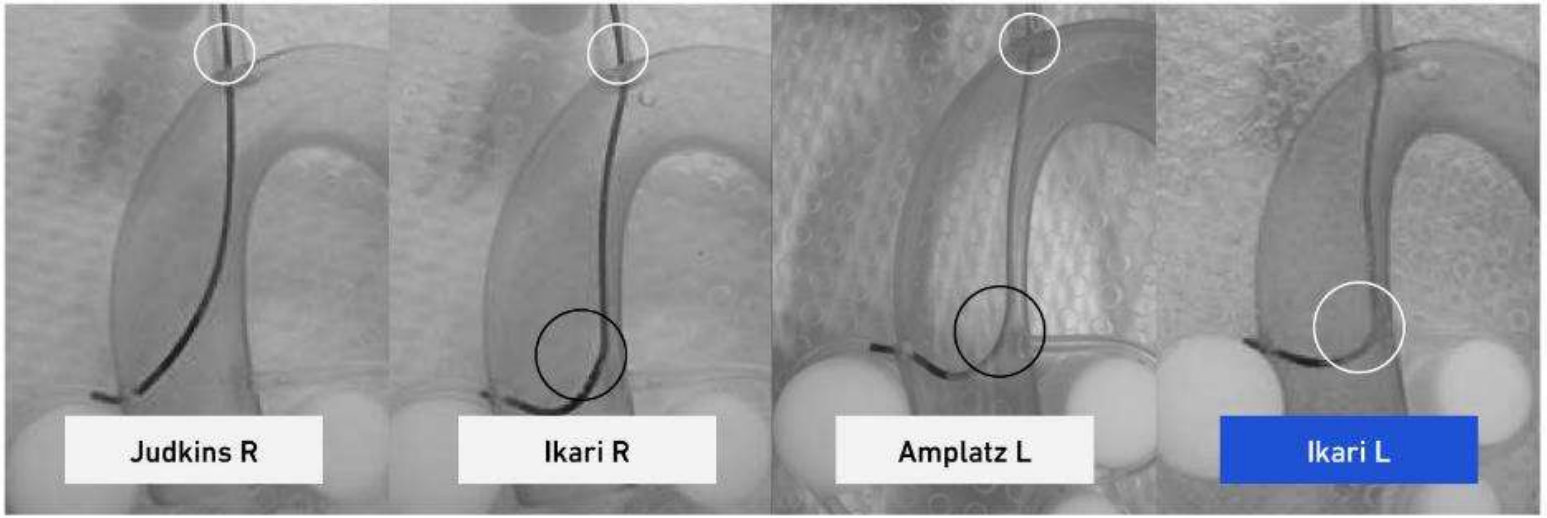
Ikari et al. J Invasive Cardiol 2005 ;17:636-41

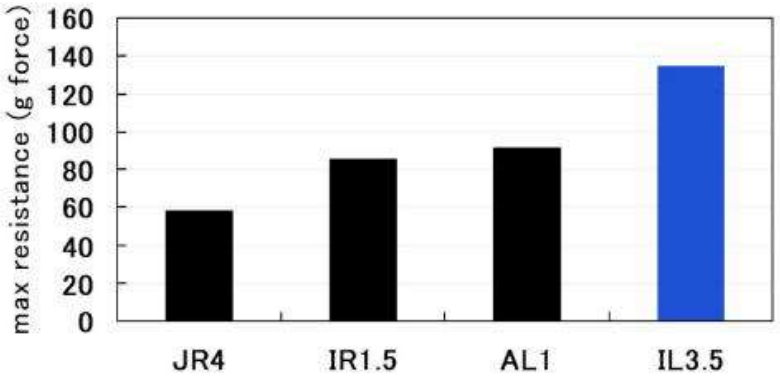

θr
θf
θi

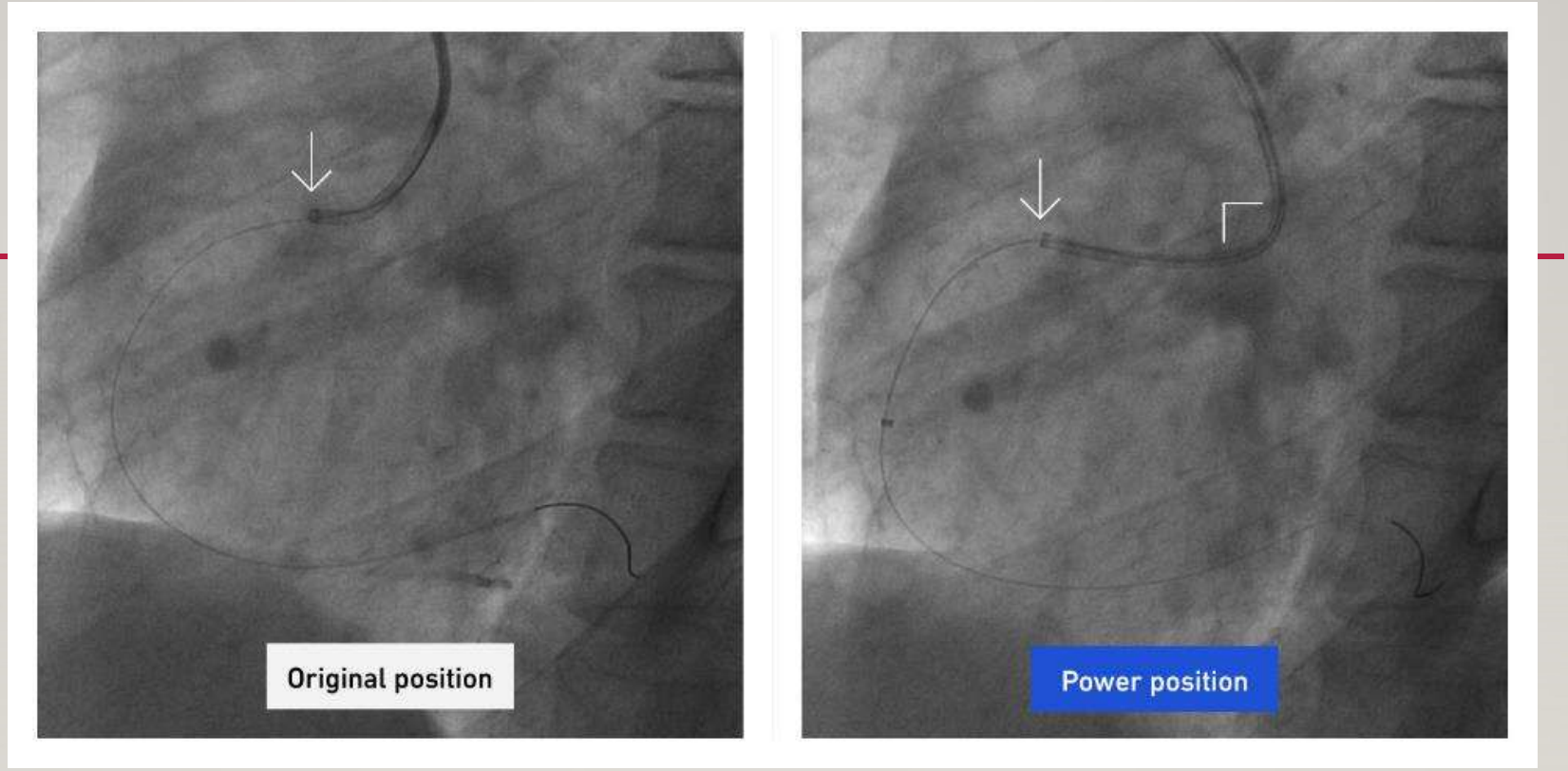

80
60
40
20
0
JL TRI
JL TFI
IL TRI



Original position (A, C) and Power position (B, D)
The angle between the catheter and the reverse side of the aorta is small in A but big as 90 degree in B.
Thus, backup force is strong in power position. The distal tip of the catheter is not inserted deeply (D)

