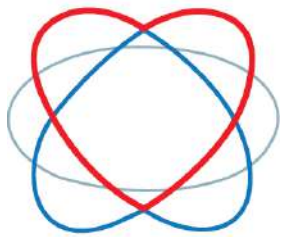


Bifurcation à deux stents: quand et comment

Nicolas Boudou

Clinique Saint Augustin

Bordeaux



Cardiologie Médicale
et Interventionnelle
SAINT-AUGUSTIN

Conflits d'intérêt

Speaker's name: Dr Nicolas Boudou

☑ CTO proctoring: Asahi, Terumo

☑ FORM A: score 2

☑ FORM B: score 2

I. I have received (a) research grant(s) / in kind support		II. I have been a speaker or participant in accredited CME/CPD ...		III. I have been a consultant / strategic advisor etc. ...		IV. I am a holder of (a) patent / shares / stocks or ownership...	
A ... from current sponsor(s)		A ... from current sponsor(s)		A ... for current sponsor(s)		A ... related to presentation	
YES	NO	YES	NO	YES	NO	YES	NO
☐	☒	☐	☒	☐	☒	☐	☒
B ... from any institution		B ... from any institution		B ... for any institution		B ... not related to presentation	
YES	NO	YES	NO	YES	NO	YES	NO
☒	☐	☒	☐	☐	☒	☐	☒

SCORE: 2

Bifurcation à deux stents: quand?

➔ **Bifurcation complexe: tortuosité, angulation, Ca++, CTO, ...**

+ Accès difficile pour guidewire, stent

- Bifurcation (1,0,1), (1,1,1)
- Accès par microcathéter, Rotablator

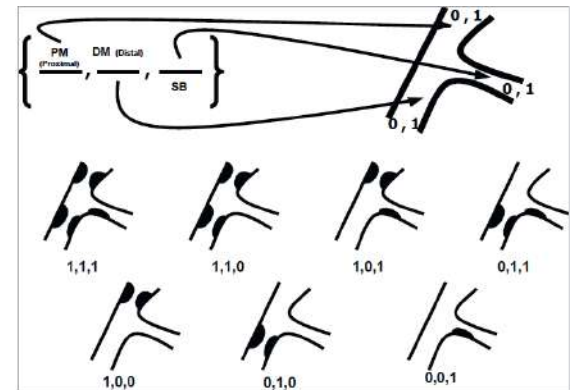
+ Branche fille pathologique au delà de la bifurcation

- > 5mm de l'ostium, au delà de la bifurcation : type (1,0,1,1); (1,1,1,1); (0,0,1,1)

