

PCI bifurkační léze



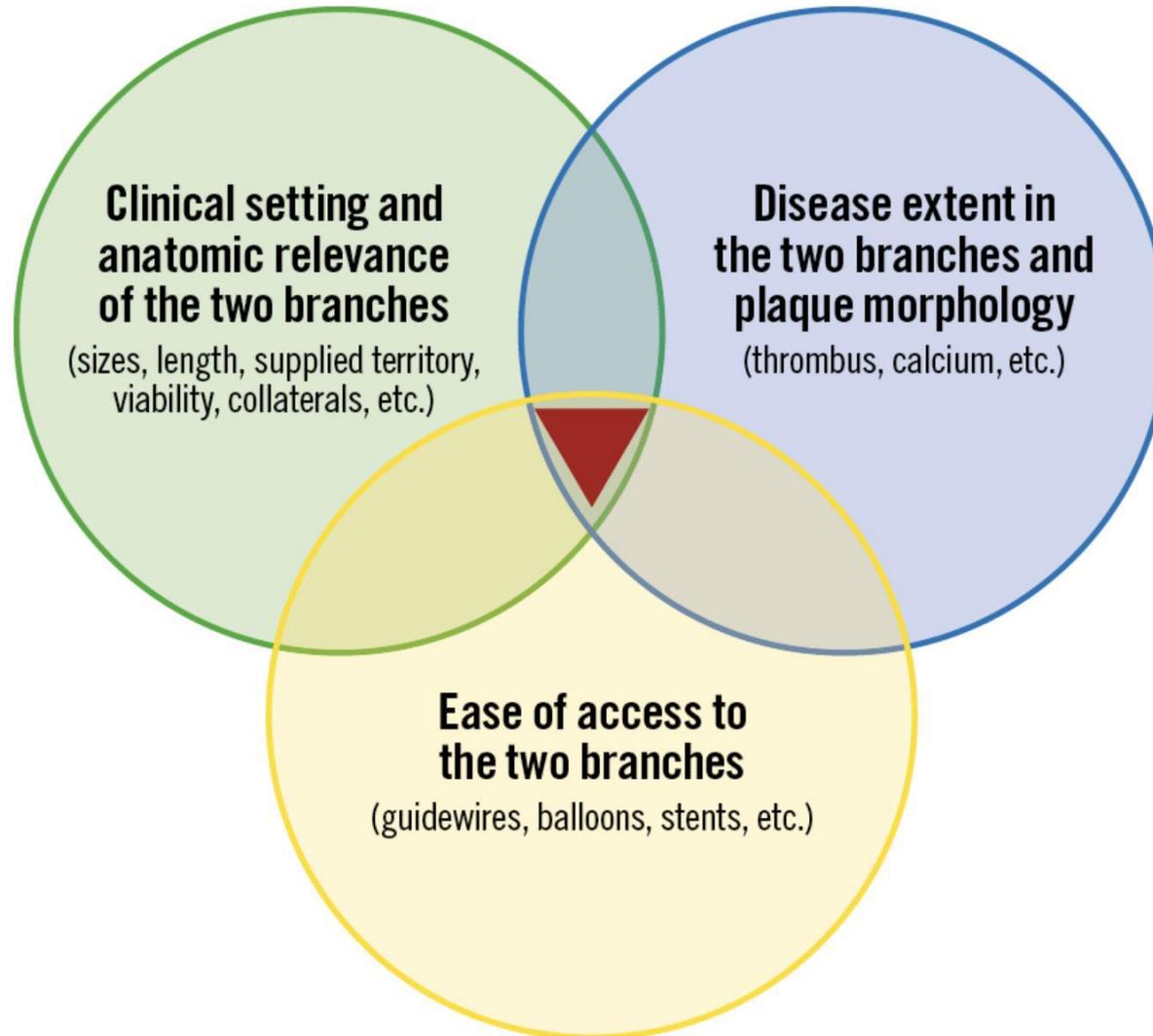
prim. MUDr. Zdeněk Coufal
Kardiologické oddělení
Krajská nemocnice Z. Bati, a.s. Zlín



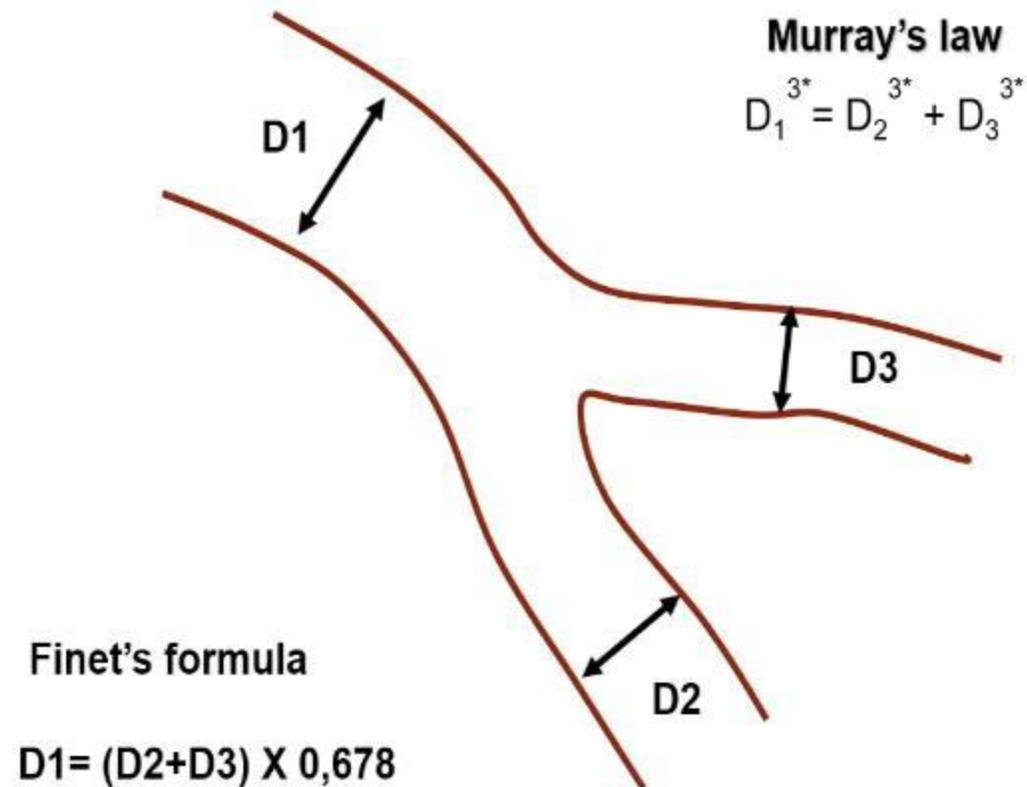
Bifurkační stenózy

- 15 – 20 % všech PCI
- časově náročnější než single PCI
- horší procedurální i klinické výsledky
- anatomické variace bifurkací
 - kmen ACS (LM)
 - úhel mezi větvemi
 - velikost a lokalizace aterosklerotických plátů

Determinanty bifurkační komplexity



Bifurkace – zákony škálování funkce a struktury



Klasfikace bifurkačních stenóz

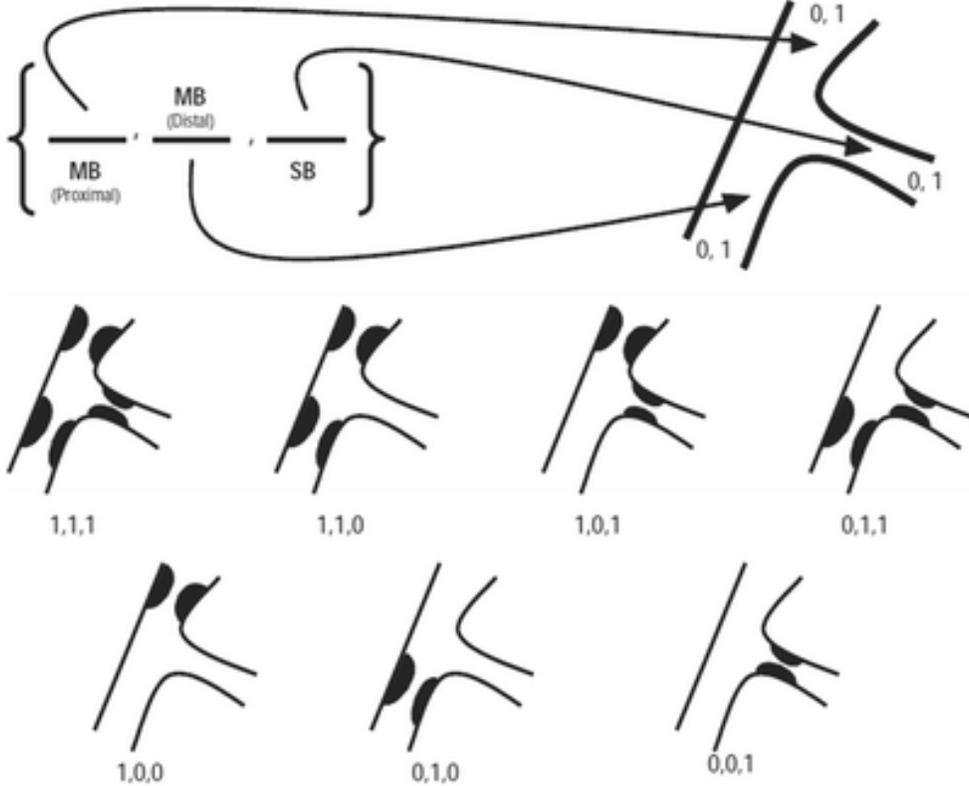
Medscape® www.medscape.com

Sanborn	 Type I	 Type II	 Type III	 Type IV	 Type V		
Lefevre	 Type 1	 Type 2	 Type 3	 Type 4	 Type 4a	 Type 4b	
Safian	 Type IA	 Type IB	 Type IIA	 Type IIB	 Type IIIA	 Type IIIB	 Type IV
Duke	 Type A	 Type B	 Type C	 Type D	 Type E	 Type F	
Medina	 Type 1,1,1	 Type 1,1,0	 Type 1,0,1	 Type 0,1,1	 Type 1,0,0	 Type 0,1,0	 Type 0,0,1
Movahed	 L	 S	 2	 1m	 1s	 V	 T

Klasfikace bifurkačních stenóz podle Mediny

proximální hlavní větev, distální hlavní větev, vedlejší větev

1 – stenóza 0 – bez stenózy



MADS classification of bifurcation stenting techniques

	M Main prox. first	A Main Across side first	D Distal first	S Side branch first							
1 st stent	 PM stenting	 MB stenting across SB	 DM stenting	 Provisional SKS	 SB ostial stenting						
After balloon	 Skirt	 MB stenting + SB balloon	 MB stenting + SB balloon	 SB minicrush	 SB crush						
2 stents	 Skirt + DM	 Skirt + SB	 Elective T stenting	 Internal crush	 Culotte	 TAP	 V stenting	 SKS	 Syst. T stenting	 Minicrush	 Crush
3 stents	 Extended V		 Trouser legs and seat								
	M Main prox. first	A Main Across side first	D Distal first	S Side branch first							
1 st stent		 Inv. MB stenting across SB	 Inv. provisional SKS	 DM ostial stenting							
After balloon		 MB to SB stenting + DM balloon	 MB to SB stenting + DM balloon	 DM minicrush	 DM crush						
2 stents		 Inv. elective T stenting	 Inv. internal crush	 Inv. culotte	 Inv. TAP	 Inv. syst. T stenting	 Inv. minicrush	 Inv. crush			
3 stents											

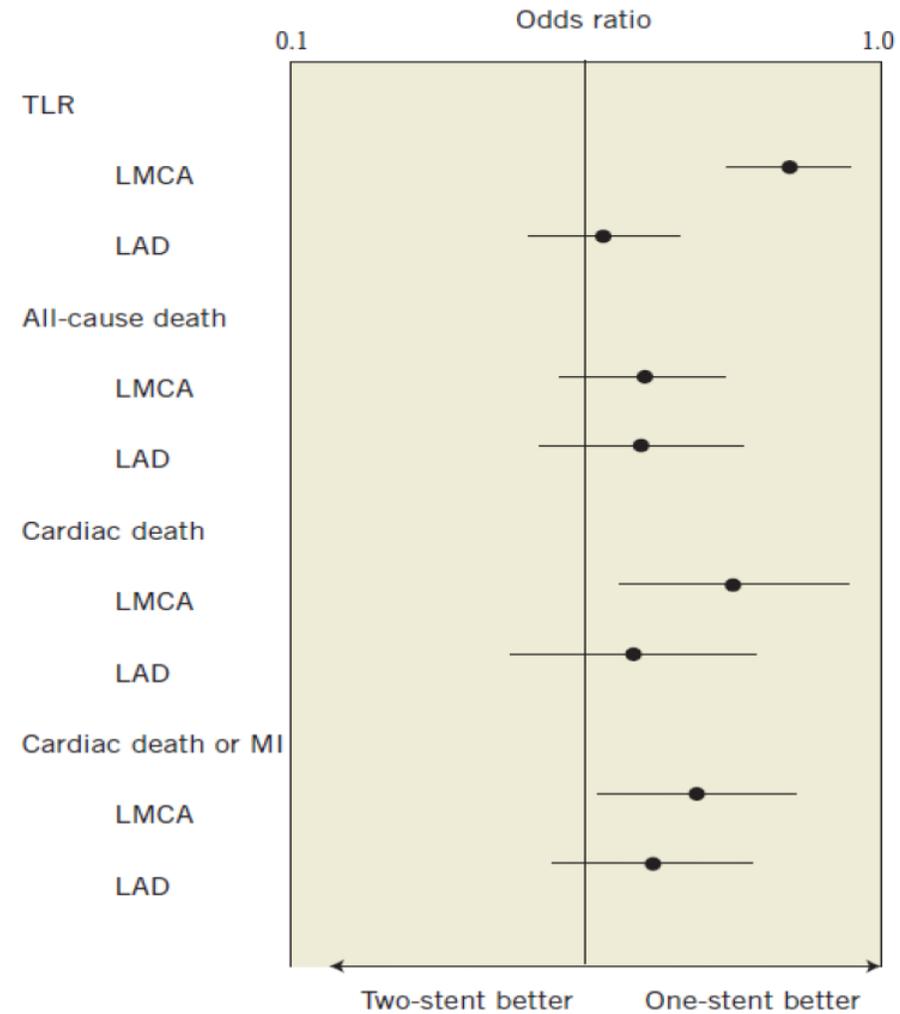
Louvard Y. et al: Classification of Coronary Artery Bifurcation Lesions and Treatments: Time for a Consensus!, Catheterization and Cardiovascular Interventions 71:175–183 (2008)