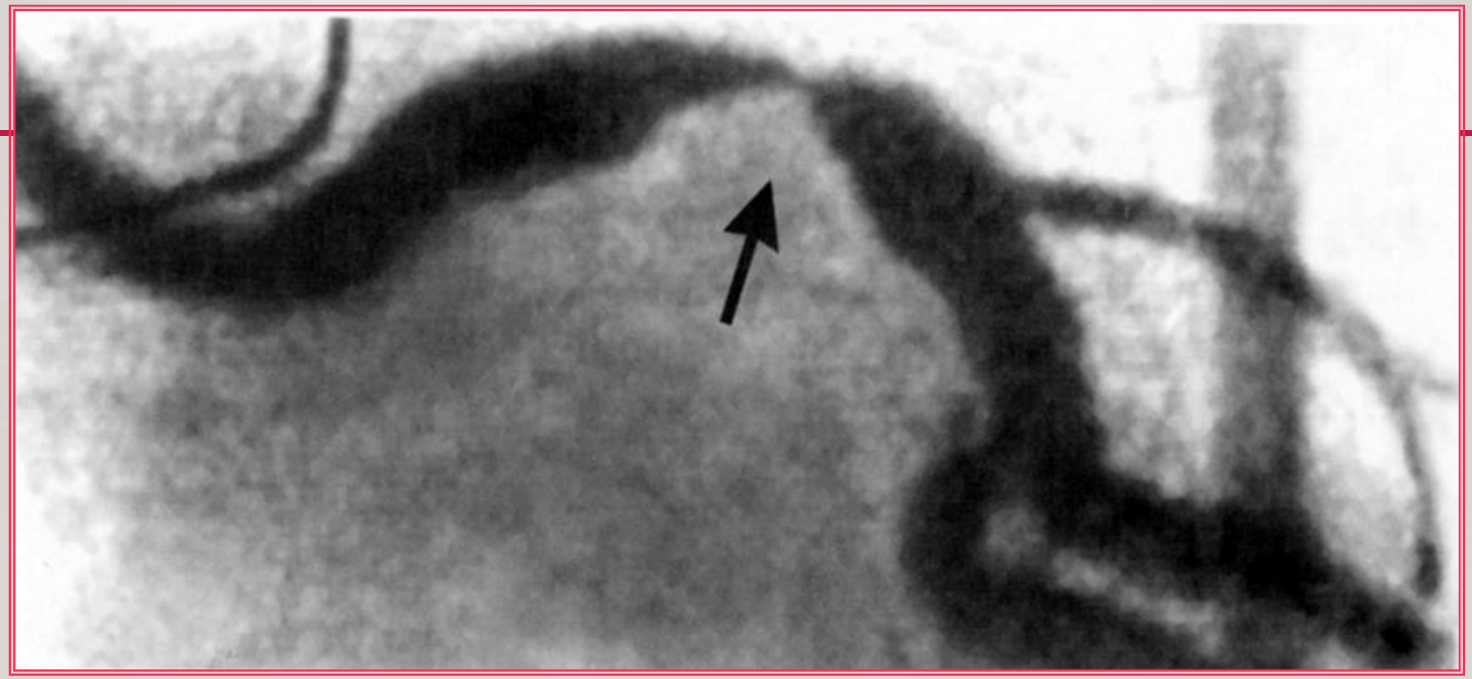

Judkins R
Ikari R
Amplatz L
Ikari L


max resistance (g force)
160
140
120
100
80
60
40
20
0
JR4
IR1.5
AL1
IL3.5



Power position is easily formed by pushing the Ikari L catheter. In the power position, the catheter attaches on the reverse side of the aorta firmly and can generate great backup force. Furthermore, the catheter does not touch aortic valve. It never complicates aortic regurgitation

LEFT MAIN STENOSIS



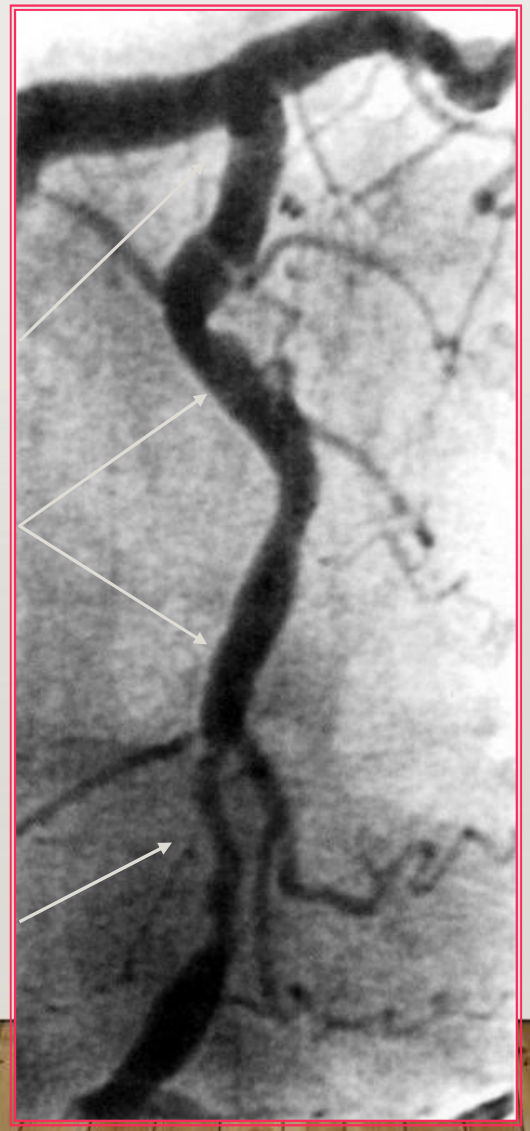
- **ISSUES: Co-axial alignment, Power guide not necessary**
- **GUIDE: JL4**

LCx: Right Angle Takeoff

Right angle takeoff

Significant tortuosity

Distal target lesion



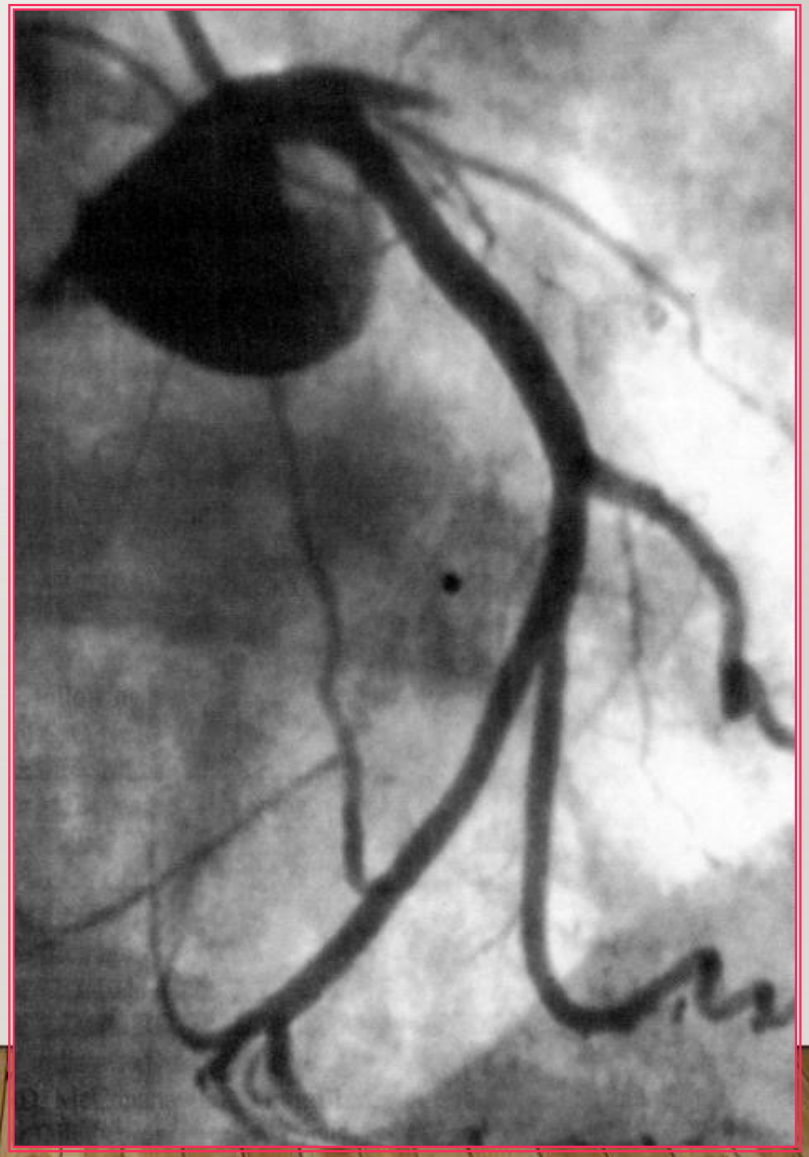
ISSUES: Co-axial alignment and extra support