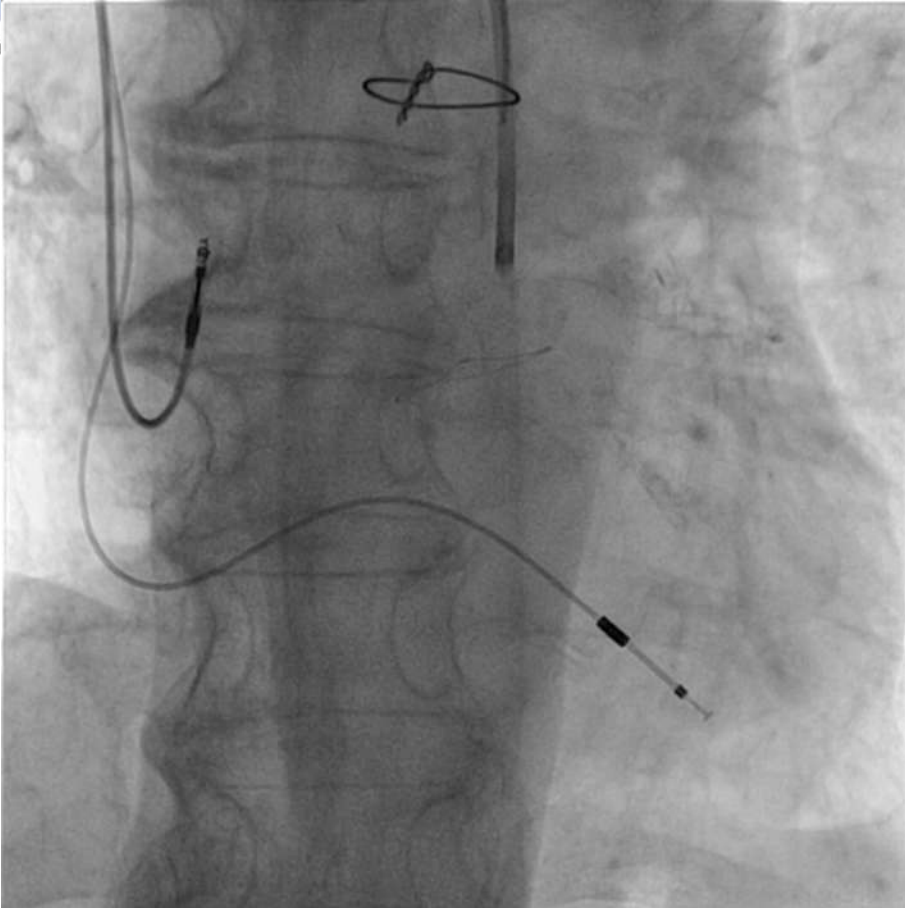
+ Sub-intimal shift

- Flap de dissection en regard de la branche, de la carène après prédilatation

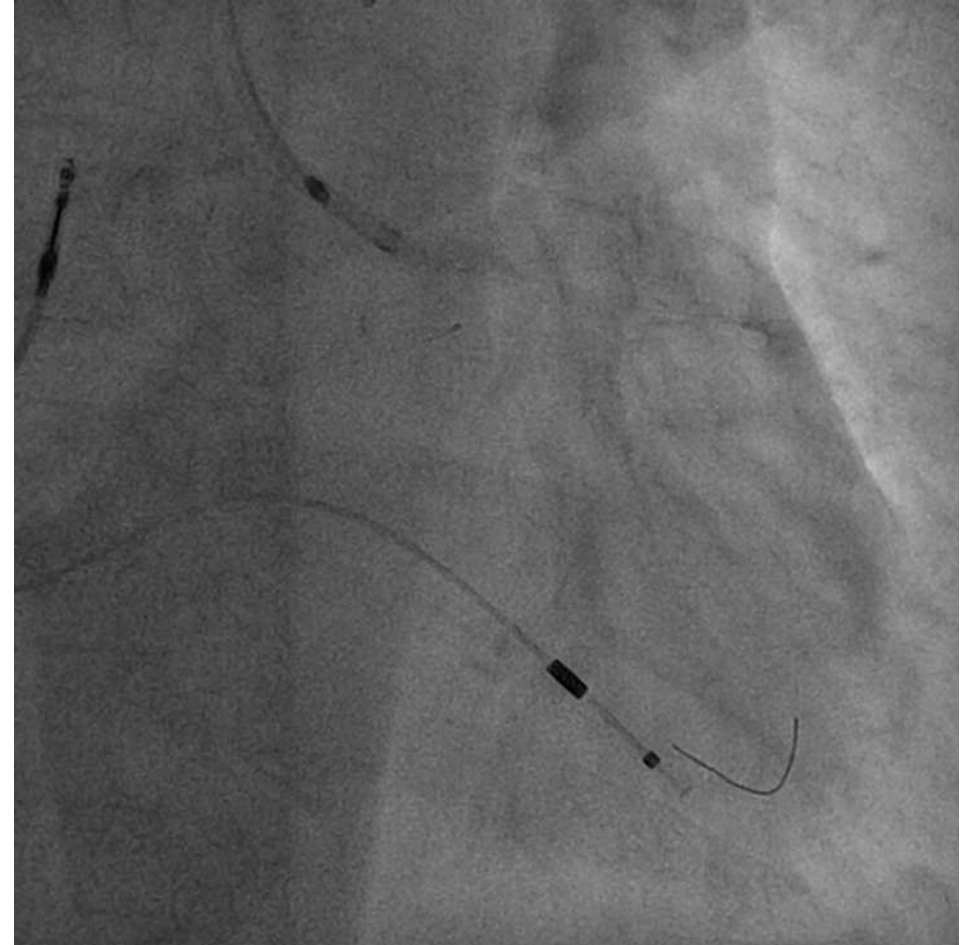
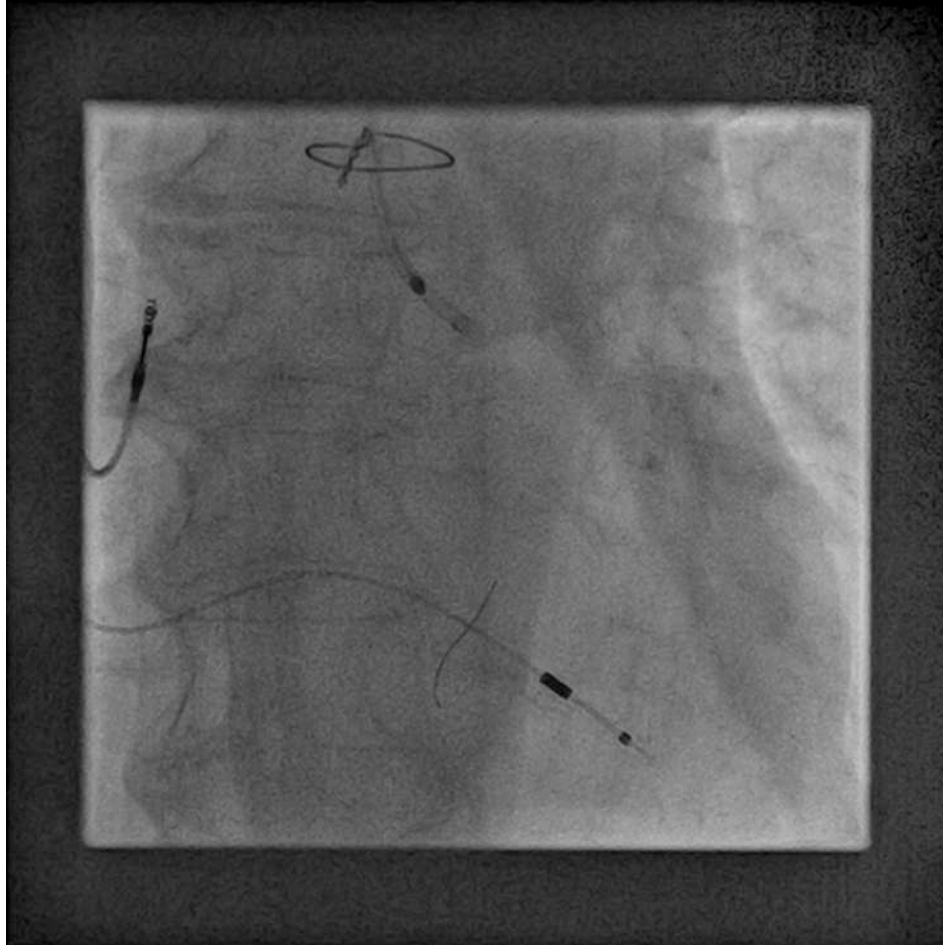
Medina classification



Accès difficile: bifurcation (1,1,1)



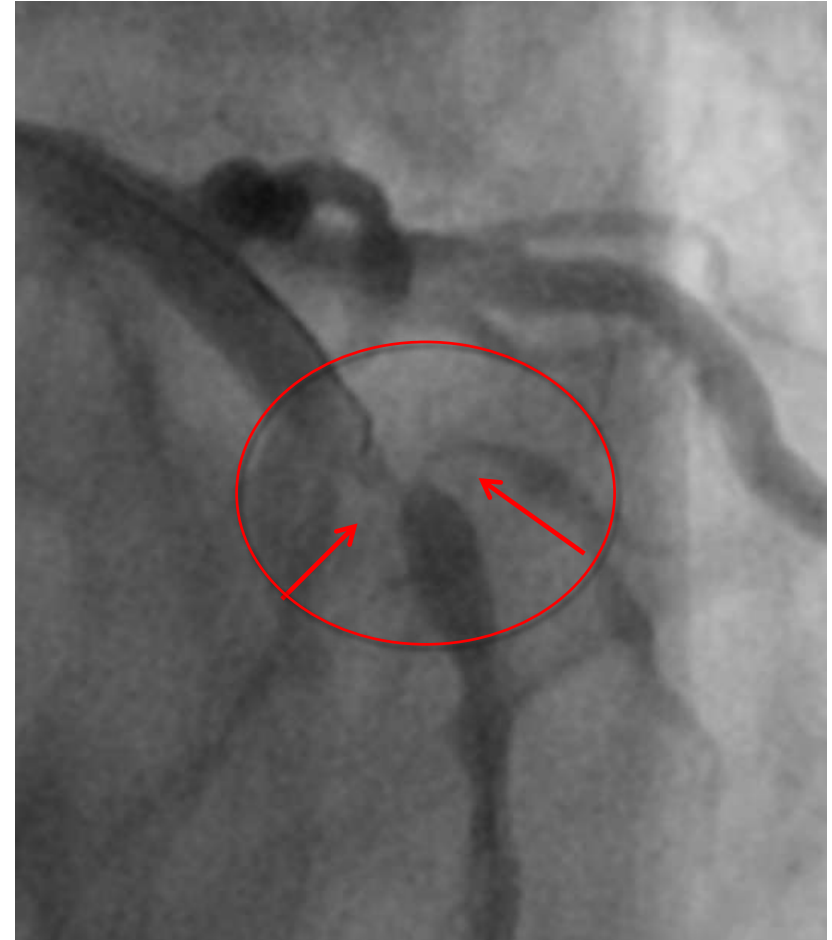
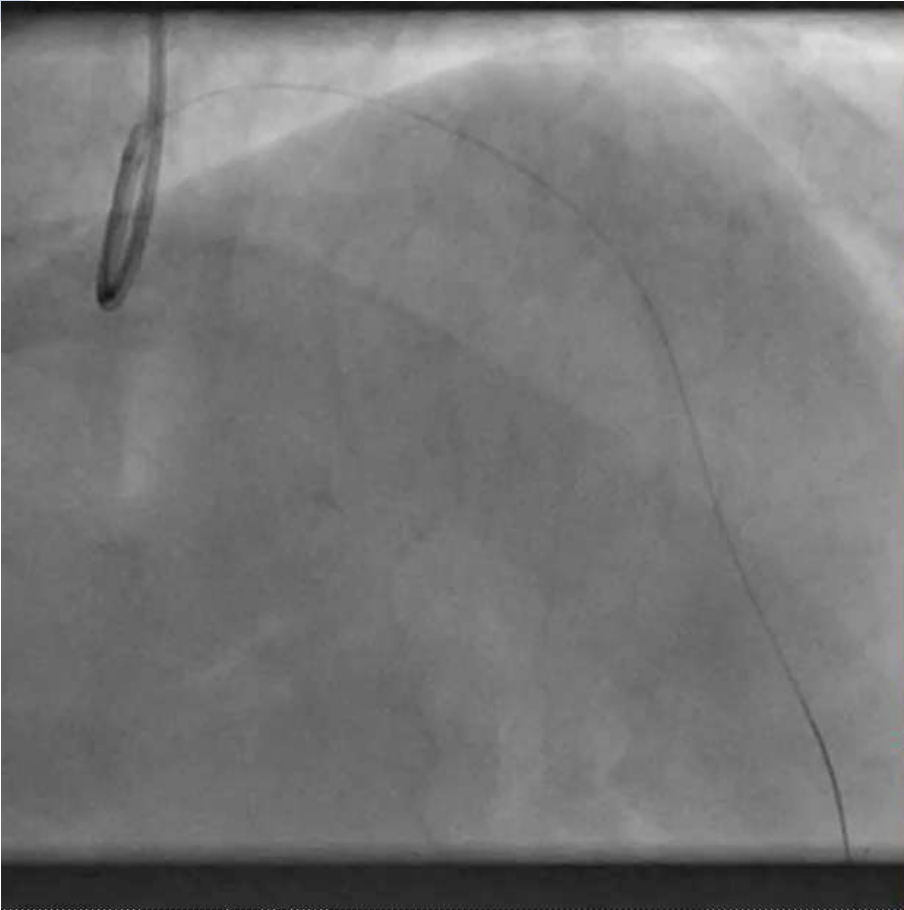
Accès difficile: Rotablator