LM – jeden stent vs. dva stenty

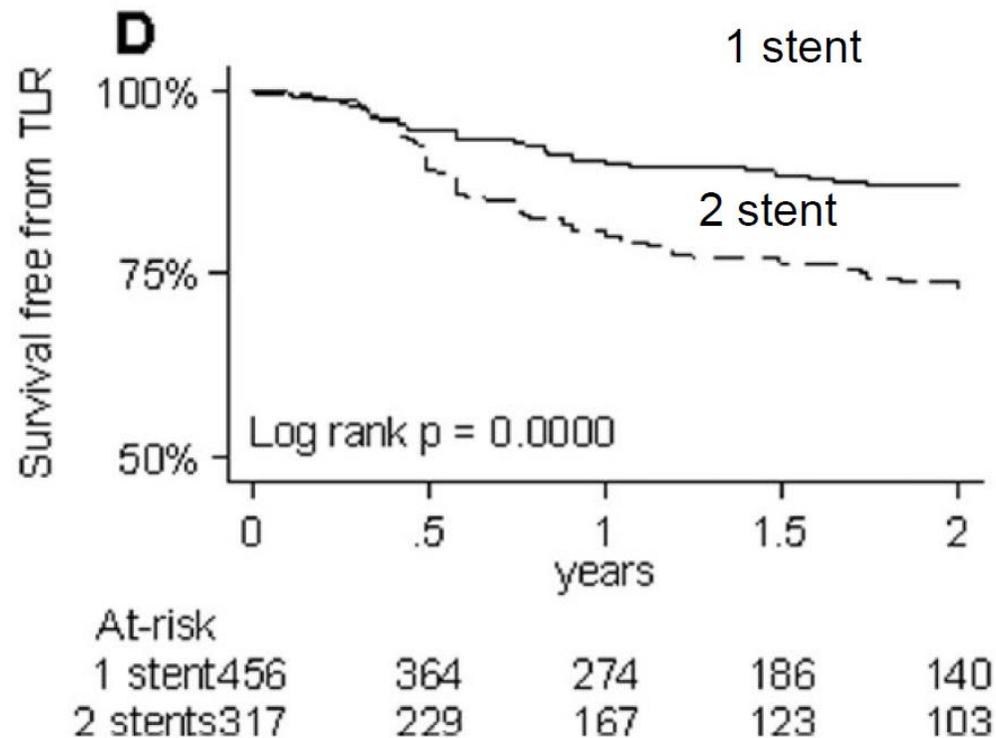
	LMCA bifurcation		
	One-stent	Two-stent	<i>p</i>
Lesion-level n	741	204	
● TLR (%)	39/701 (5.6)	46/190 (24.2)	<.0001
● Definite ST (%)	1 /698 (0.1)	5/188 (2.7)	0.002
Early ST (1-30 days)	0 (0.0)	2 (1.0)	0.046
Late ST (31-365 days)	1(0.1)	3 (1.5)	0.03
Patient-level n	741	204	
All-cause death (%)	43 (5.8)	18 (8.8)	0.15
● Cardiac death (%)	22/720 (3.1)	14/200 (7.0)	0.021
MI (%)	8/698 (1.2)	6/190 (3.2)	0.091
Cardiac death or MI (%)	30/720 (4.2)	16/200 (8.0)	0.03

Toyofuku et al, J-Cypher Registry, *Eurointervention* 2011

J-Cypher Registry



Freedom from MACE 1 vs. 2 stenty

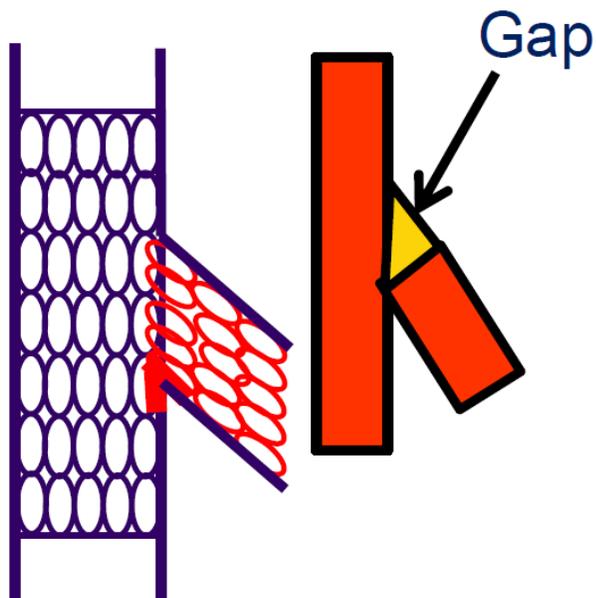


Použití 2 stentů

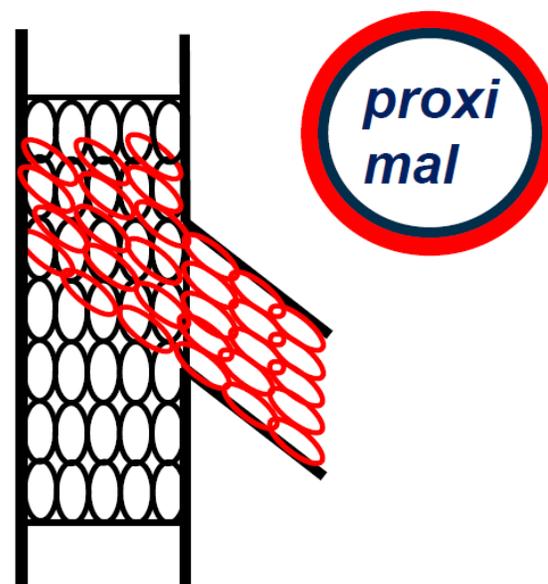
- Použití 2 stentů je potřeba u 5 – 36% PCI bifurkací k dosažení optimálního angiografického výsledku
- Technický přístup závisí na
 - anatomii
 - morfologii
 - výsledku léze po preparaci (disekce?, reziduální stenóza po predilataci)

Volitelné techniky dvojího stentování

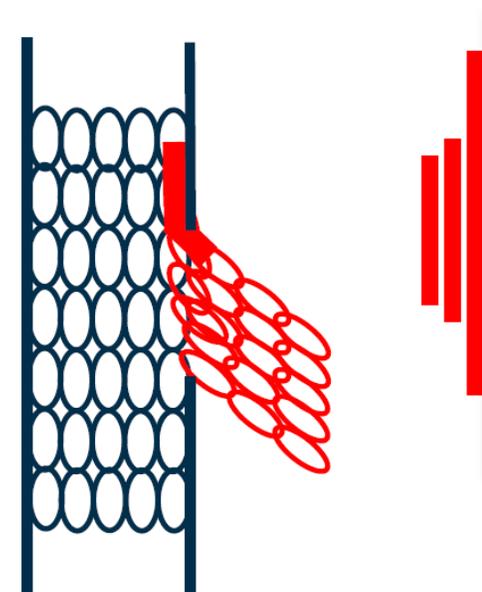
Modified T-Stenting-
TAP = T And Protrusion



Culotte -
Stenting



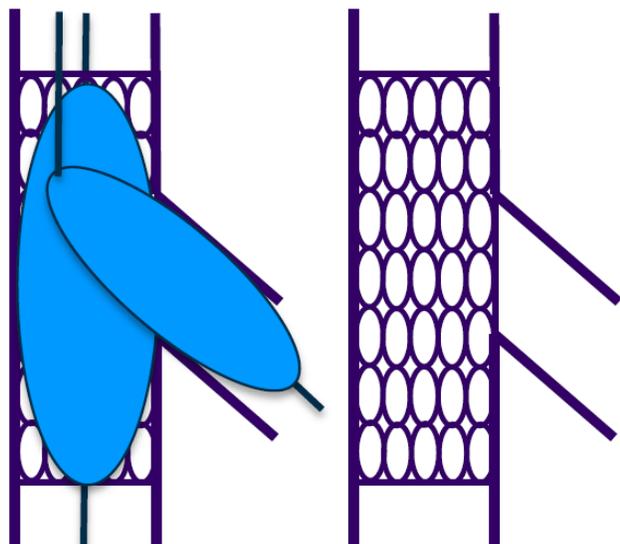
„Double kissing“-
Crush -Stenting



Modifikace T-stentování

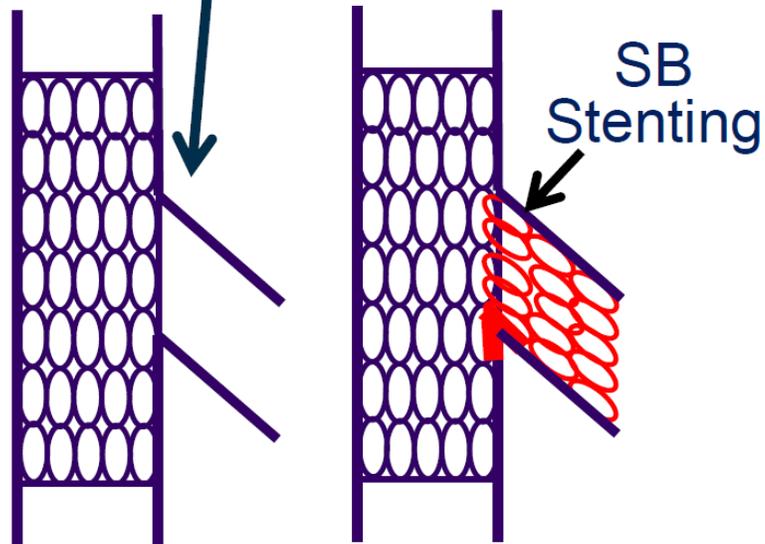
Provisional side branch
Stenting

Final kissing
(optional)



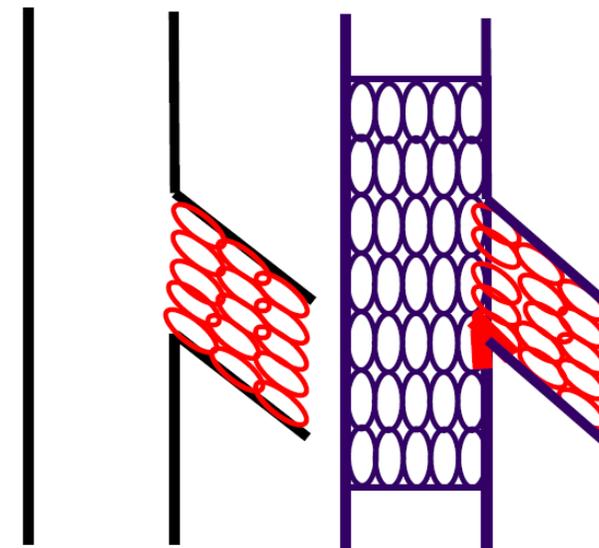
„Modified T-Stenting =
TAP“

If, dissection; residual
stenosis $>75\%$; TIMI < 2

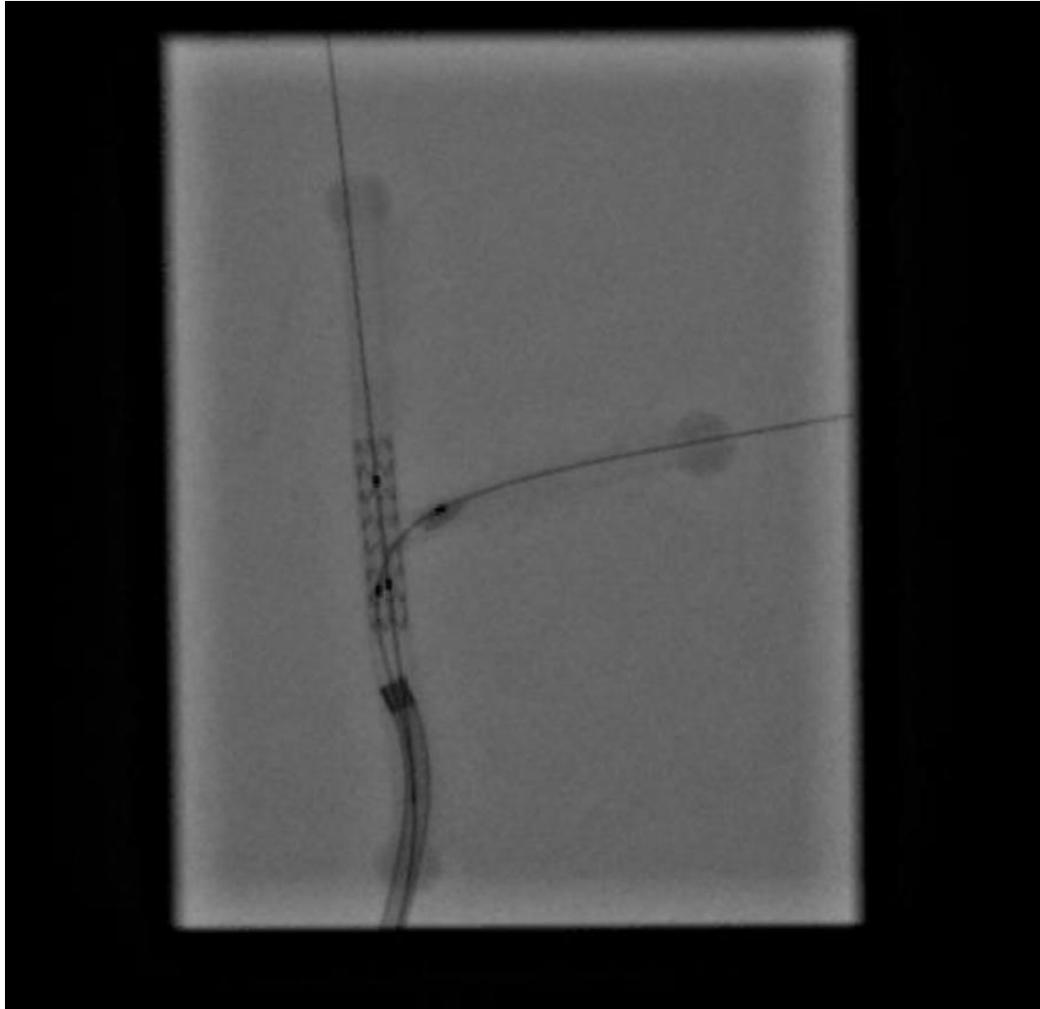


Classic – T-
Stenting

Side branch
Stenting Main branch
Stenting



Provisional side branch stenting



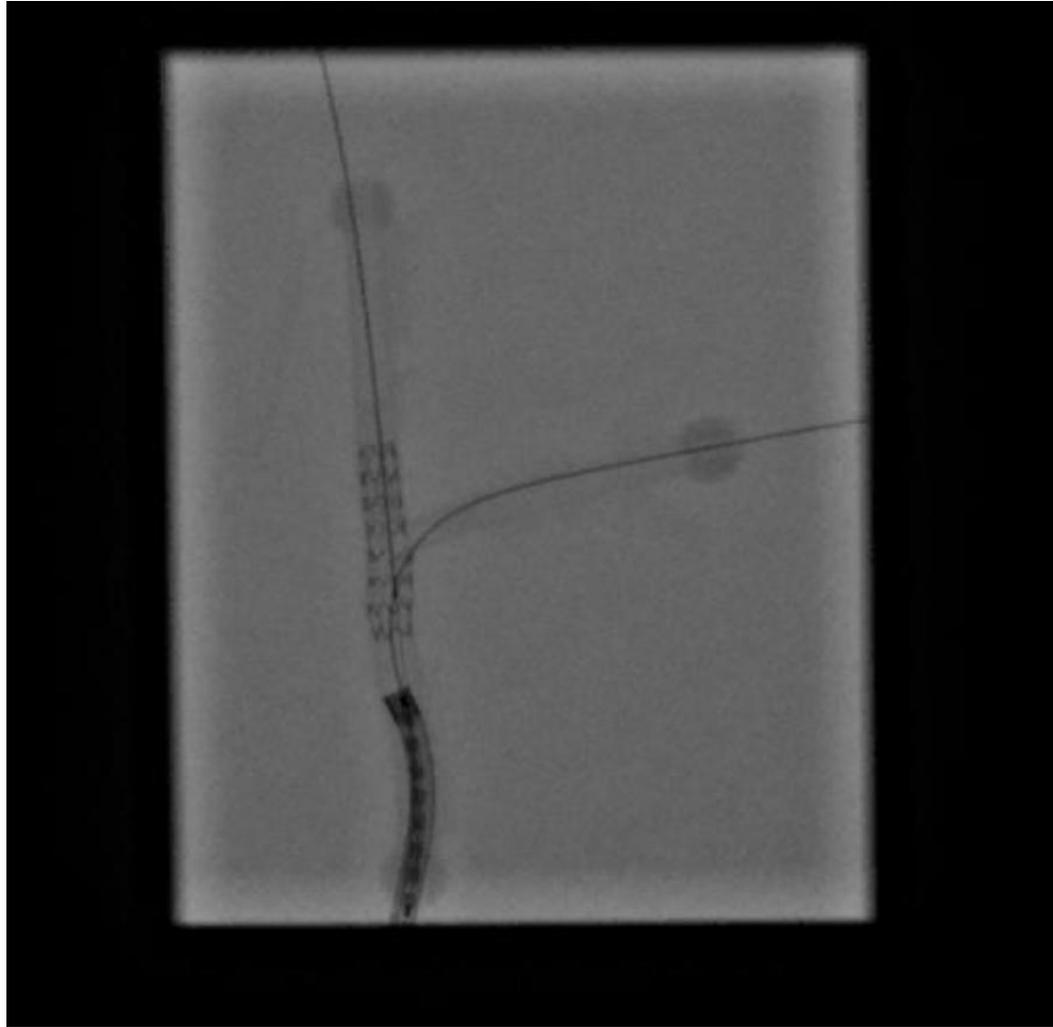
V případě přetrvávající:

- disekce
- reziduální stenózy > 75%
- TIMI < 2



TAP

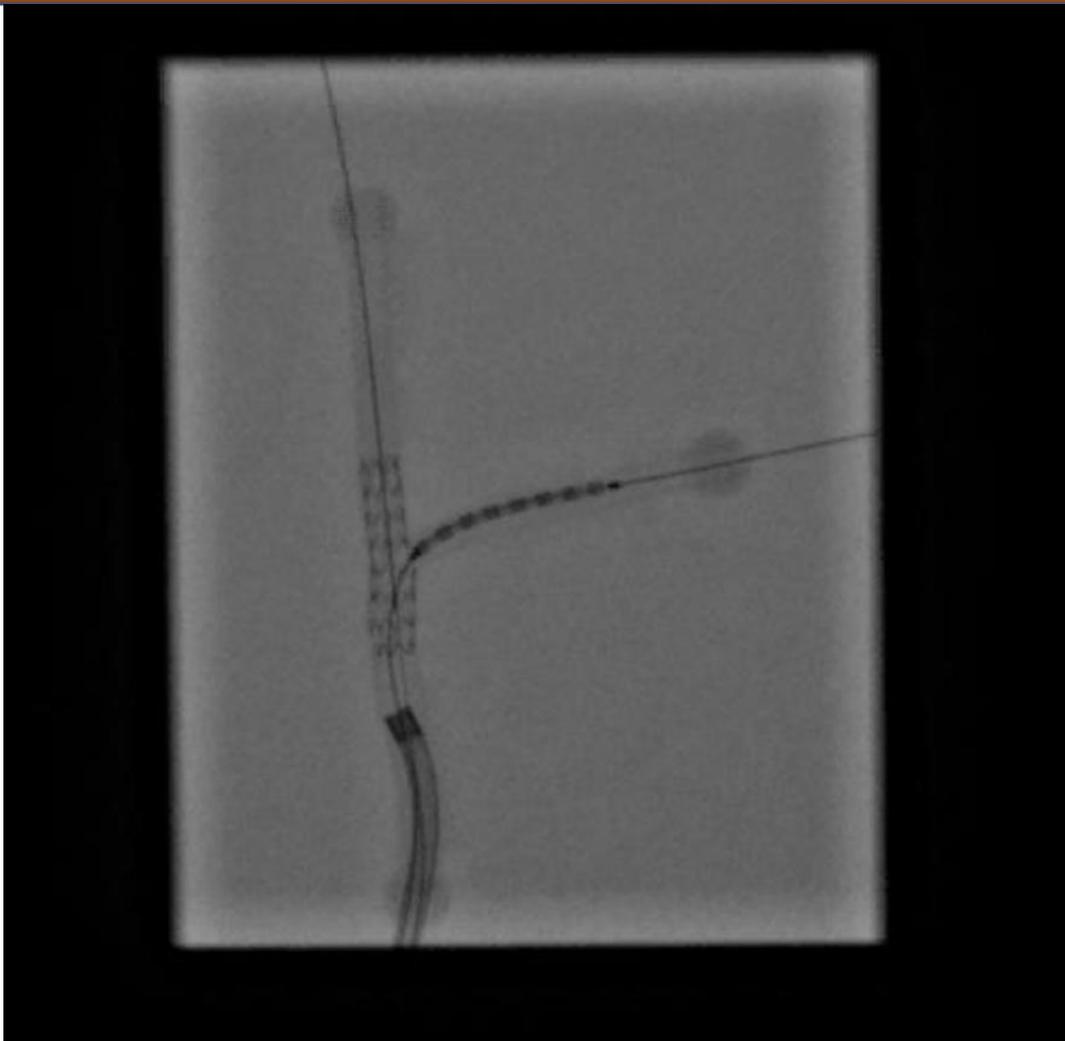
TAP stenting



V případě, že **stent neprochází**:

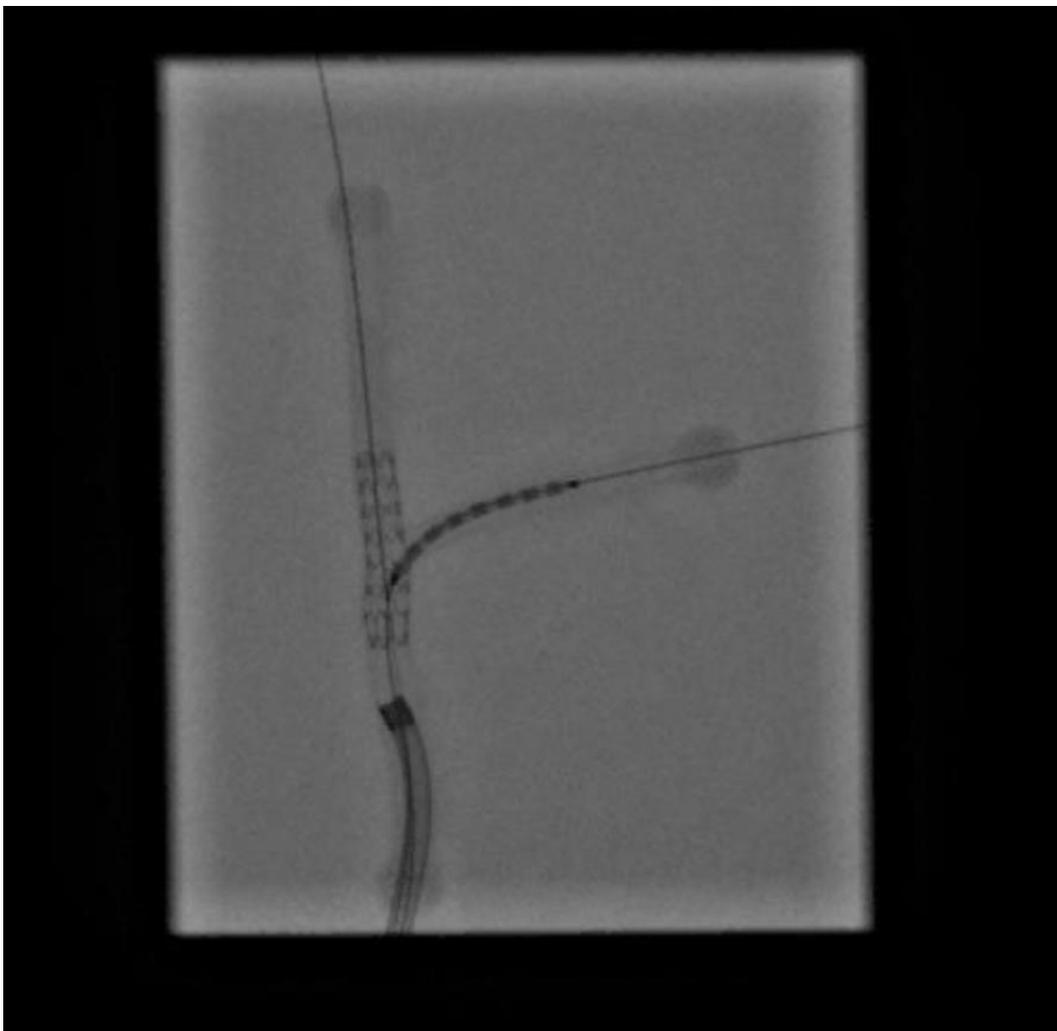
- predilatujte SB znovu (větším NC balonem)
- použijte druhý wire (extra support)
- guide extension (Guideliner)
- použijte kratší stent

TAP stenting



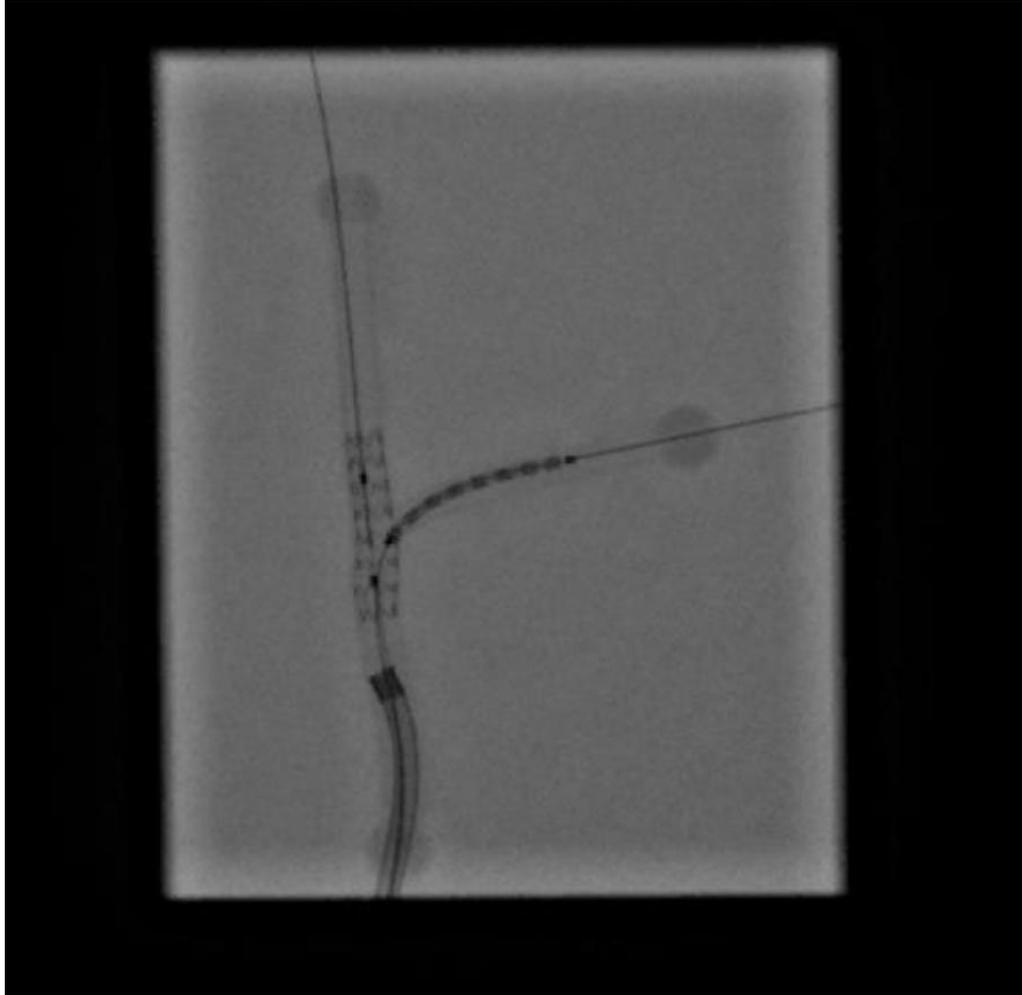
Možnost gapu

TAP stenting



Možnost velké protruze

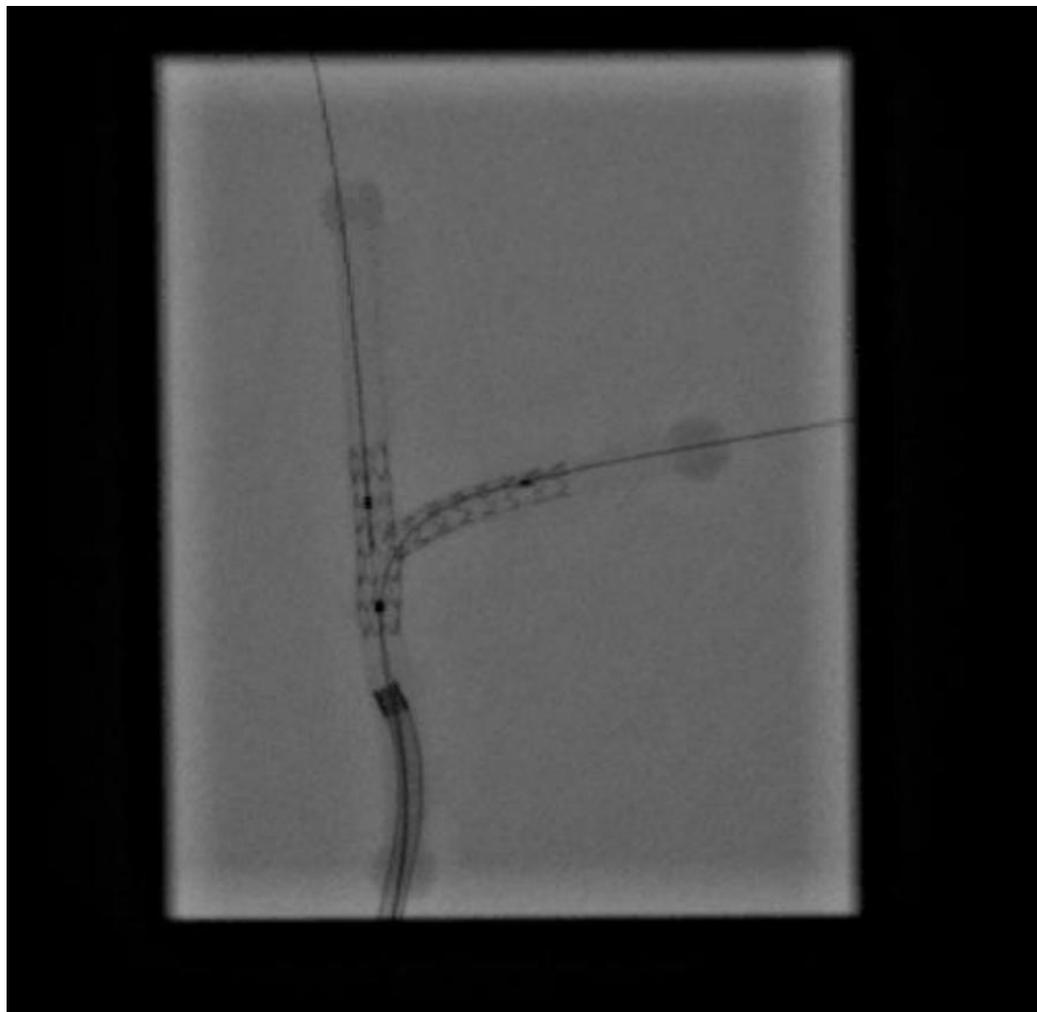
TAP stenting



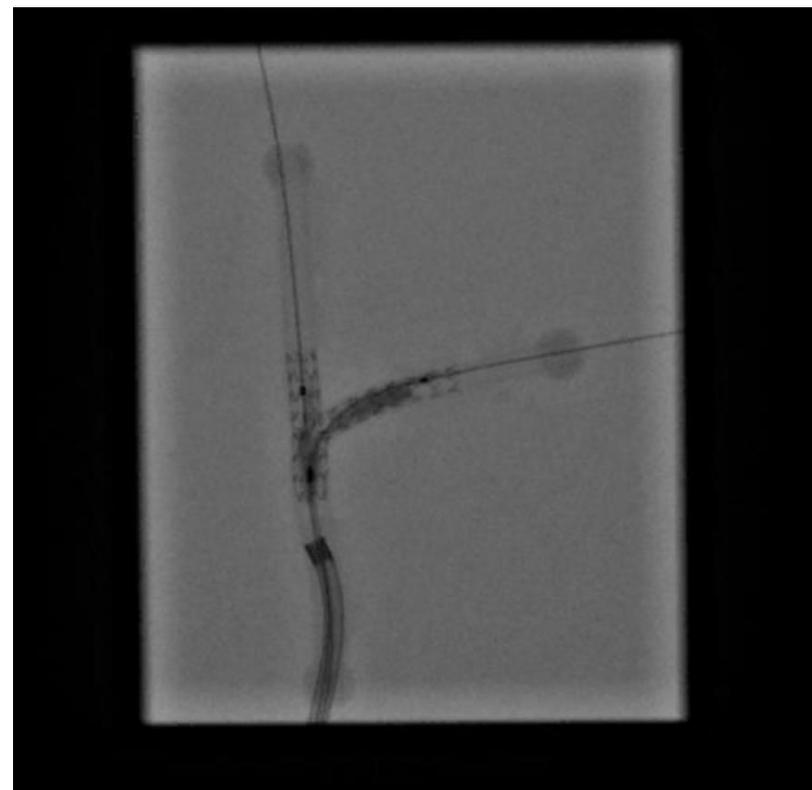
Optimální pozice stentu
ve vedlejší větvi
(vhodné zkontrolovat
z více projekcí)