GUIDE: EBU, XB, AL

LAD: Total Occlusion

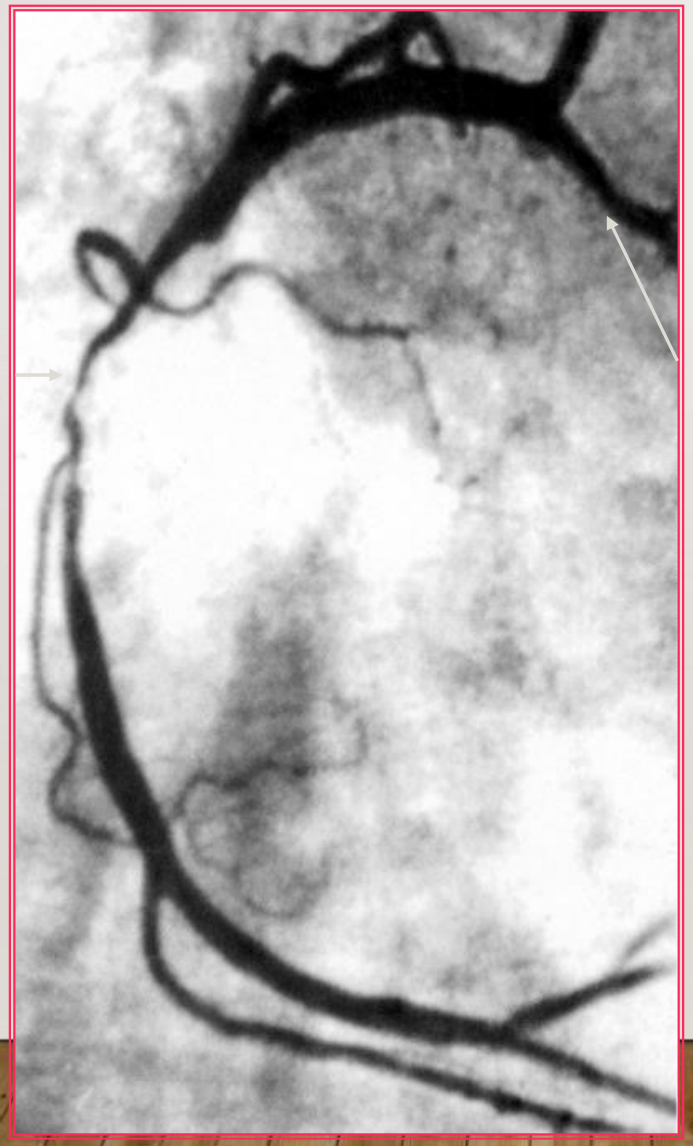
ISSUES: Co-axial alignment
Extra support may be needed

GUIDE: EBU3.5



RCA: Horizontal Takeoff

Simple lesion



ISSUES: Co-axial alignment
JR4 may point inferiorly
Extra support not necessary

GUIDE: JR4 ST
JR 3.5
AR 1

RCA: Horizontal Takeoff

Very tortuous vessel

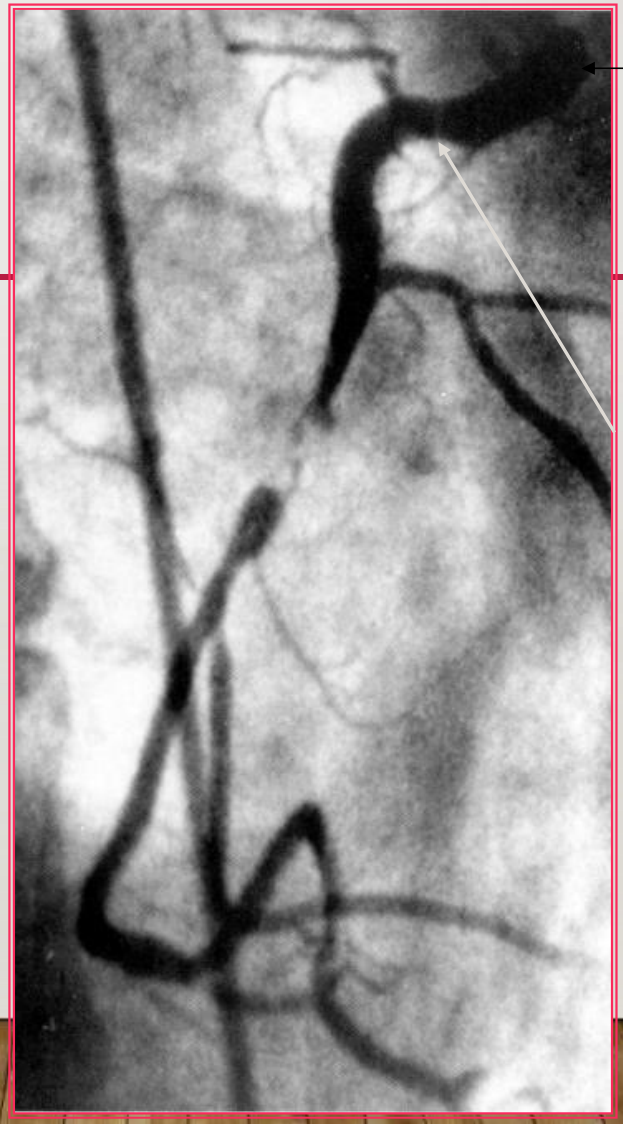
ISSUES:
Co-axial alignment; Extra- or power-support because of tortuosity