Athérectomie ↘ risque d'occlusion de branche

Elargissement espace proximal sans dissection

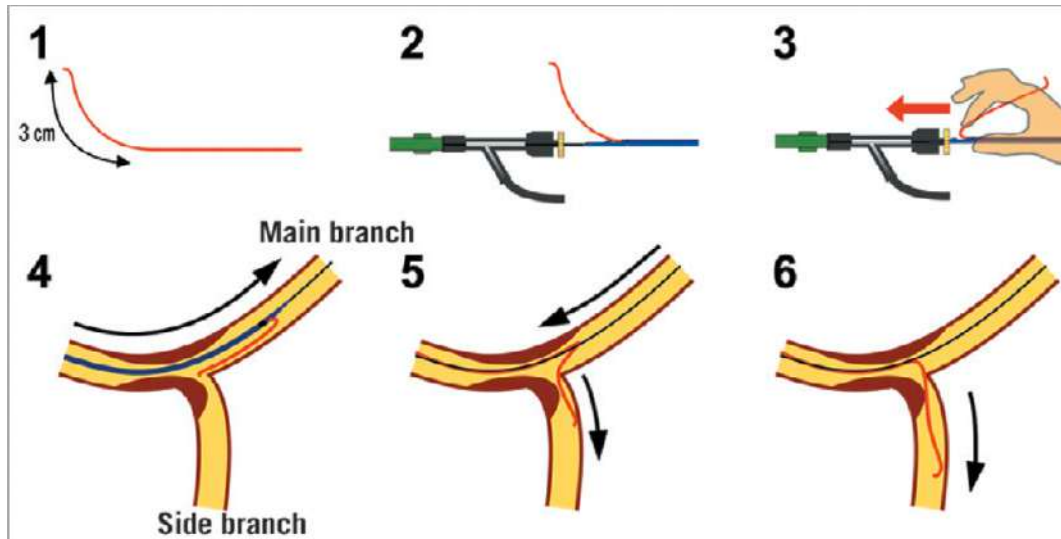
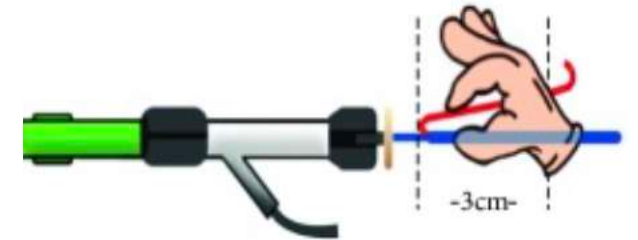
Branche fille pathologique: Reverse wire technique



Accès difficile: Reverse wire technique

Branche mère pathologique, en regard de la carène?

- Espace suffisant pour positionner le guide (1,0,1) ou (0,0,1)
- microcathéter simple ou double lumière, thrombo-aspirateur +++

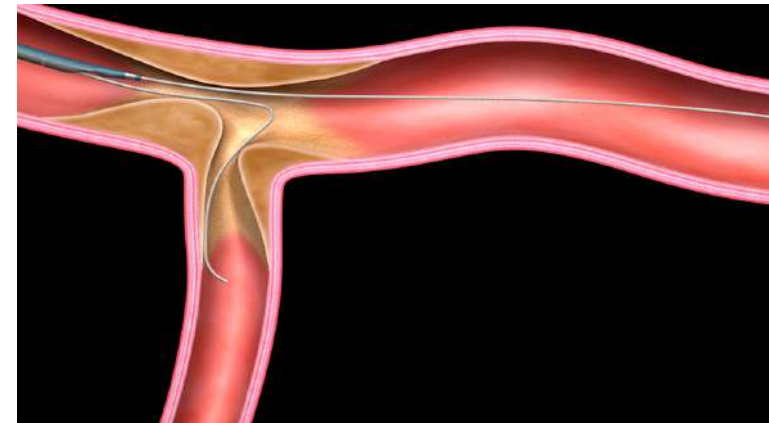
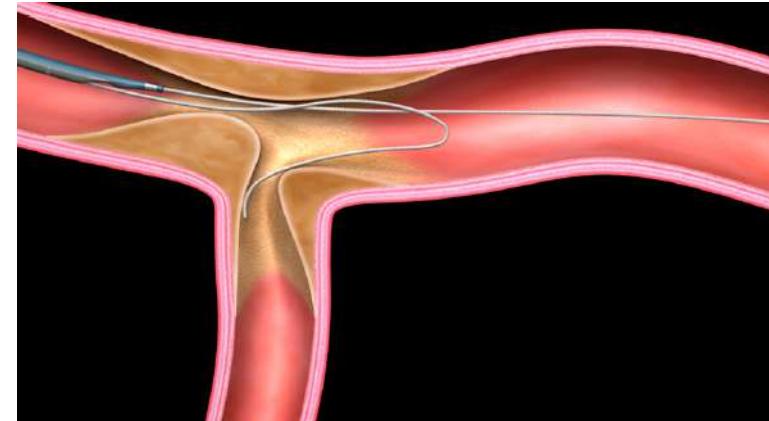
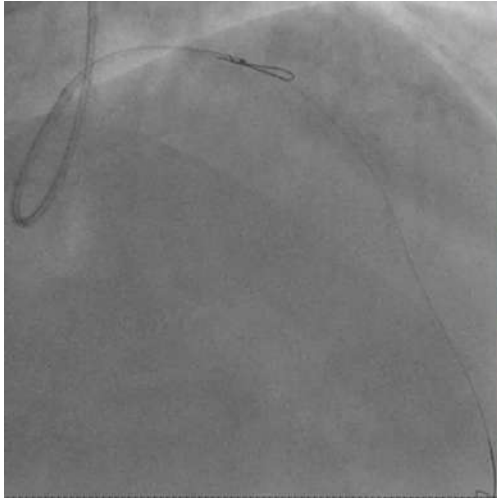