**Stent implantovat do vedlejší větve za
simultánní dilatace balonu v hlavní větvi.**

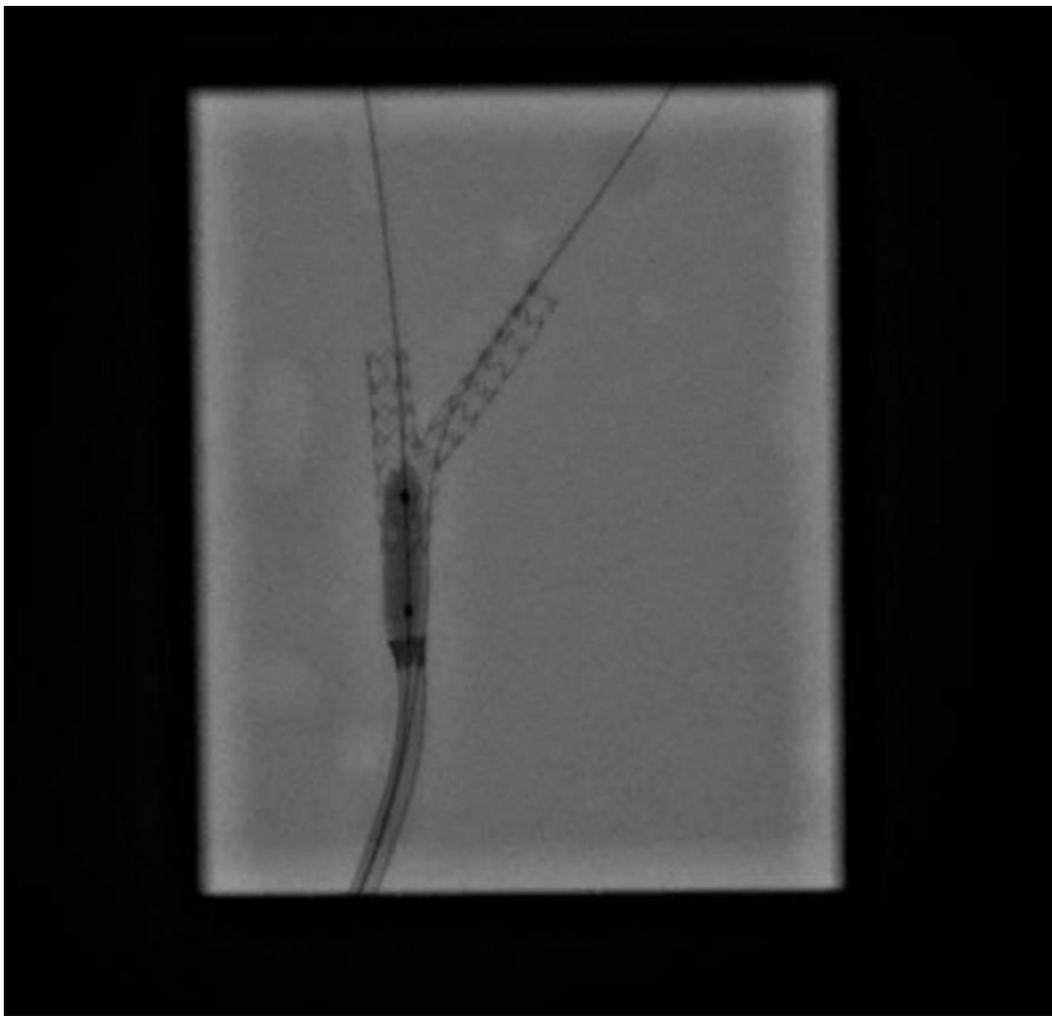
TAP stenting



Final kissing NC balony

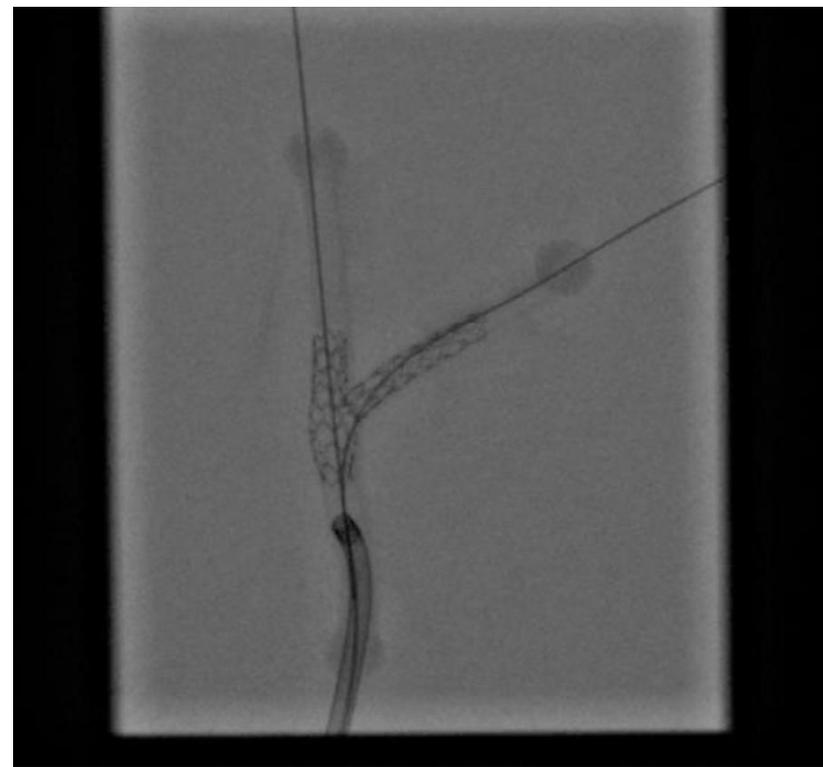


TAP stenting

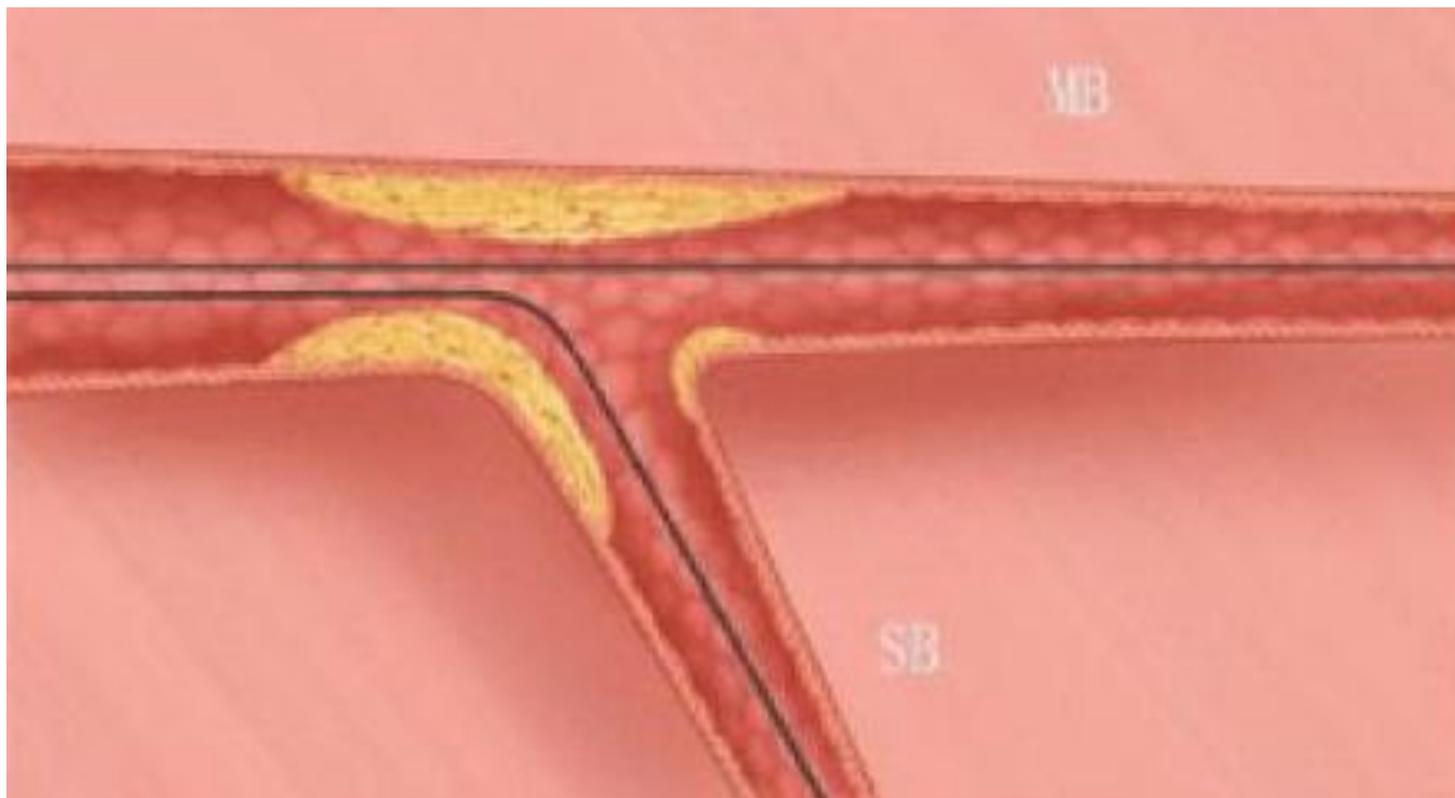


Final POT

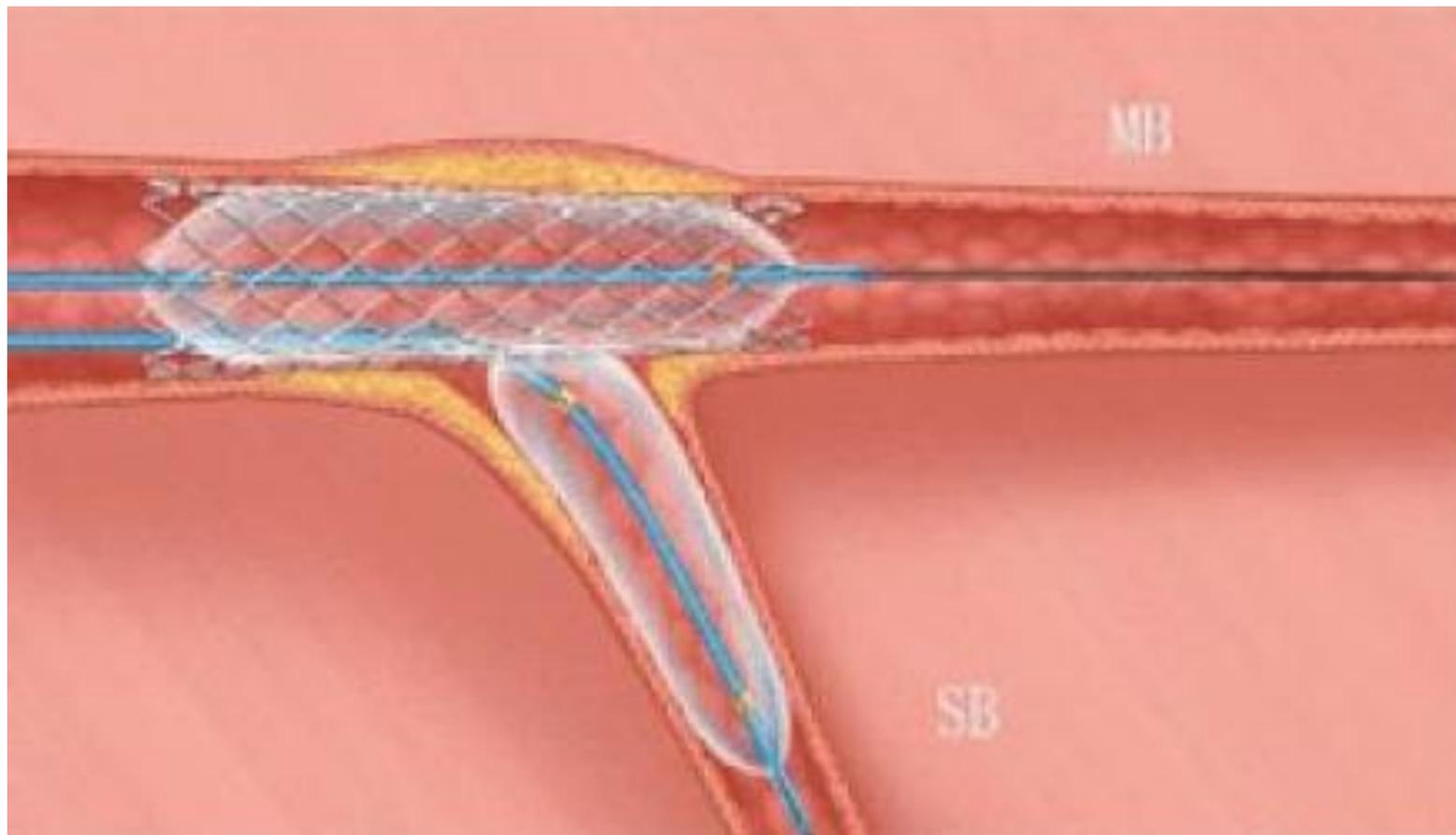
NC balonem o 0,25-0,50mm
většího průměru



POT technika



POT technika



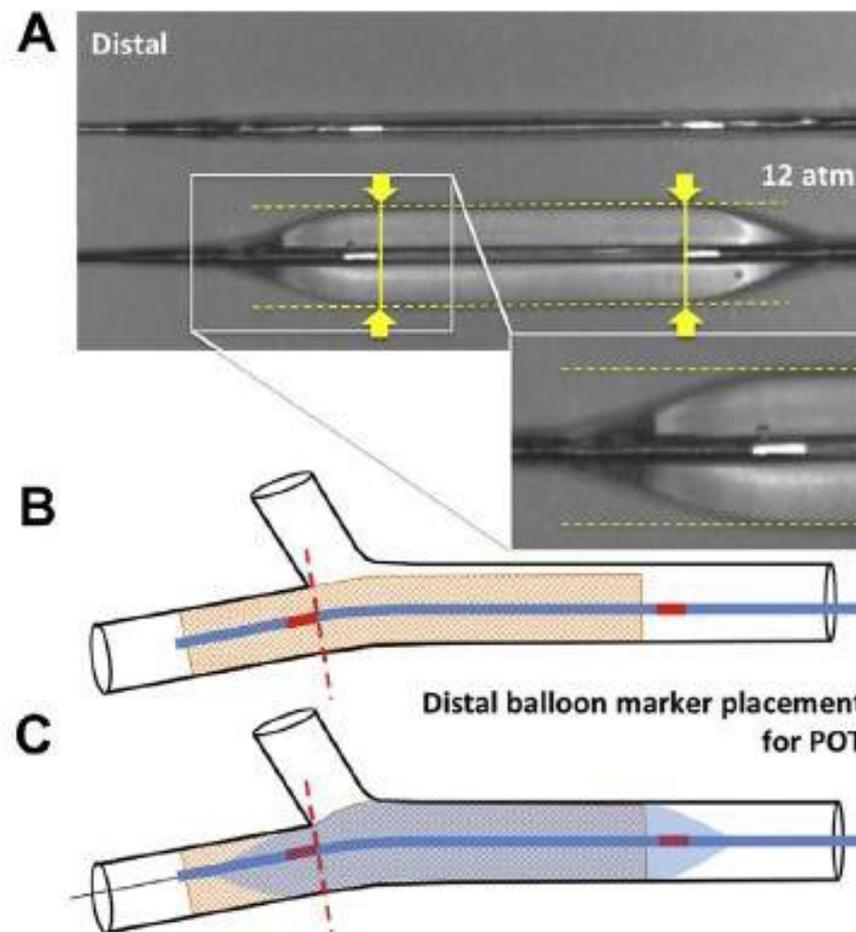
POT technika

Comparative Analysis of Sequential Proximal Optimizing Technique Versus Kissing Balloon Inflation Technique in Provisional Bifurcation Stenting