GUIDE: AR, HS, AL, MAC

RCA: High-Anterior Origin

ISSUES: Co-axial alignment
Anomalous origin is challenging for JR4

GUIDE: AL
Hockey stick
Multipurpose



Ostial RCA: Inferior Takeoff

ISSUES: Co-axial alignment is crucial

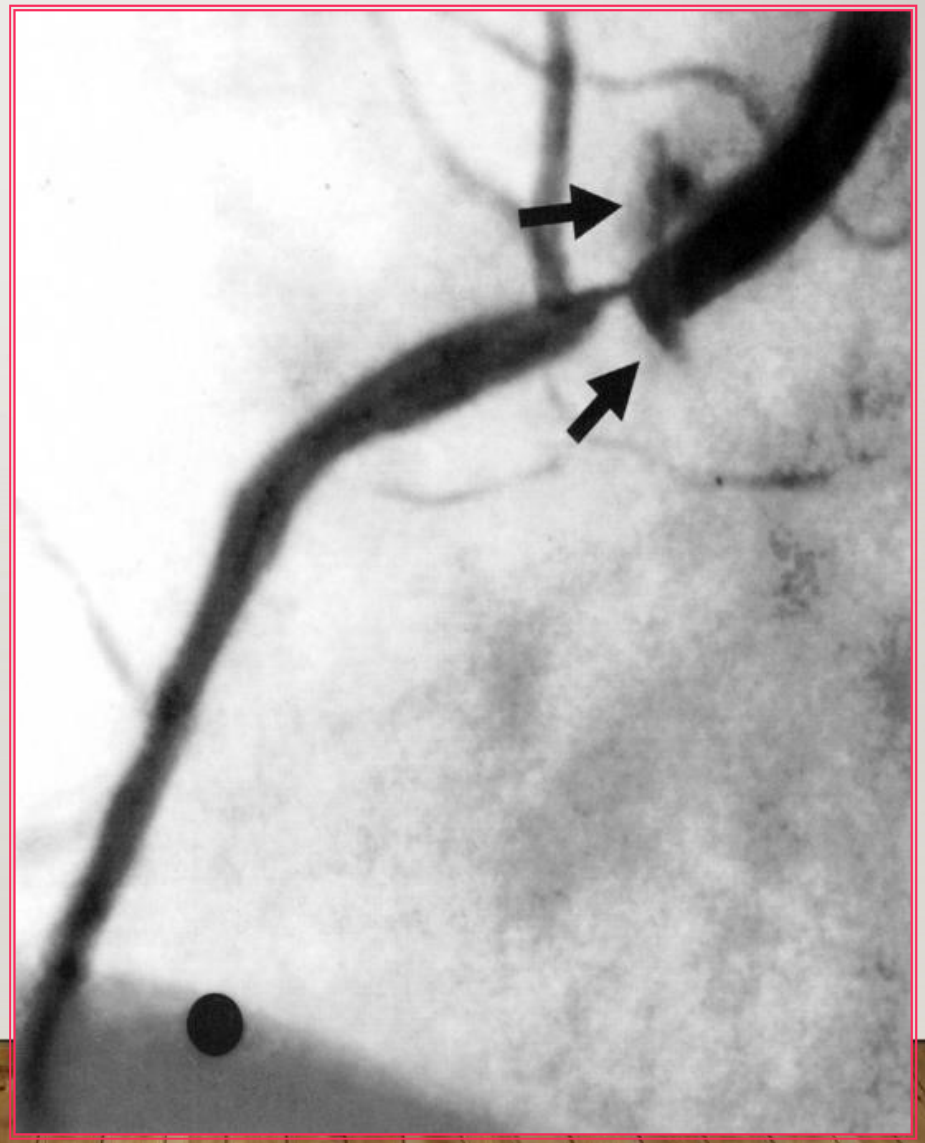
(Rotablator)

Powerguide is unnecessary & will make the procedure more difficult

GUIDE: JR4

JR4 ST

JR 3.5



RCA: Shepherd Crook

ISSUES: **Co-axial alignment**

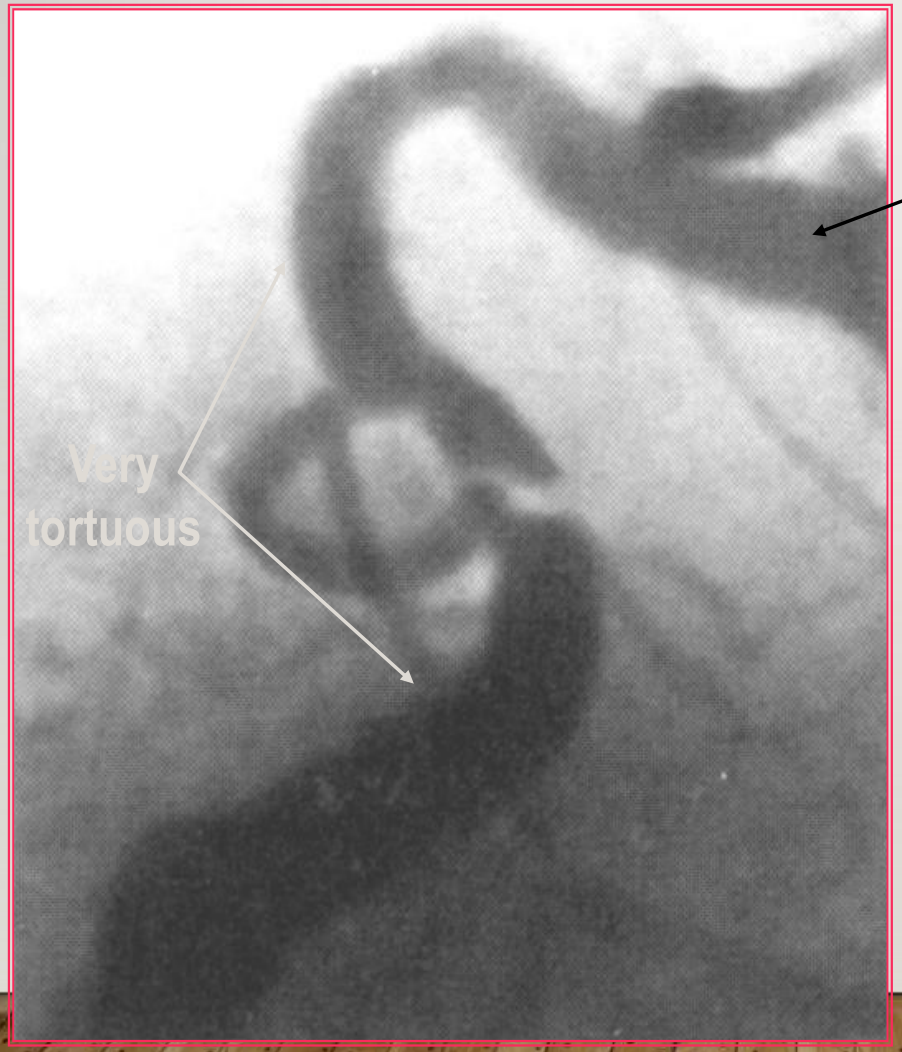
"Simple" lesion, so extra-support is not necessary

Aggressive position with AL should be avoided

GUIDE: **Hockey stick**

IMA

RCA:
Shepherd Crook



Long shepherd crook

ISSUES: Co-axial alignment

Extra support is necessary because of tortuosity

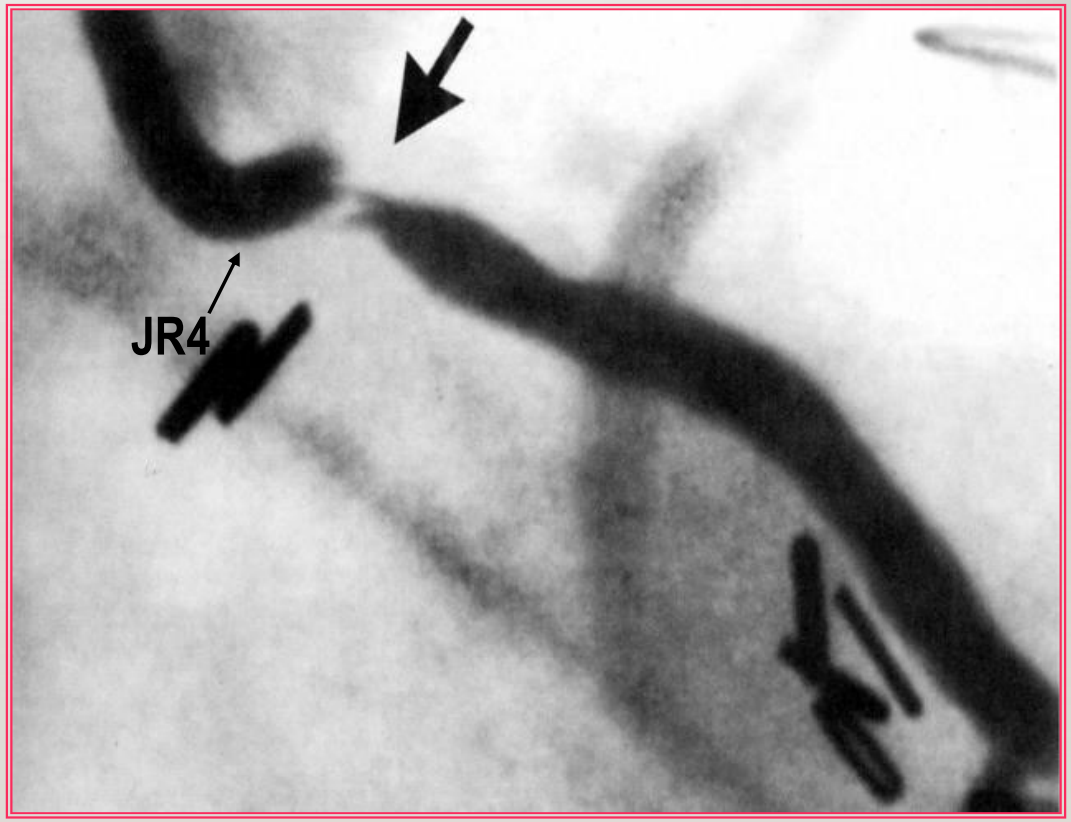
GUIDE: Hockey stick

AL

SVG to LAD: Ostial Lesion

ISSUES: Co-axial alignment (JR4 is OK, but slightly short)