Microcatheter-facilitated reverse wire technique for side branch wiring in bifurcated vessels: an *in vitro* evaluation

Shin Watanabe¹, MD; Naritatsu Saito^{1*}, MD; Bingyuan Bao¹, MD; Akihiro Tokushige², MD; Hiroki Watanabe¹, MD; Erika Yamamoto¹, MD; Yoshiaki Kawase³, MD; Takeshi Kimura¹, MD

EuroIntervention 2013;9:870-877

Branche fille pathologique: Reverse wire technique



Microcathéter simple ou double lumière, thromboaspirateur

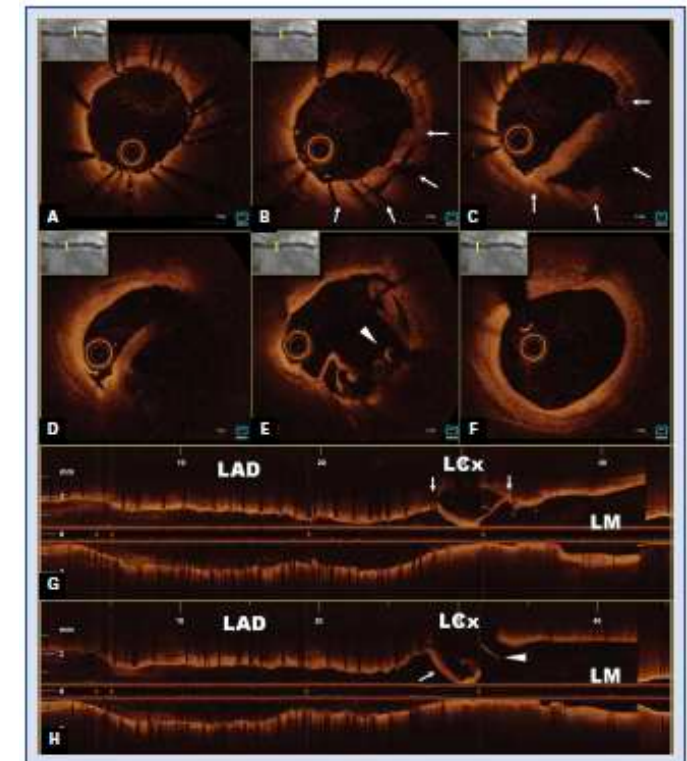
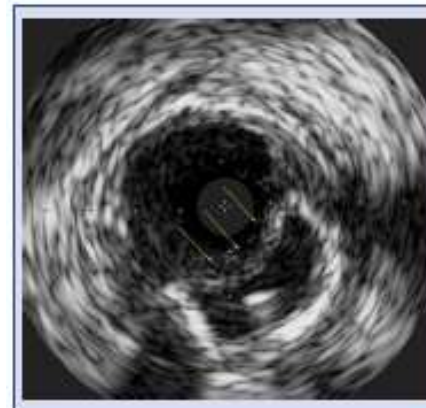
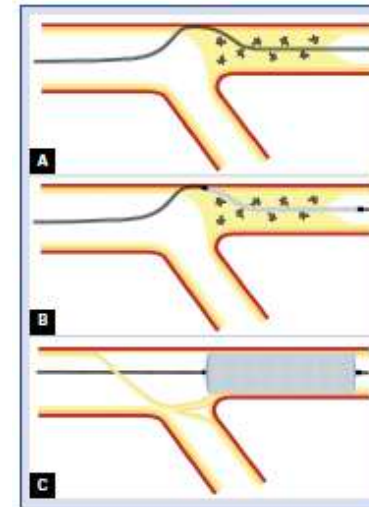
Sub intimal shift

- Flap intimal (dissection) en regard de la bifurcation
- **Facteur favorisant:** prédilatation branche fille (occlusion / stenting branche mère en premier), CTO ...
- **Stratégies :**
 - Avec stenting branche fille en premier
 - Avec retrait de guide après stenting
- Intérêt du Rotablator / éviter prédilatation branche fille

Subintimal shift as mechanism for side-branch occlusion in percutaneous treatment of chronic total occlusions with bifurcation lesions

Juan Luis Gutiérrez-Chico^{1,2}, Carlos Cortés^{3,4}, Mohamed Ayoub⁵,
Bernward Lauer⁵, Sylvia Otto⁵, Bernd Reisbeck², Manuela Reisbeck²,
Christian Schulze⁵, Kambis Mashayekhi²

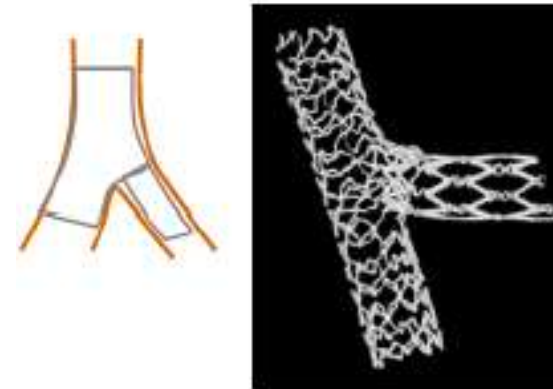
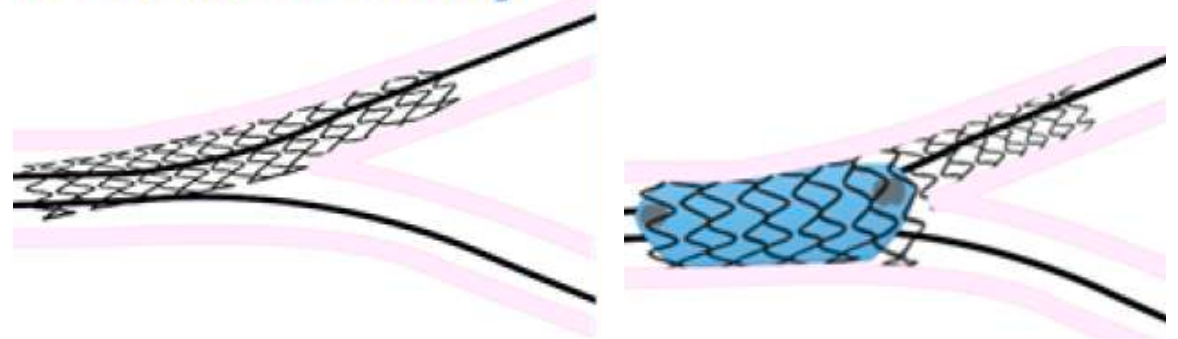
Cardiology Journal, 2021