Fractal Coronary Bifurcation Bench Test

G rard Finet, MD, PhD,* Fran ois Derimay, MD, MSc,* Pascal Motreff, MD, PhD,† Patrice Guerin, MD, PhD,‡ Paul Pilet, B Eng,‡ Jacques Ohayon, PhD,§ Olivier Darremont, MD,|| Gilles Rioufol, MD, PhD*

(J Am Coll Cardiol Intv 2015;8:1308-17)



POT technika

Influence of the sequence of proximal optimisation technique and side branch dilation for the opening of jailed struts after coronary bifurcation stenting

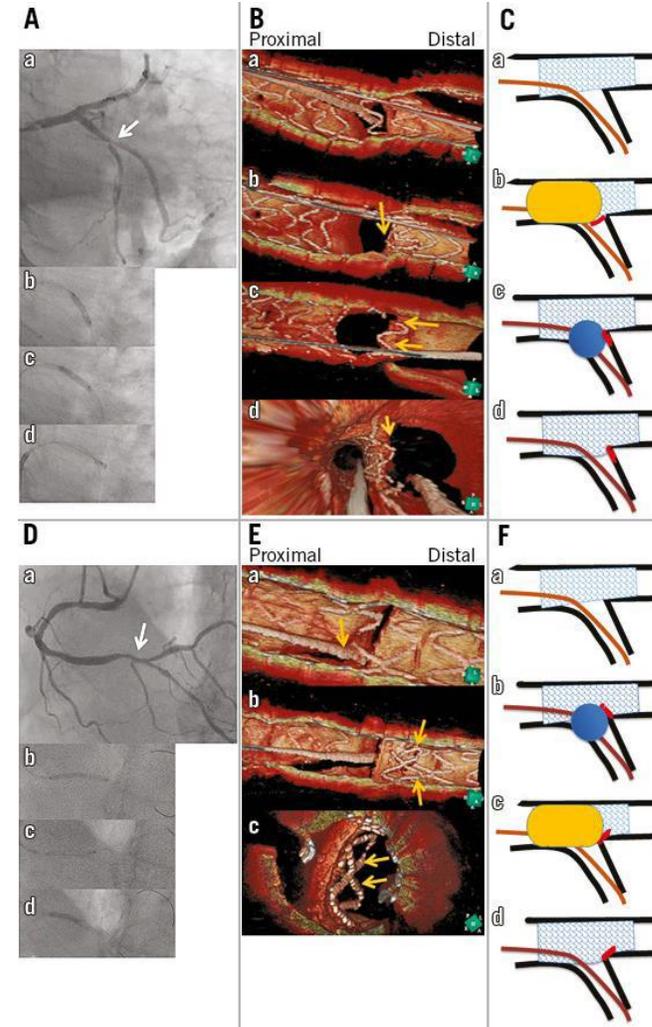


Yoshinobu Murasato^{1,2*}, MD, PhD; Takahiro Mori^{1,2}, MD, PhD; Takayuki Okamura³, MD, PhD; Junya Shite⁴, MD, PhD

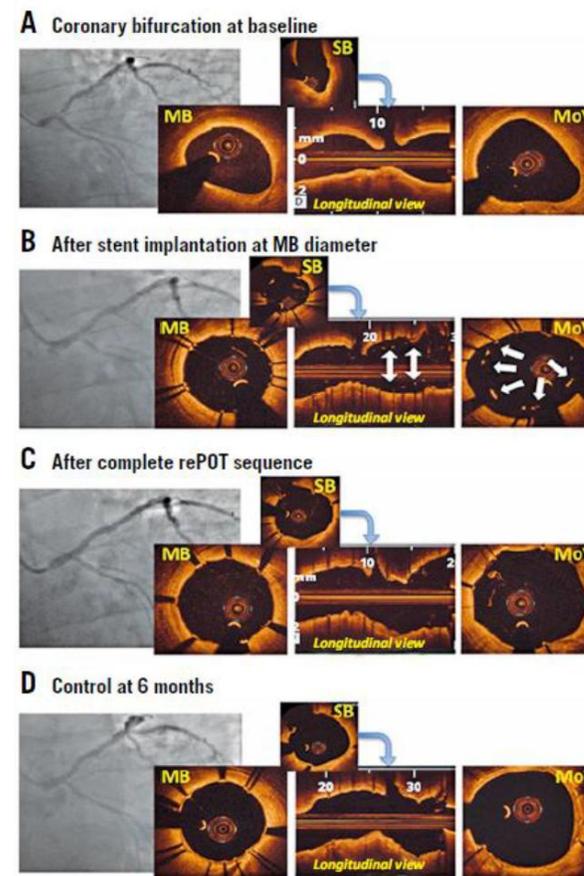
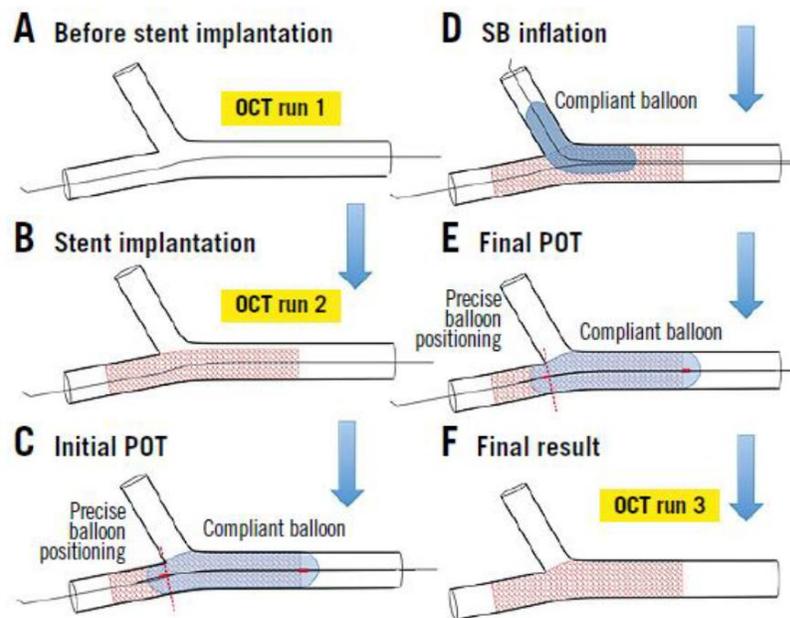
POT should be performed before SB dilatation

Importance of distal wire crossing

OCT imaging can help avoid deformation



Benefit nové provisional stenting strategie, re-proximal optimization technique: the re-POT clinical study

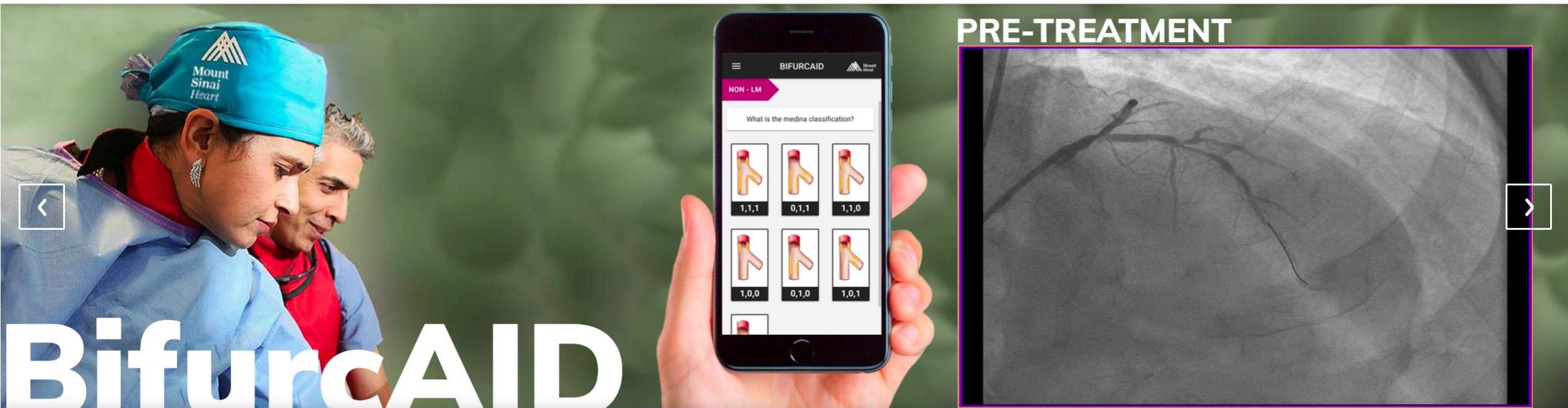


POT

Proximal OpTimisation

- **At least once for any significant bifurcation**
Especially at the end
- **Up to 3x for every complex bifurcation**