GUIDE: JR5, AR1



SVG to LAD: Superior Takeoff

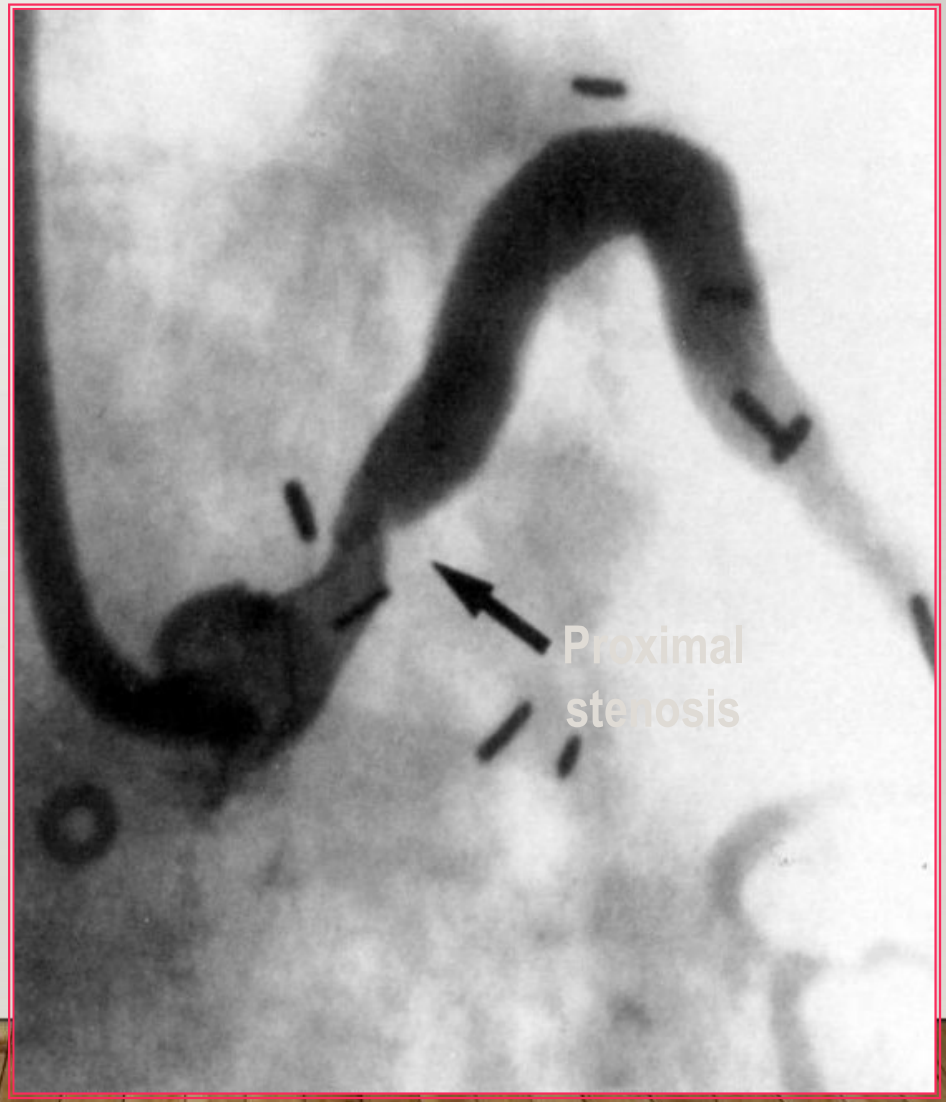
ISSUES: Co-axial alignment for superior takeoff

Extra support not necessary unless lesion is rigid

GUIDE: Hockey stick

LCB

IMA



SVG to PDA: Inferior Takeoff

Ostial disease (may have to treat this, too)