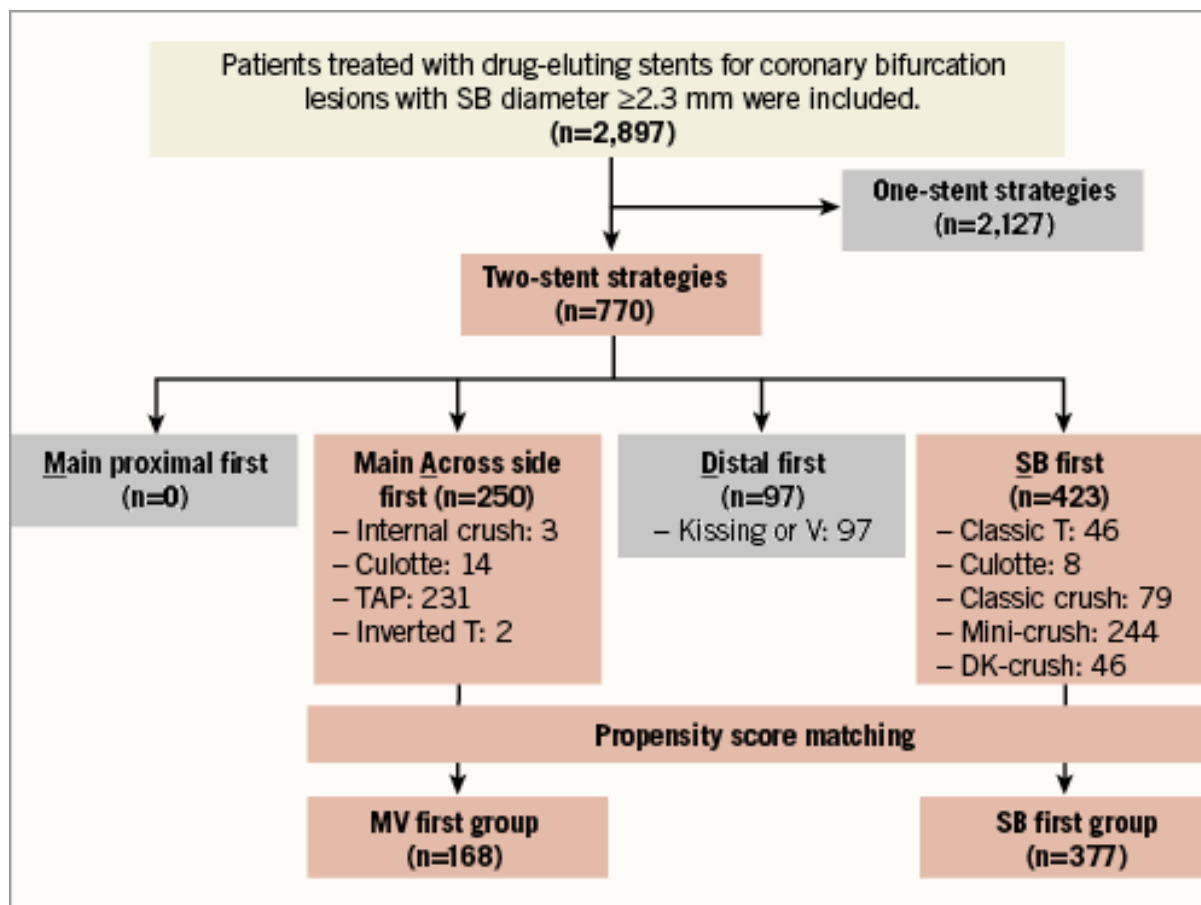
Bifurcation à un stent en prévision d'un second

- **Premier stent :**
 - Side Provisional stenting?
 - Inverted ou Main provisional stenting?
- **Second stent: T, Culotte?**

1. Prox MV-SB stenting

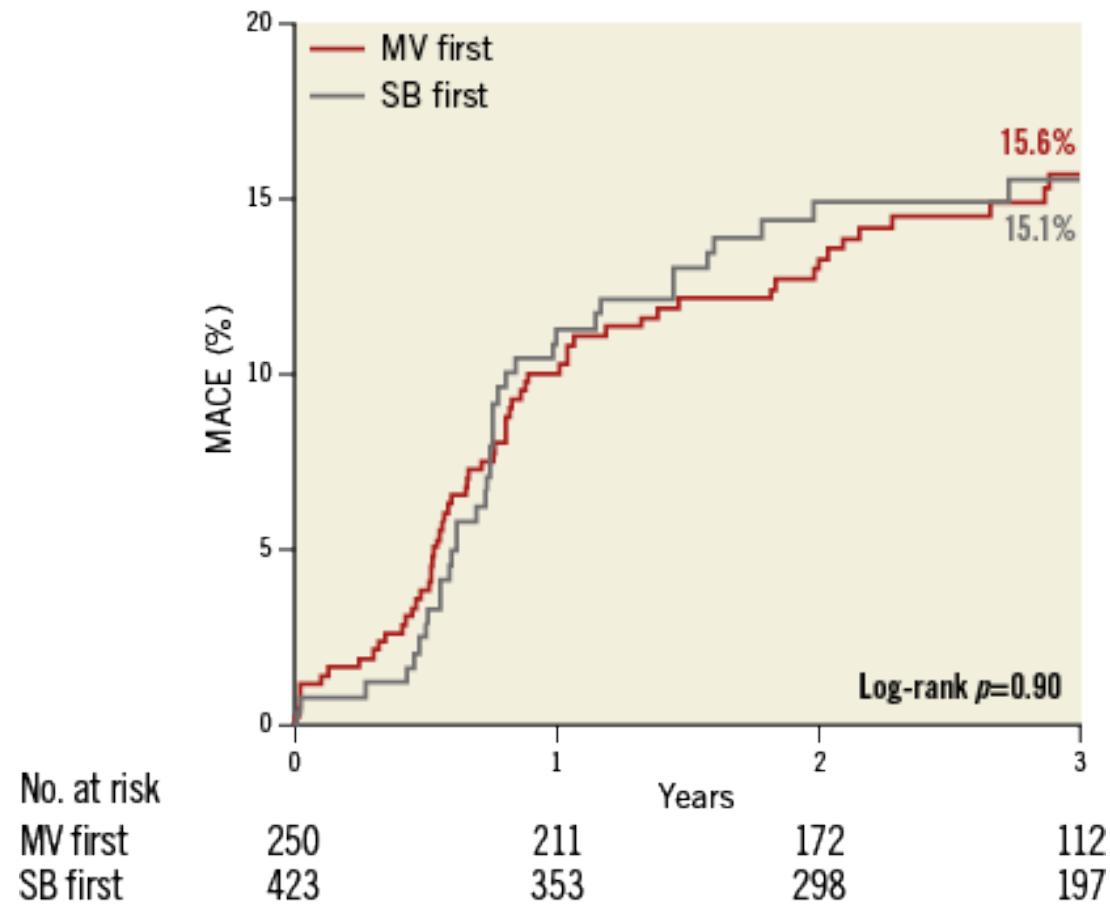


European Bifurcation Club white paper on stenting techniques
for patients with bifurcated coronary artery lesions