BifurcAID



Minicrush



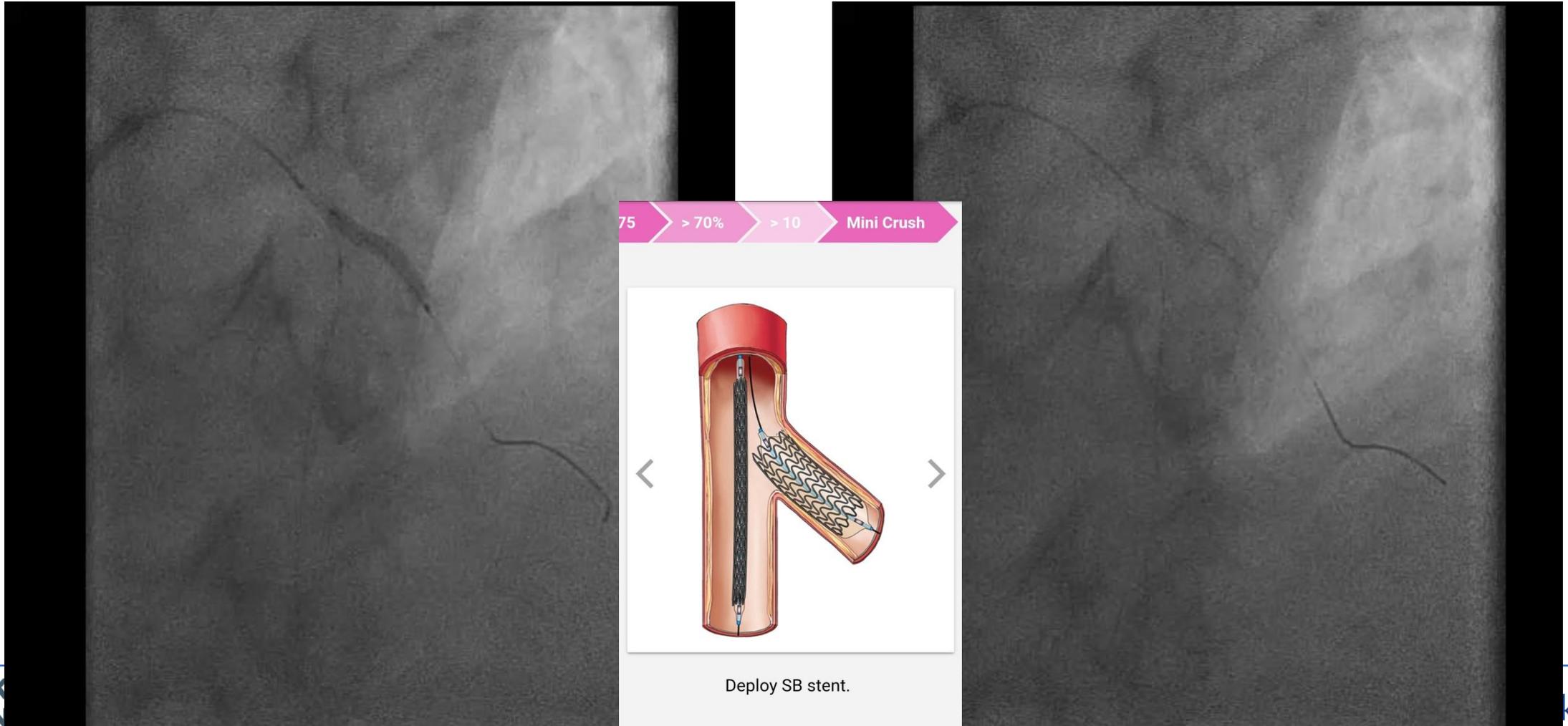
Minicrush

Sapphire 3 2,0x15mm v RD



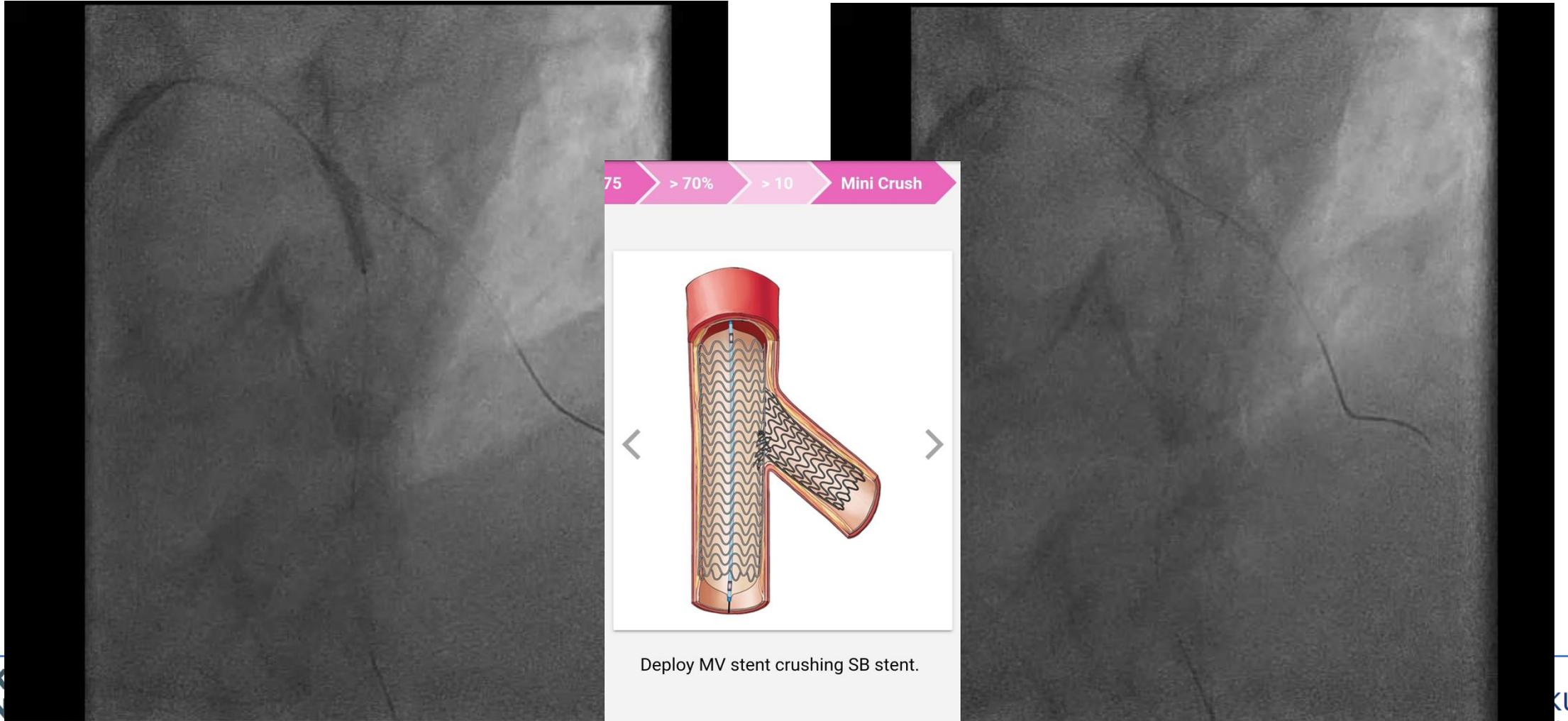
Minicrush

stent **Synergy XD 2.5/20mm** v RD, balon **Sapphire 3 3.0/15mm** v



Minicrush

stent **Synergy XD 3.0/16mm** v RIA



75 > 70% > 10 Mini Crush

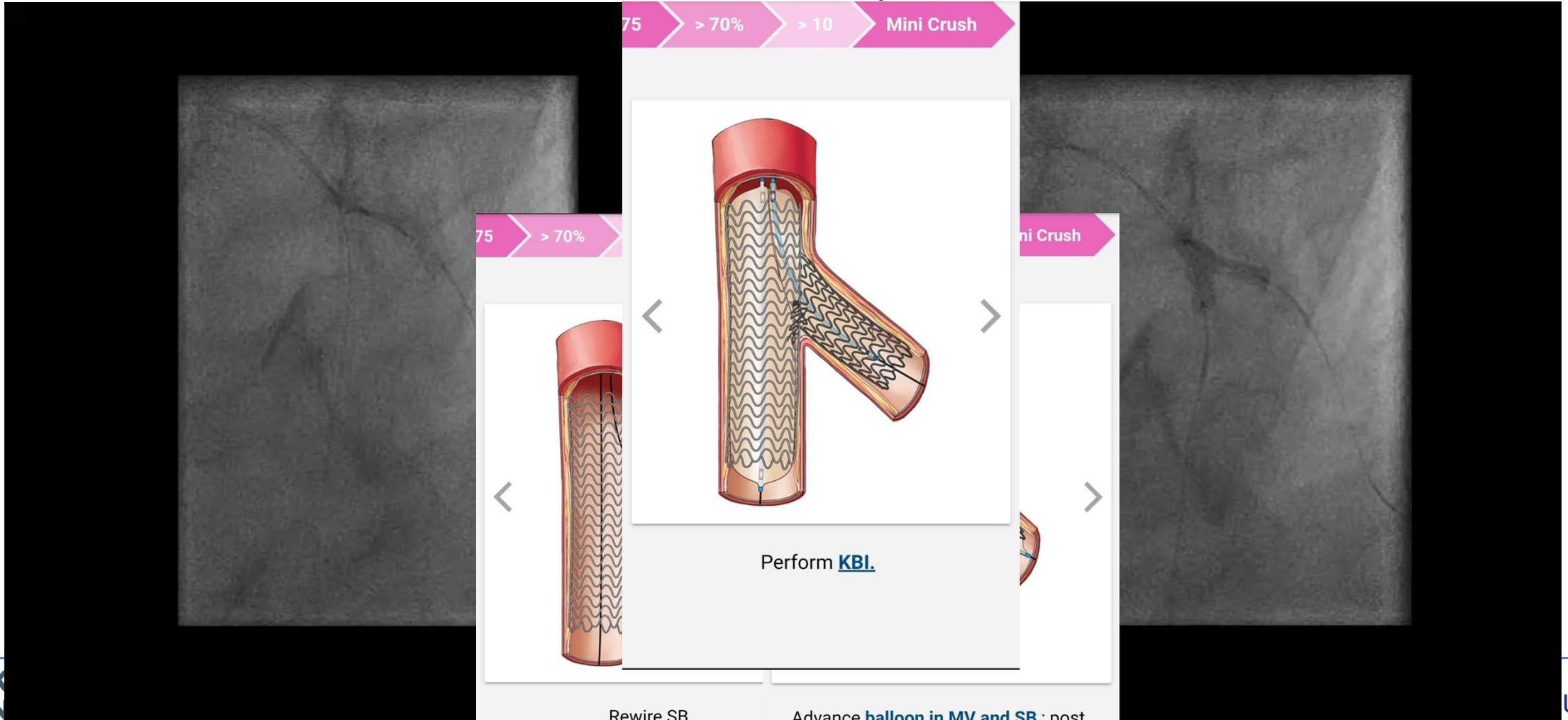


Deploy MV stent crushing SB stent.

Minicrush

rewiring do RD, balon **Sapphire 3 2.0/15mm** do

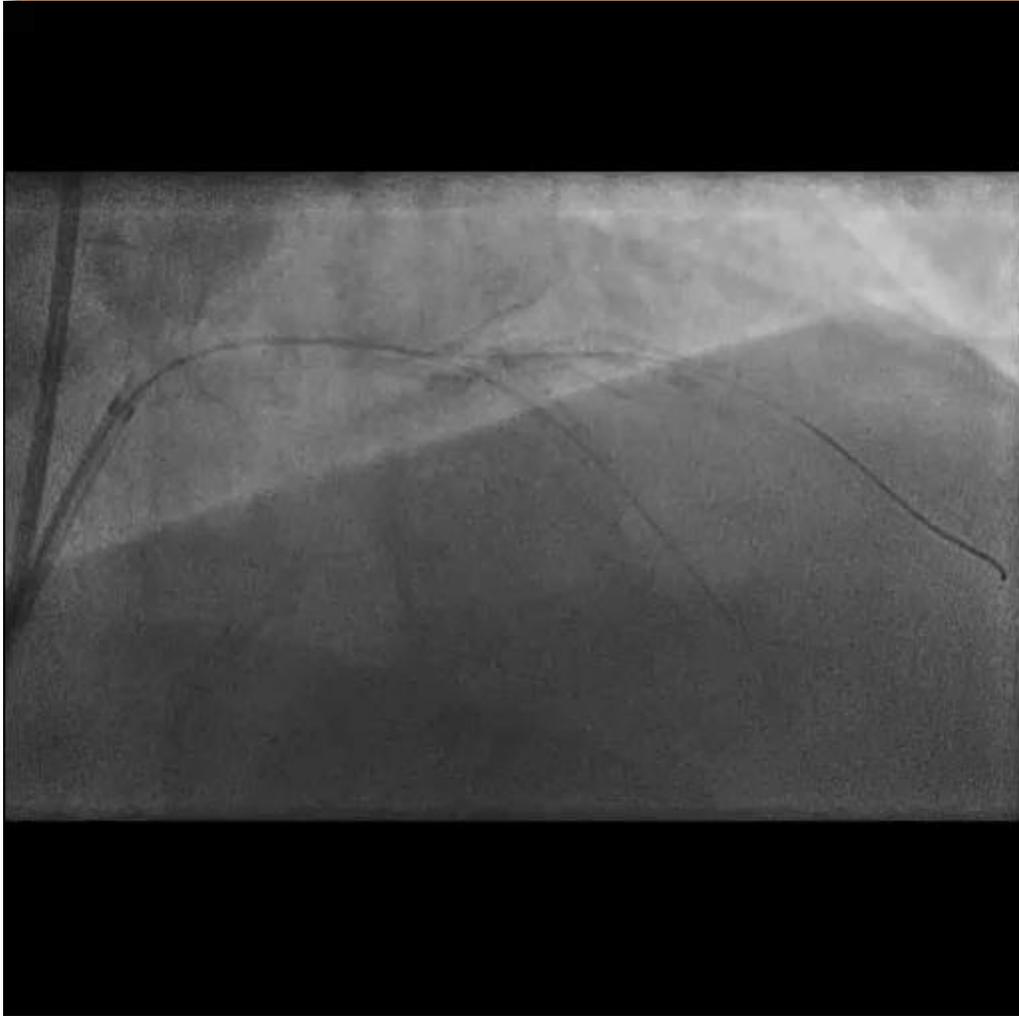
kissing **Sapphire 3 2.0/15** do RD a NC **Conqueror 3.0/12** do RIA



Rewire SB.

Advance [balloon in MV and SB](#); post dilate SB stent first.

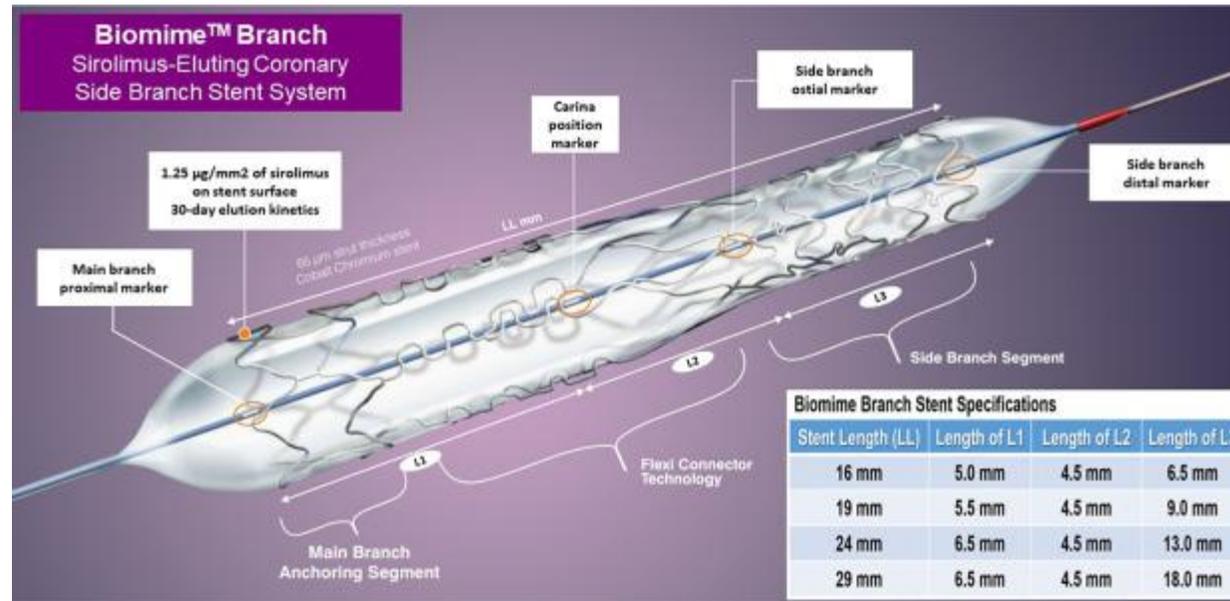
Minicrush



Výhody mini crush techniky

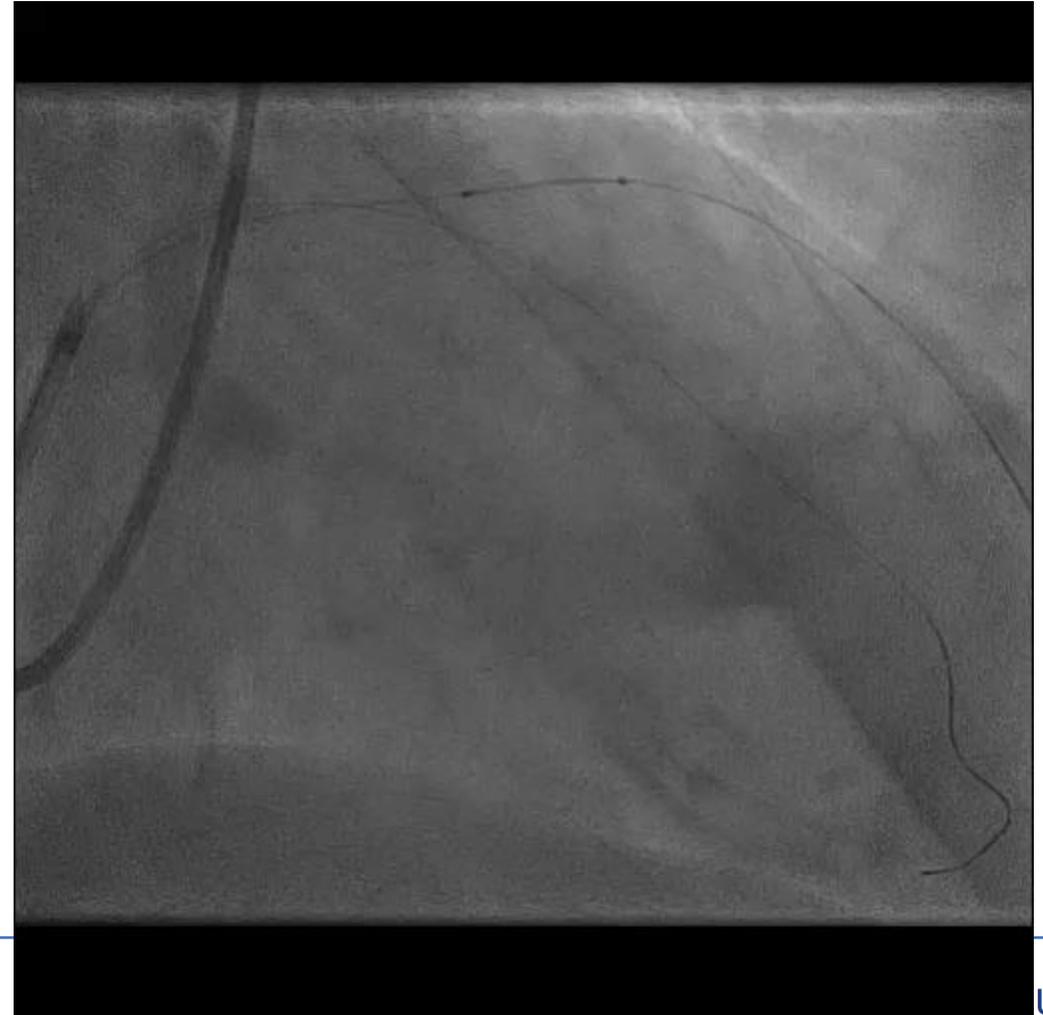
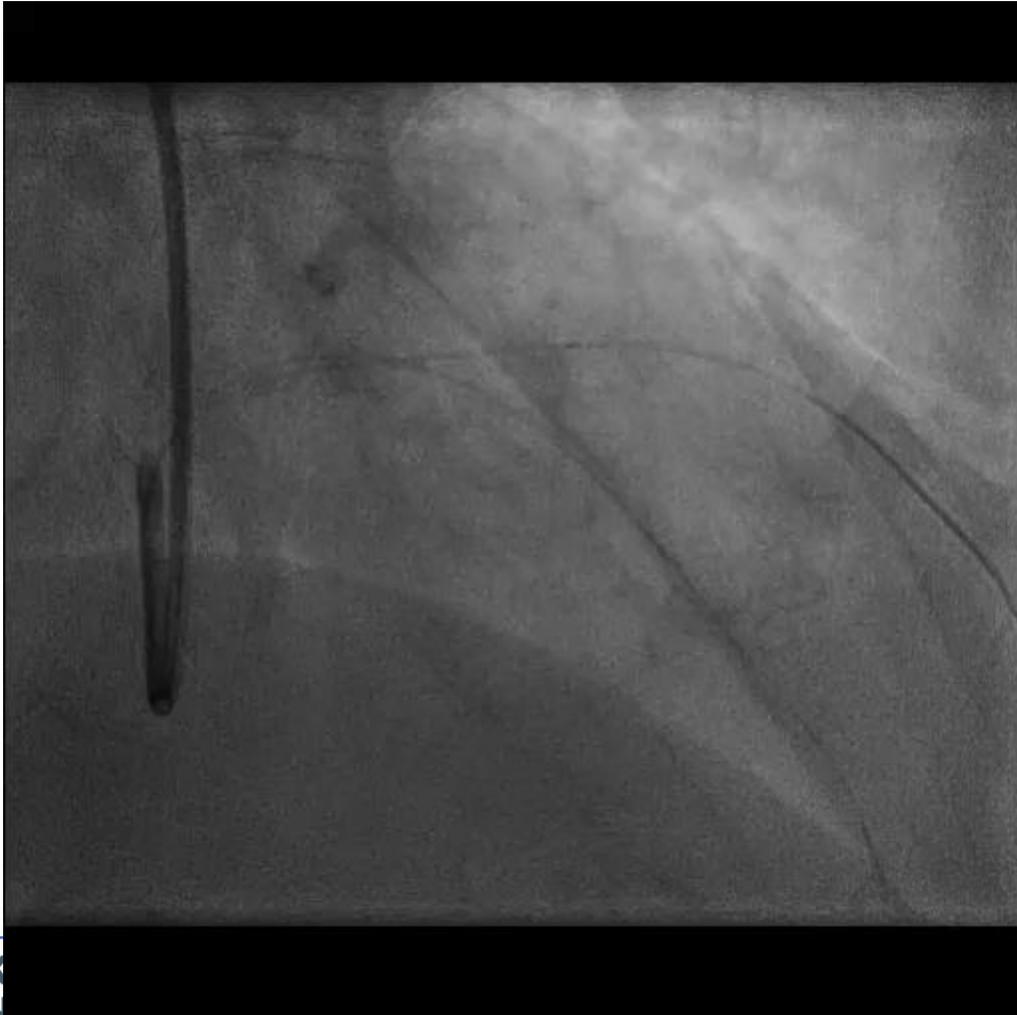
1. Rychlejší procedura
2. Odpadá opakovaná kissing dilatace oproti DK crush
3. „Méně železa“ před bifurkací (kde není patrné postižení) oproti DK crush, crush i Culotte
4. Optimální karina oproti T-stentingu