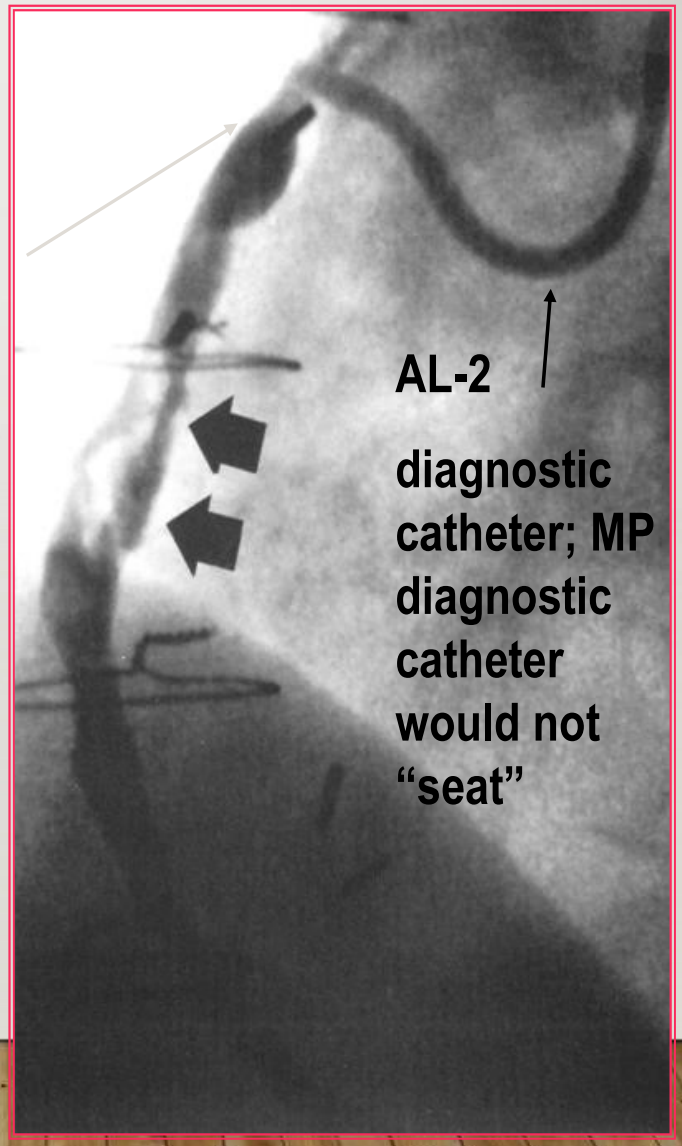
ISSUES: Co-axial alignment

Aggressive guide may make it more difficult to treat the ostium

GUIDE: MP

AR

AL

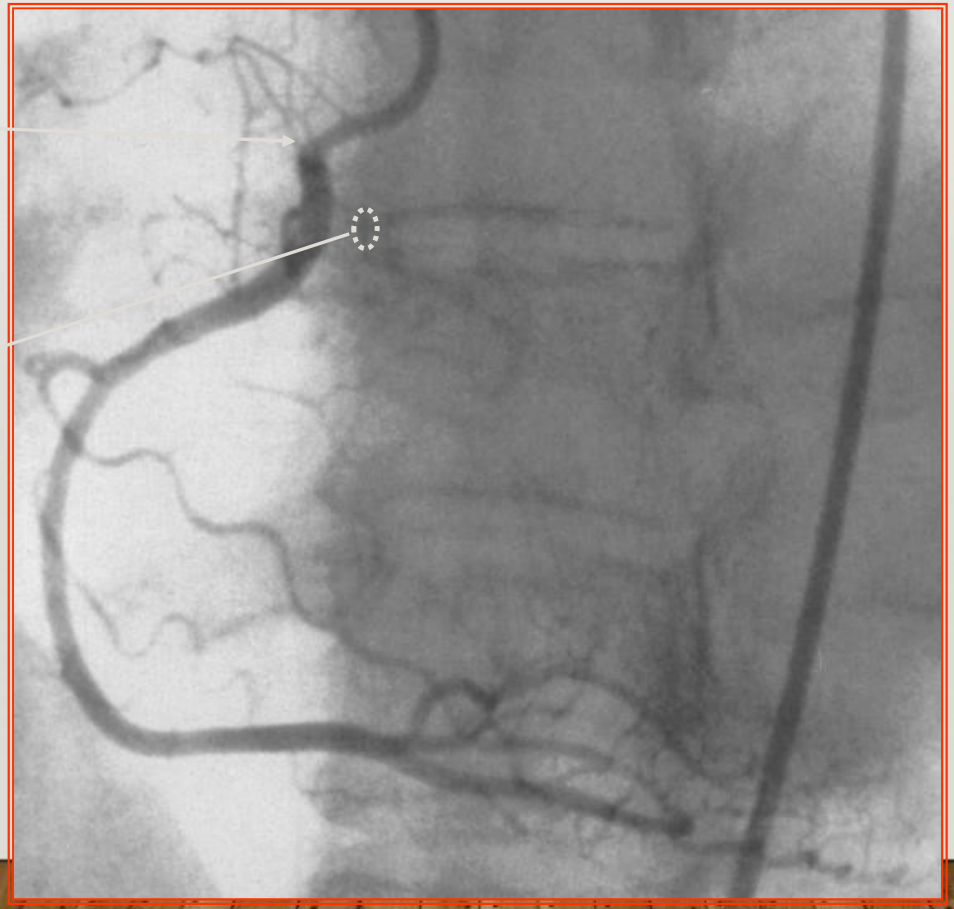


Anomalous RCA

High, anterior takeoff with inferior course

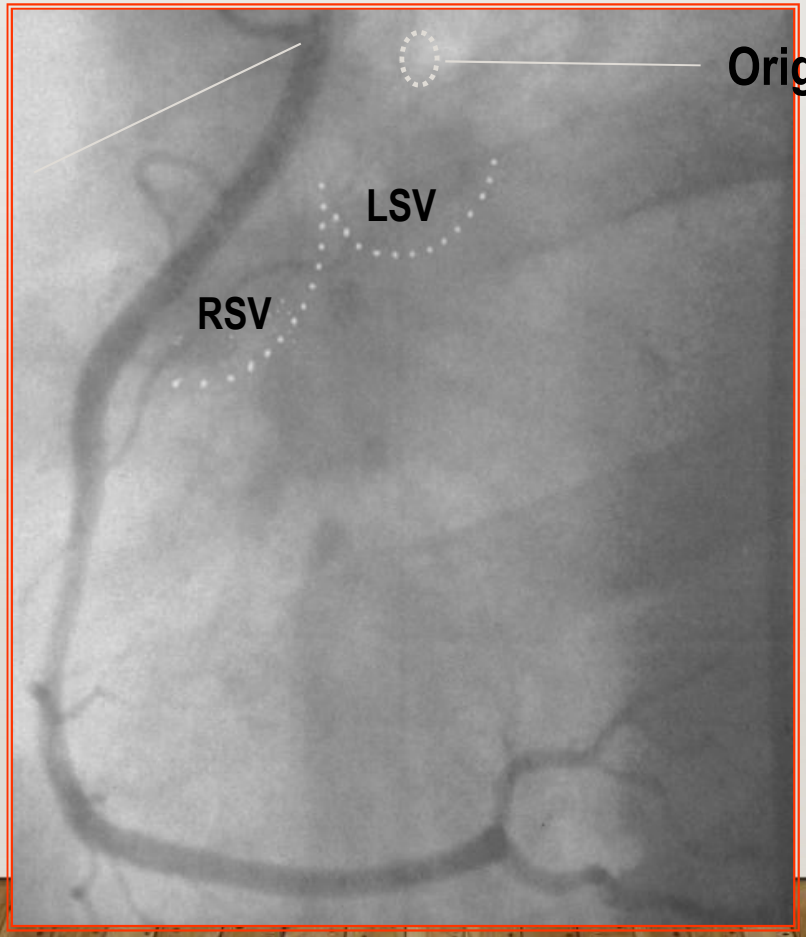
Usual origin of RCA

GUIDE: **AL**



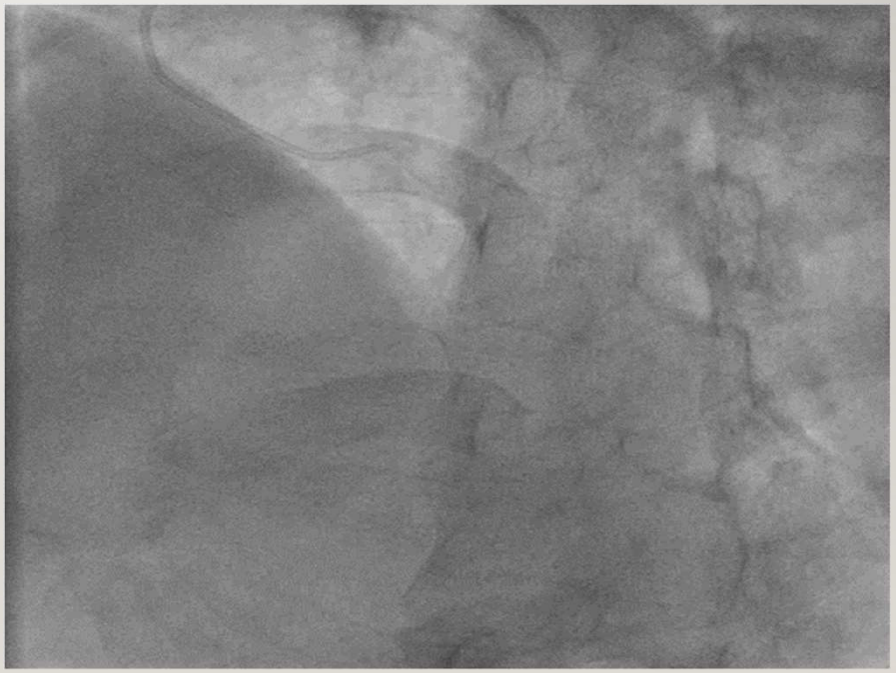
Anomalous RCA

Origin of RCA from high, anterior position in LSV (just anterior to LCA)