EuroIntervention 2017;13:835-842 published online May 2017

Two-stent techniques for coronary bifurcation lesions (main vessel first versus side branch first): results from the COBIS (COronary BIfurcation Stenting) II registry



EuroIntervention 2017;13:835-842 published online May 2017

Two-stent techniques for coronary bifurcation lesions (main vessel first versus side branch first): results from the COBIS (COronary BIfurcation Stenting) II registry

COBIS II

Table 3. Procedural outcomes and in-hospital events in the total and propensity score-matched populations.

		Total population			Propensity score-matched population		
		SB first (n=423)	MV first (n=250)	p-value	SB first (n=377)	MV first (n=168)	p-value
MV occlusion during procedure ^a		13 (3.1)	10 (4.0)	0.68	12 (3.2)	8 (4.8)	0.63
SB occlusion during procedure ^a		16 (3.8)	30 (12.0)	<0.001	11 (2.9)	21 (12.5)	<0.001
Angiographic success ^b	MV	421 (99.5)	249 (99.6)	>0.99	375 (99.5)	167 (99.4)	0.86
	SB	418 (98.8)	246 (98.4)	0.73	373 (98.9)	164 (97.6)	0.31
In-hospital events ^c	Death	2 (0.5)	1 (0.4)	>0.99	2 (0.5)	1 (0.6)	0.82
	ST-elevation myocardial infarction	2 (0.5)	2 (0.8)	>0.63	2 (0.5)	2 (1.2)	0.32
	Bypass graft surgery	1 (0.2)	0 (0)	>0.99	1 (0.3)	0 (0.0)	0.51

Table 5. Determinants of side branch first techniques.

	Univariable analysis		Multivariable analysis ^a	
	Odds ratio (95% CI)	p-value	Odds ratio (95% CI)	p-value
Preprocedural MV RD ≥ 3.25 mm ^b	0.63 (0.45-0.87)	0.005	0.89 (0.61-1.33)	0.58
Preprocedural SB RD ≥ 2.5 mm ^b	0.56 (0.40-0.76)	<0.001	0.69 (0.47-1.01)	0.06
Preprocedural SB RD > MV RD	0.76 (0.43-1.37)	0.36	0.95 (0.51-1.77)	0.86
Preprocedural MV DS $\geq 70\%$ ^b	0.86 (0.63-1.19)	0.36	1.00 (0.68-1.46)	0.98
Preprocedural SB DS $\geq 70\%$ ^b	2.19 (1.52-3.18)	<0.001	1.31 (0.83-2.06)	0.25
Preprocedural SB DS > MV DS	2.38 (1.70-3.38)	<0.001	1.92 (1.24-3.02)	0.004
Lesion length of MV ≥ 18 mm ^b	1.23 (0.90-1.69)	0.19	1.08 (0.75-1.54)	0.69
Lesion length of SB ≥ 7.5 mm ^b	1.88 (1.37-2.58)	<0.001	1.49 (1.05-2.13)	0.03

EuroIntervention 2017;13:835-842 published online May 2017

Two-stent techniques for coronary bifurcation lesions (main vessel first versus side branch first): results from the COBIS (COronary BIfurcation Stenting) II registry