Dedikovaný bifurkační stent



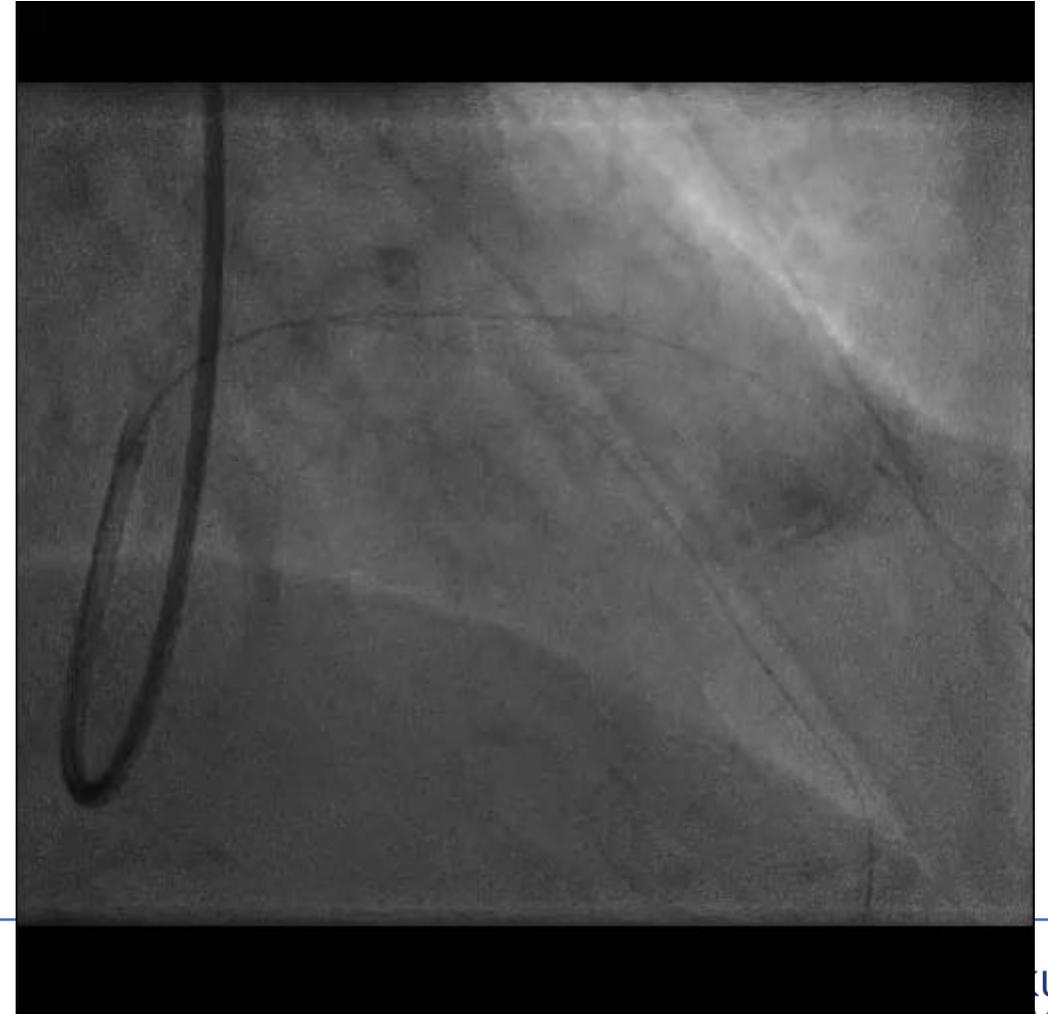
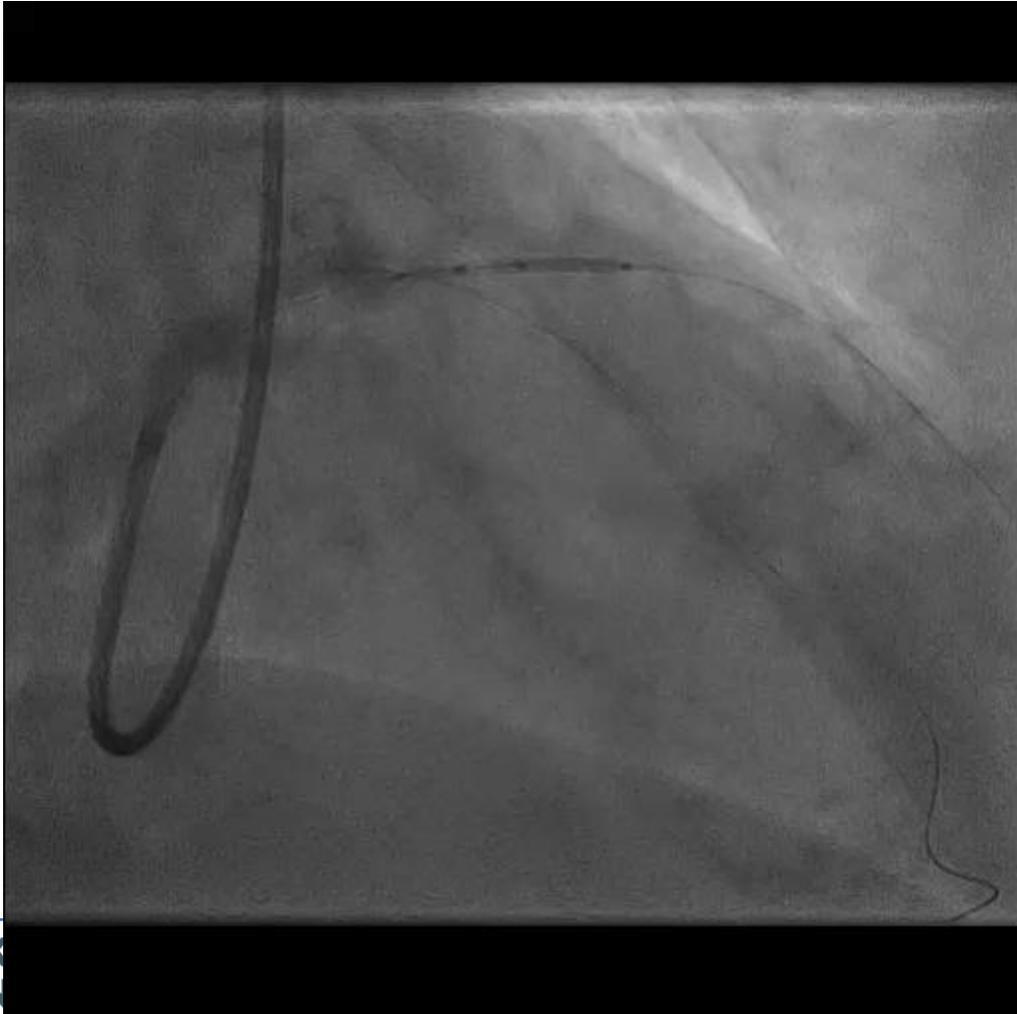
Dedikovaný bifurkační stent