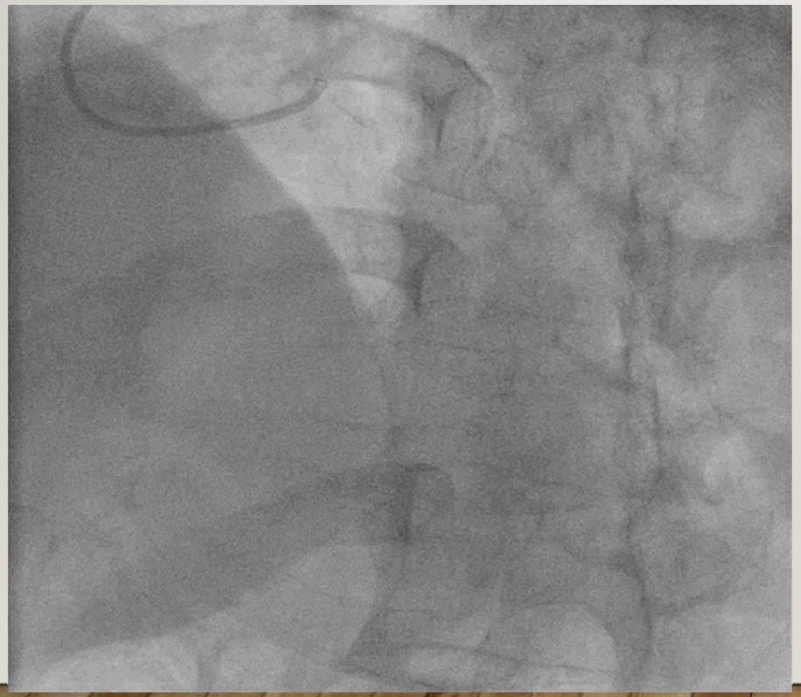


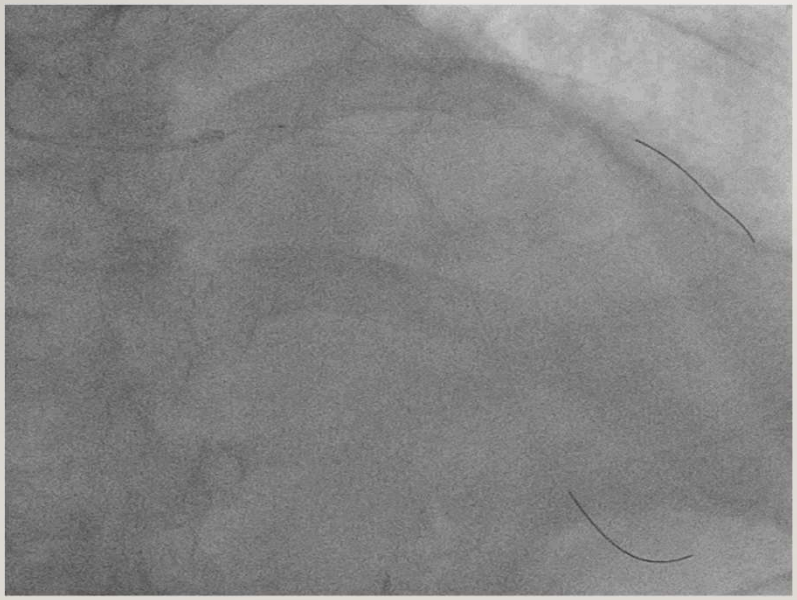
GUIDE: AL
MP

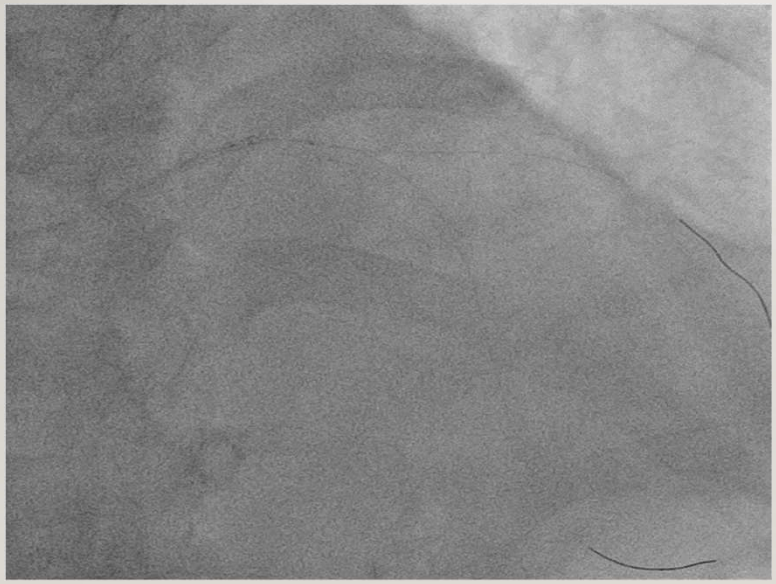
A TYPICAL CASE

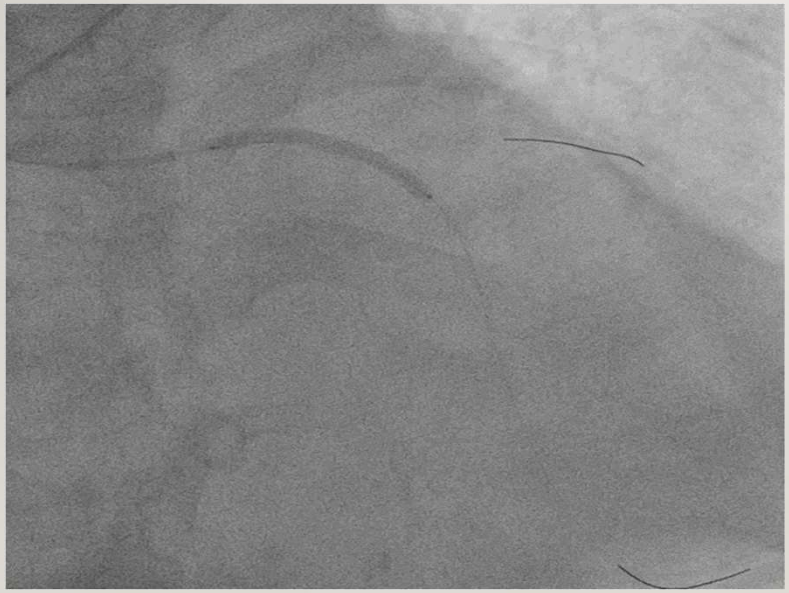


IL 4.0 GUIDING , LMN BIFURCATION PCI

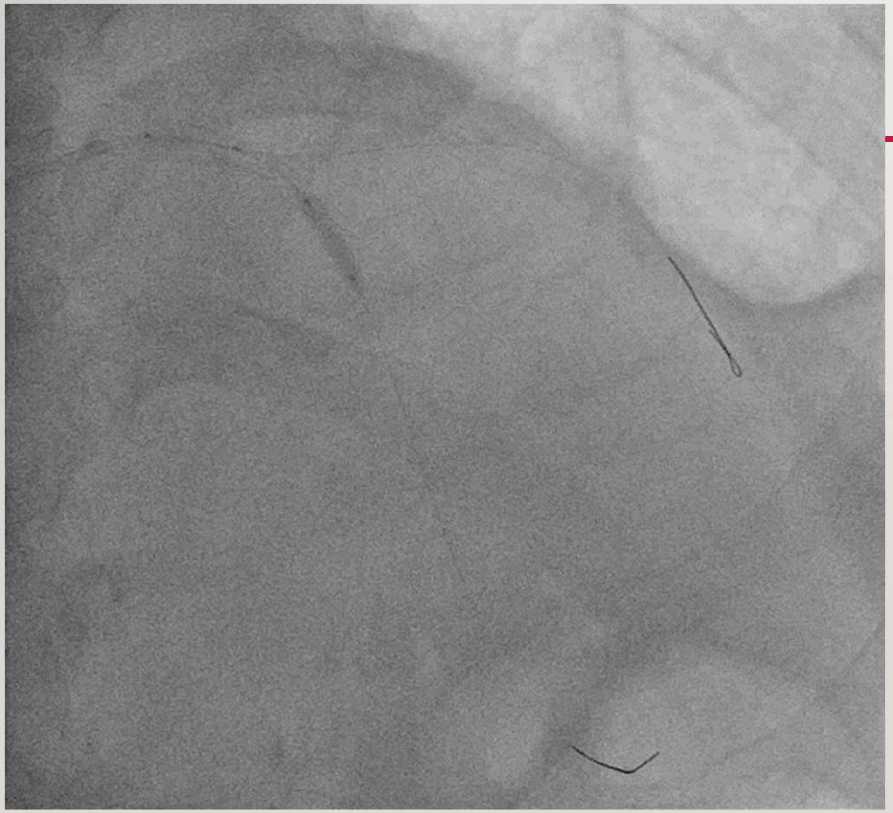


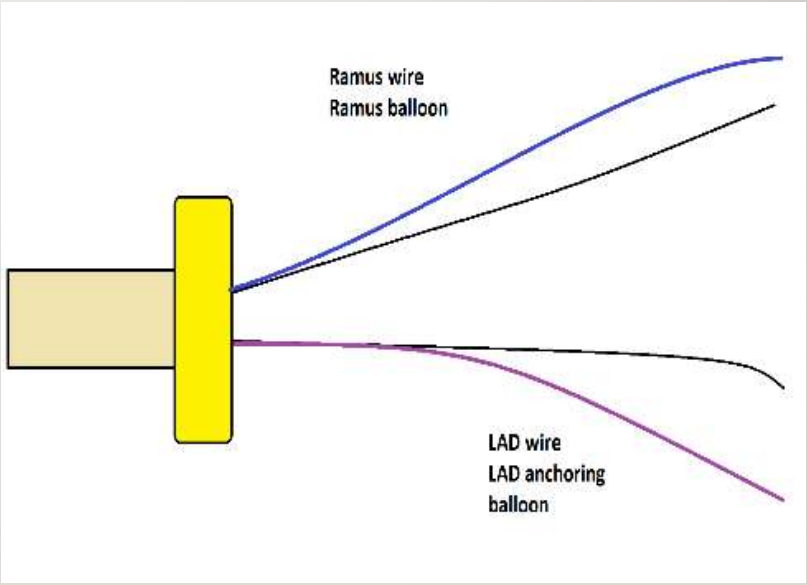




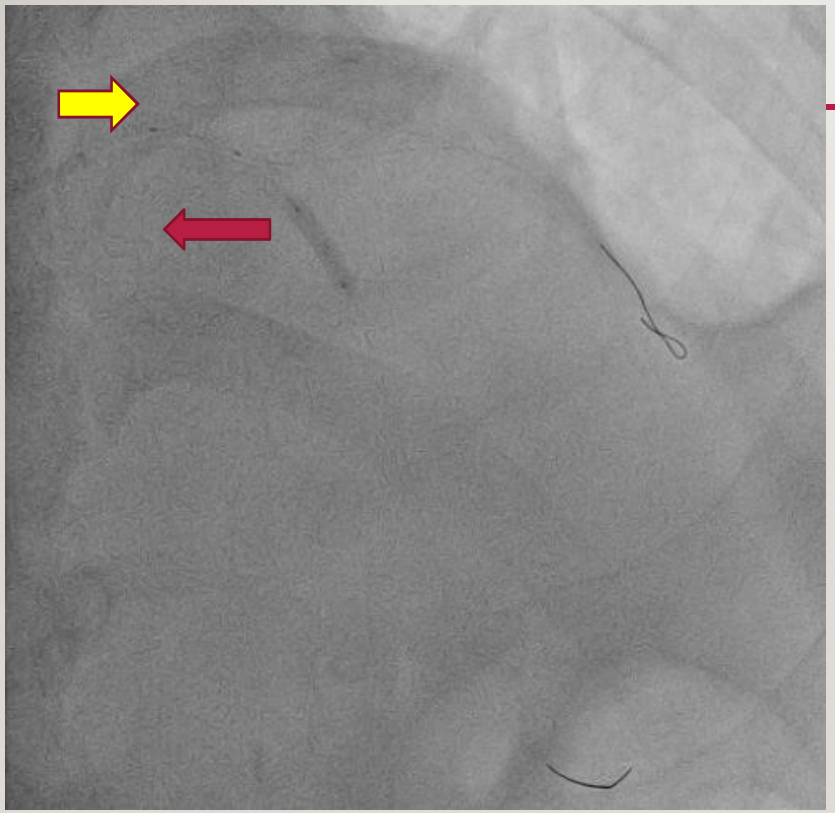


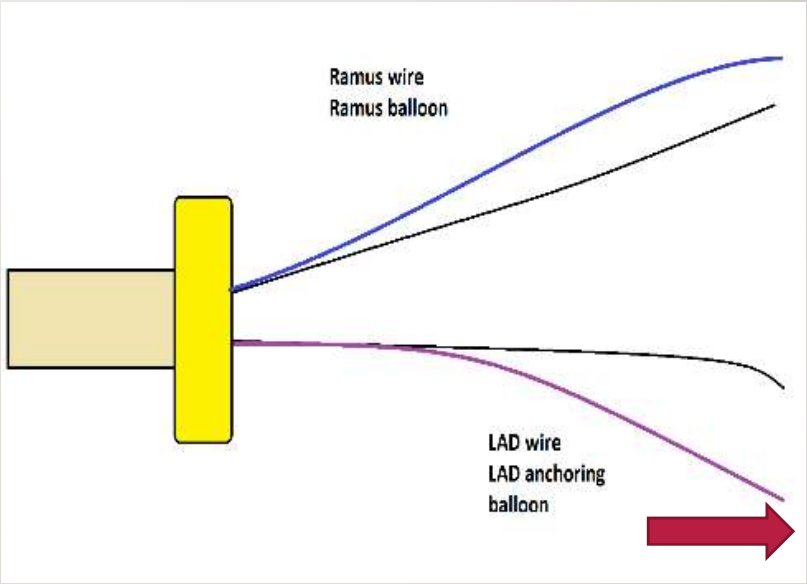