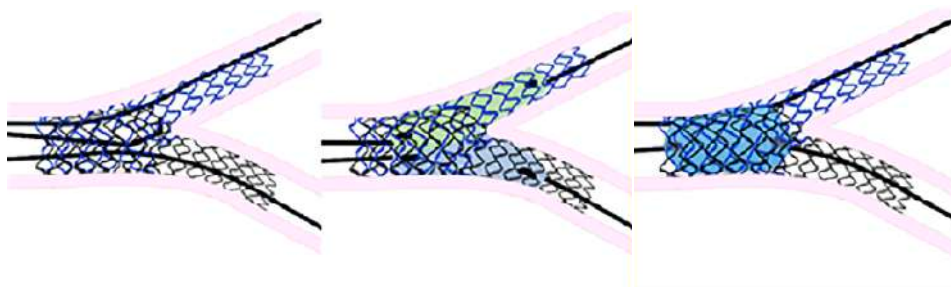
Bifurcation à deux stents: comment

DOUBLE KISSING CULOTTE

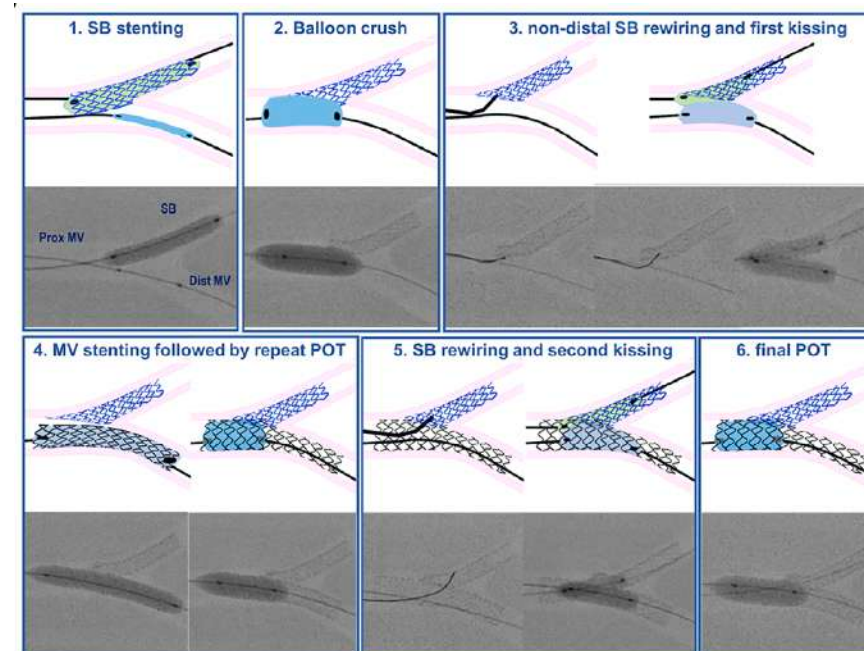
Culotte or inverted culotte

Double-kissing culotte technique for coronary bifurcation stenting

■ EuroIntervention 2020;16:e724-e733



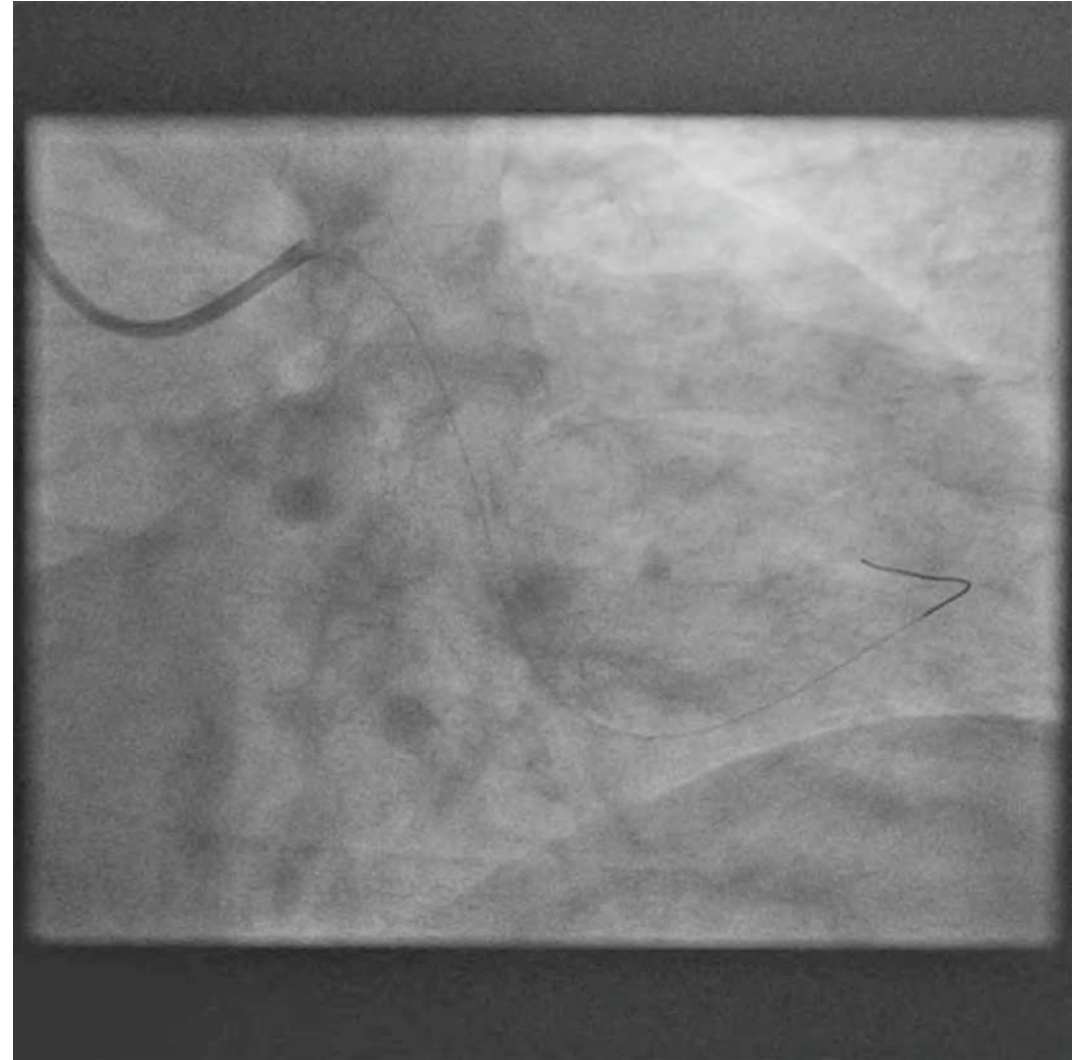
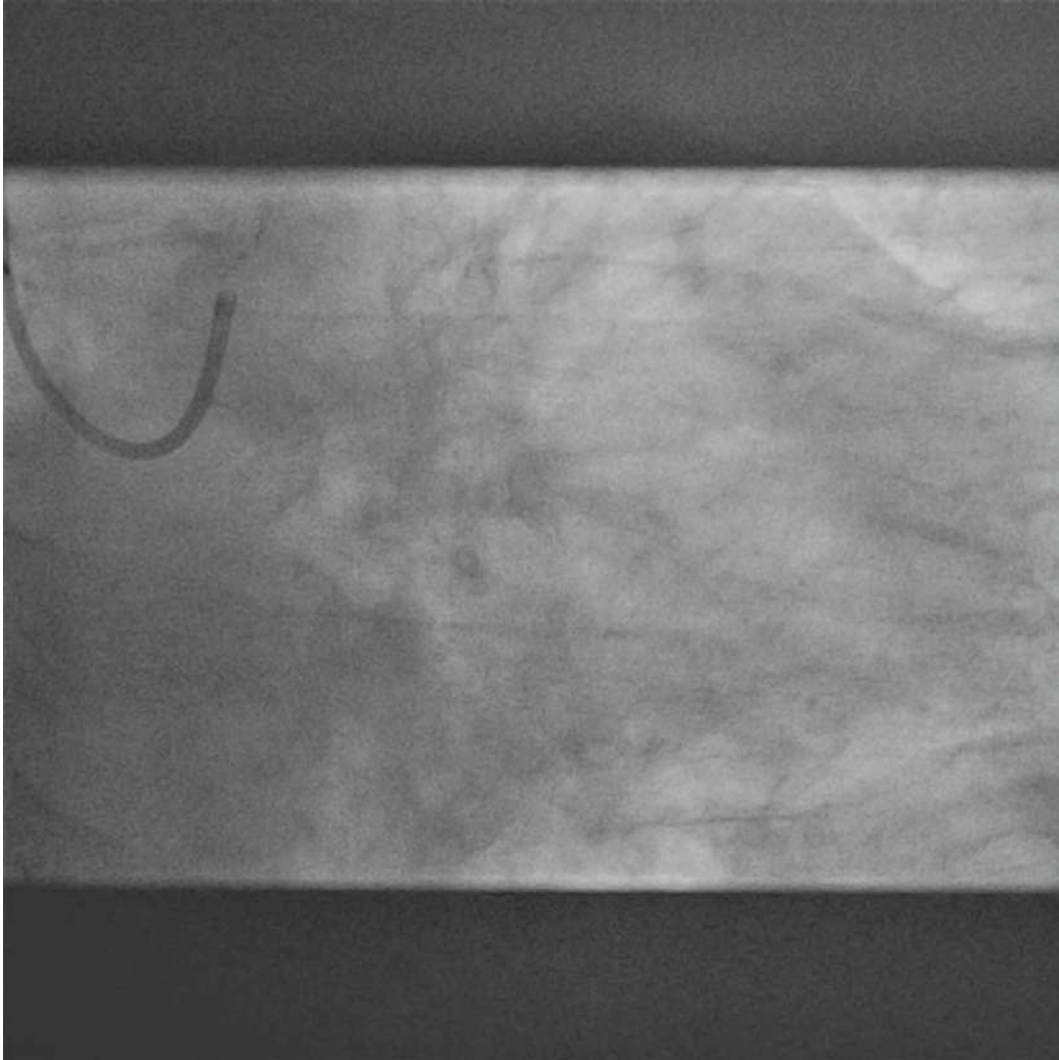
DOUBLE KISSING CRUSH



European Bifurcation Club white paper on stenting techniques
for patients with bifurcated coronary artery lesions

Catheter Cardiovasc Interv. 2020;96:1067–1079.