predilatace balonem *RyuRei 3.0/15mm* v RD



Dedikovaný bifurkační stent

Biomime Branch 3.5-3.0/19mm z RIA do RD

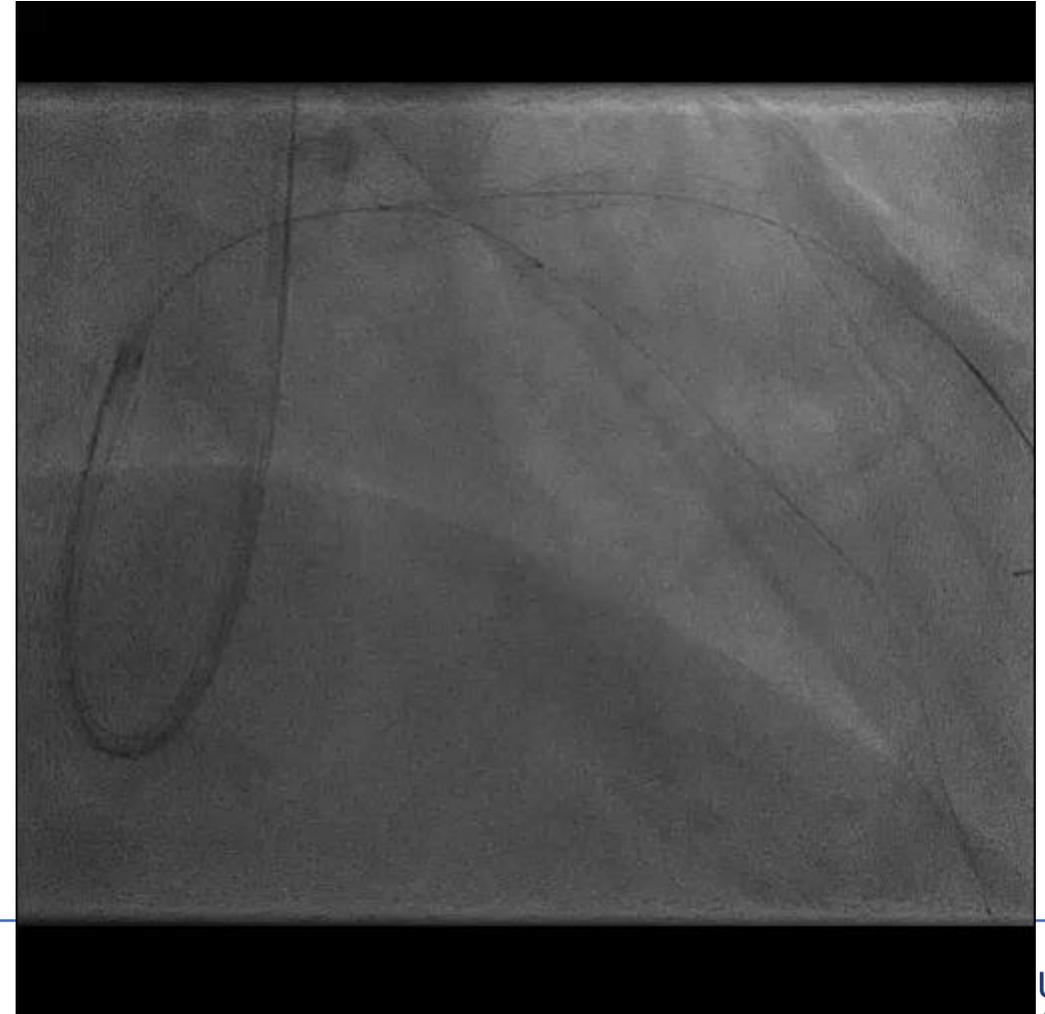


Dedikovaný bifurkační stent

disekce RD - **Coroflex ISAR NEO 2.75/16mm**



rewire do RIA, *RyuRei 3.0/15* v RIA



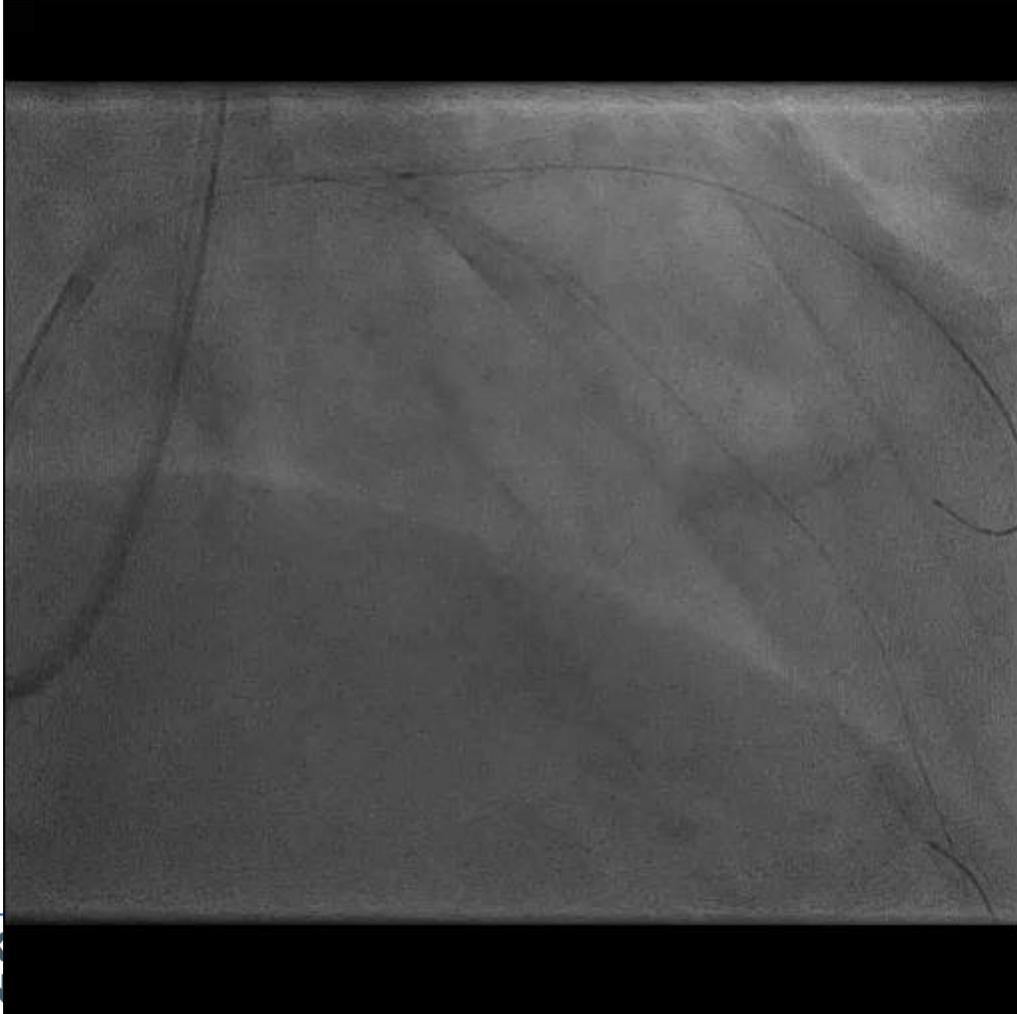
Dedikovaný bifurkační stent

stent **Coroflex ISAR NE 3.5/28mm** do RIA



Dedikovaný bifurkační stent

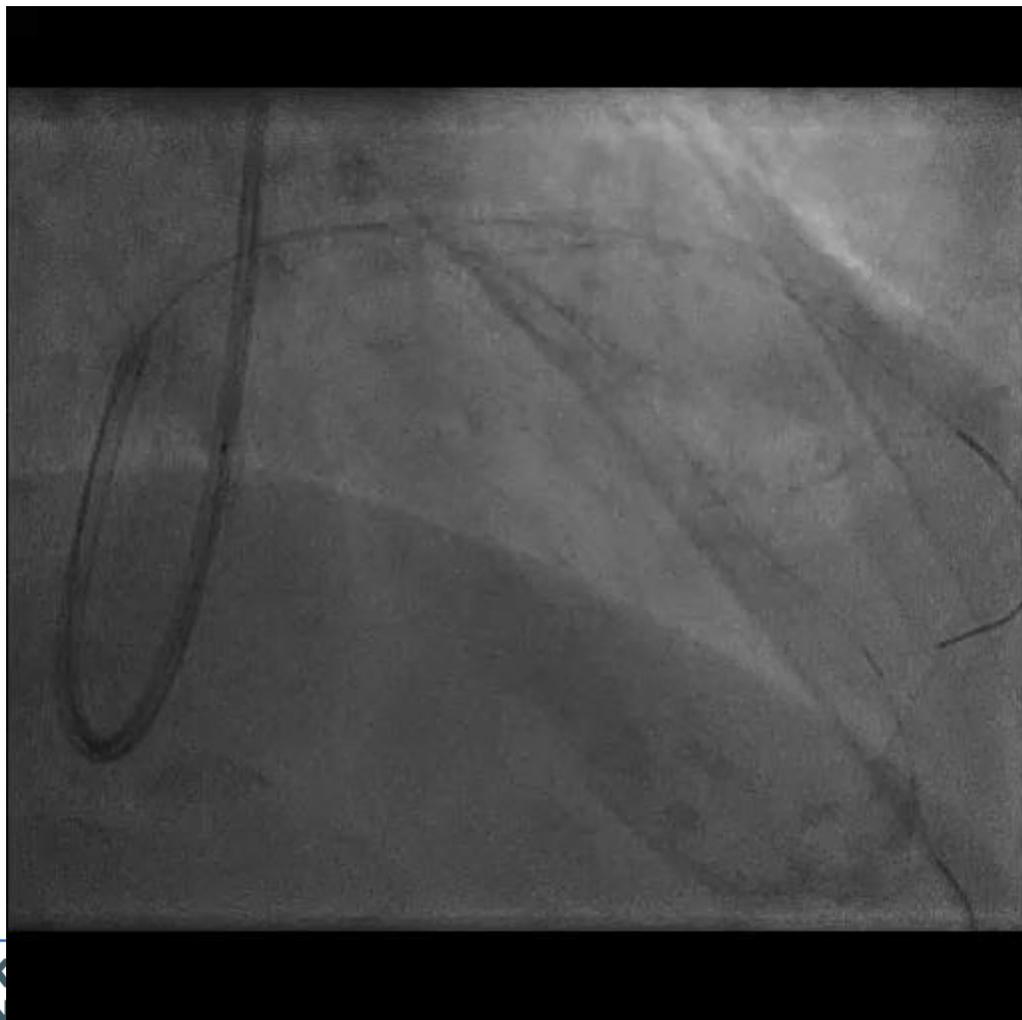
rewire do RD, balon Sapphire 3 1.5/15mm



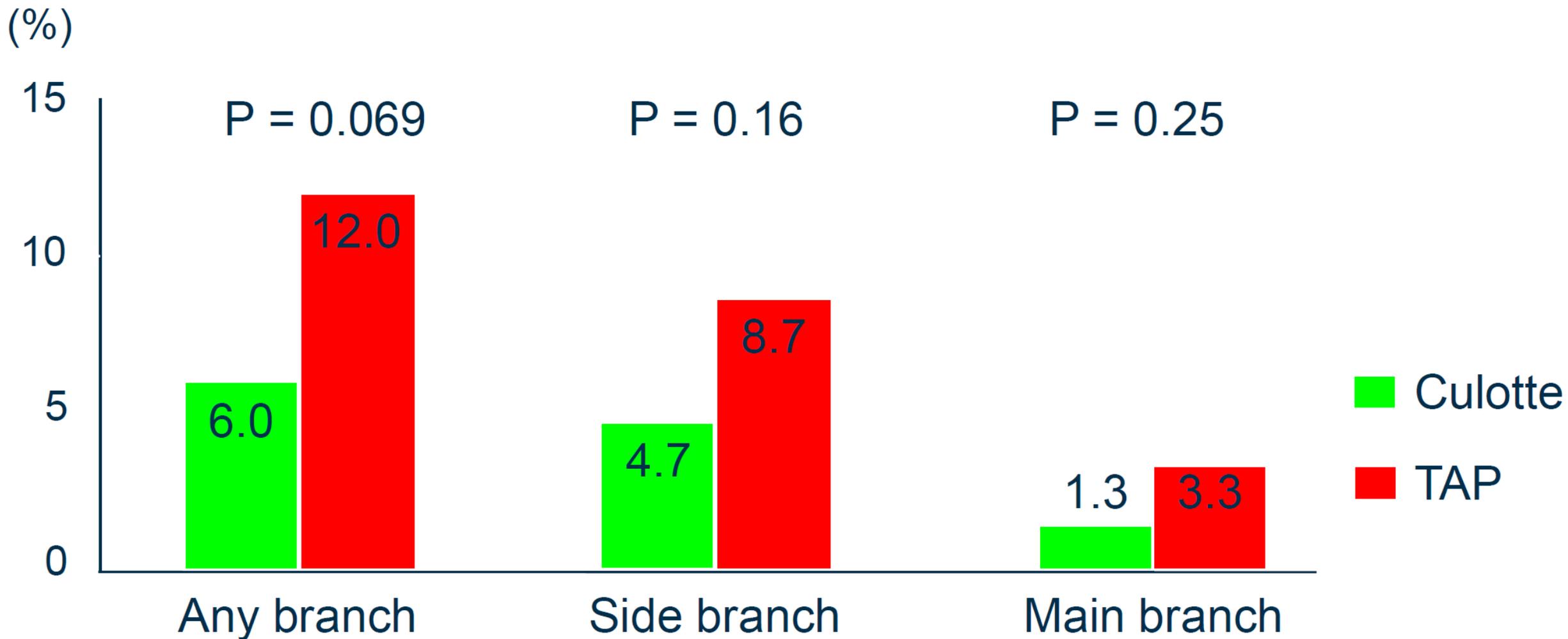
kissing RD RyuRei 3.0/15mm v RIA NC TREK 3.5/6mm



Dedikovaný bifurkační stent



TLR bifurkačních lézí po 1 roce



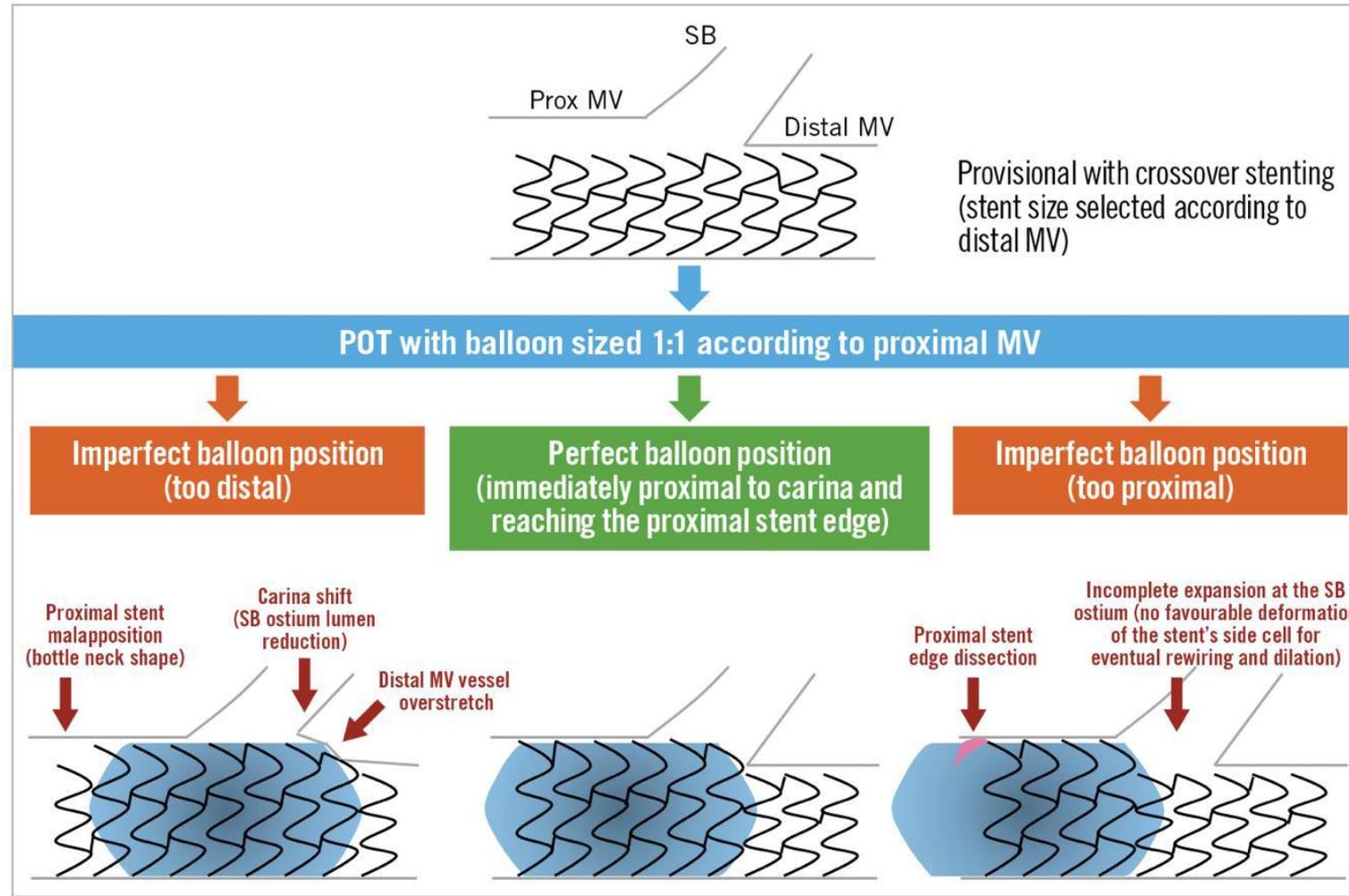
Zobrazení je nezbytné k vedení přípravy léze, stanovení velikostí a optimalizace bifurkační PCI

- Plánování PCI strategie
 - 1 vs 2 stenty
- Příprava léze (preparace)
 - vyhodnocení úhlu, délky a tloušťky kalcia
- Stanovení velikosti (sizing) materiálu
 - Pre-dilatation sizing (balon)
 - Stent sizing
 - POT balon sizing
- PCI optimalizace
 - Expanze
 - Apozice a prolaps tkáně
 - Disekce na konci stentu, velikost plátu (plaque burden)

Zobrazení k zhodnocení distribuce plátu napomáhá bifurkační strategii a velikosti použitého materiálu

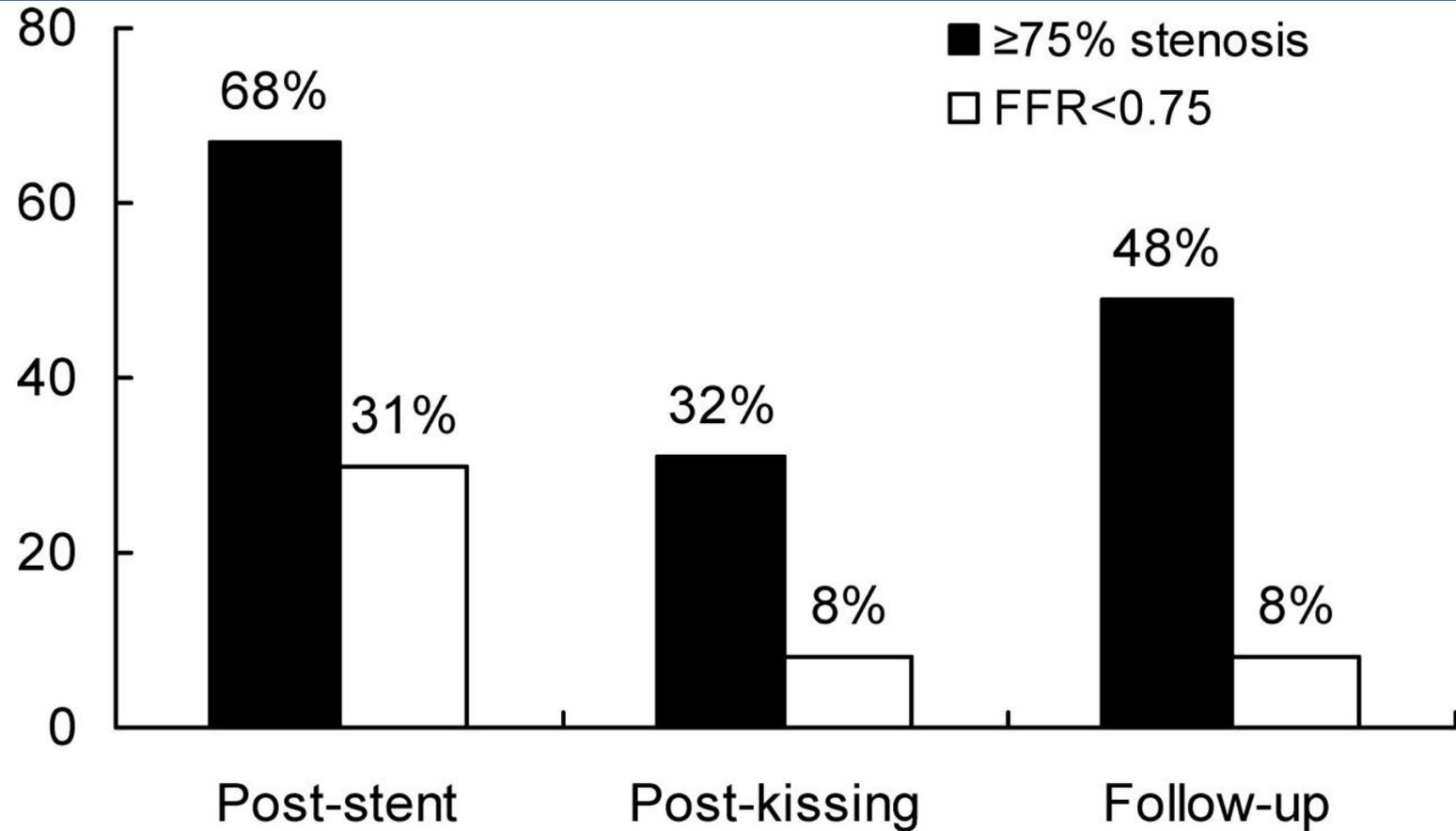


Zobrazení k zajištění adekvátní techniky proximální optimalizace (POT)



FFR u bifurkačního onemocnění

N = 108 pacientů s FFR guided bifurkační PCI vs 108 pacientů s angiograficky vedenou PCI s DES



Děkuji

za pozornost