SIMPLE AND ADVANCED ANCHORING BALLOON

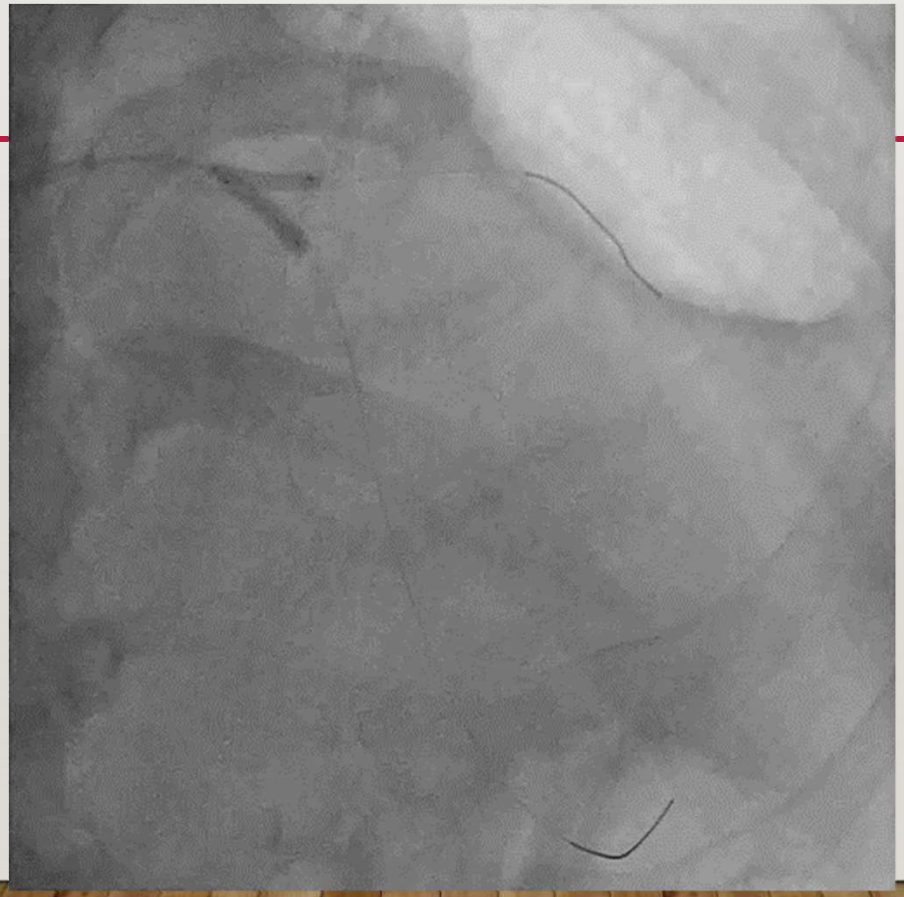




SIMPLE AND ADVANCED ANCHORING BALLOON







CONCLUSION

- Characteristic of guiding
- different guiding shape to fit different anatomy
- Passive vs active guide manipulation
- Concept of action and reaction in PCI mechanics

- A good choice of guiding make half of the success of a PCI


Thank you!