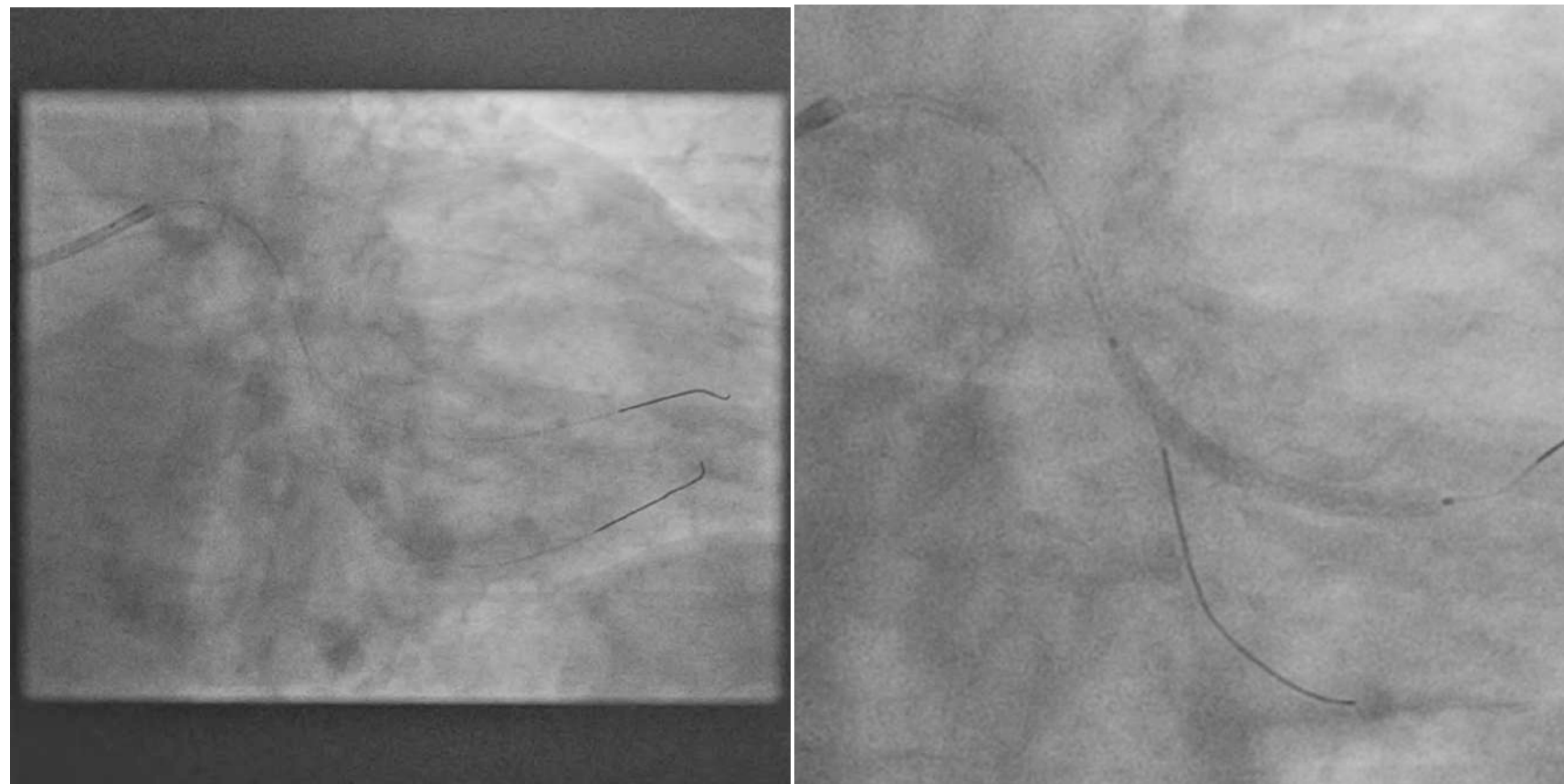
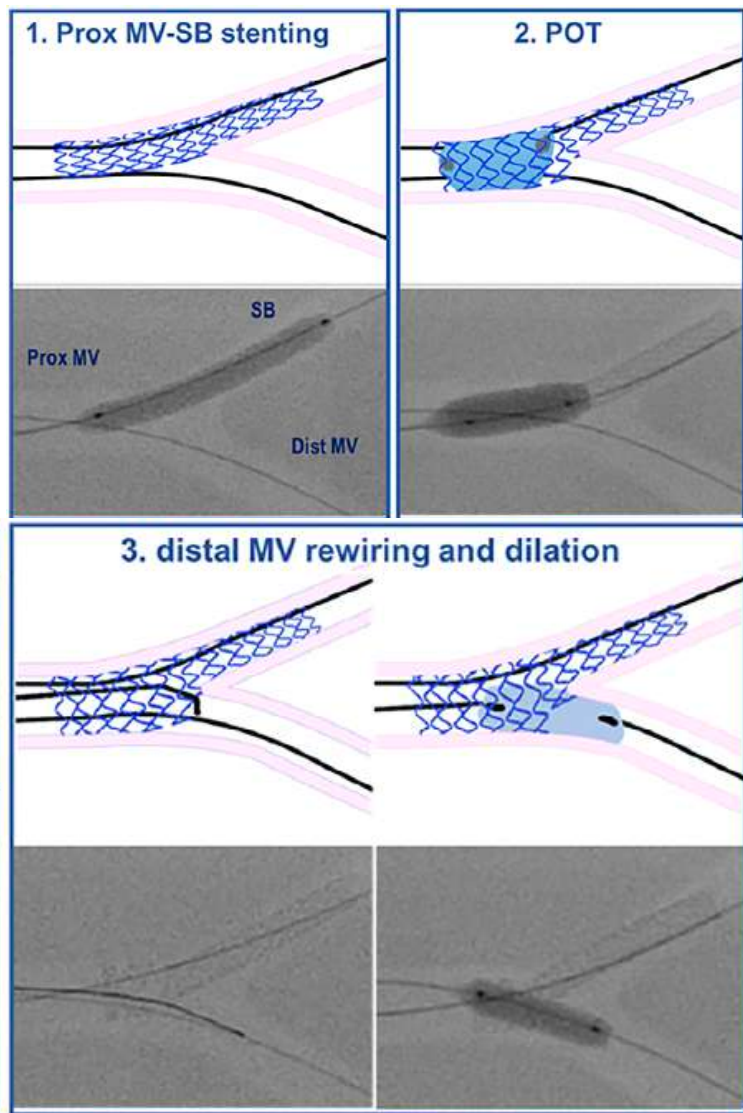
Bifurcation à deux stents: DK culotte



Bifurcation à deux stents: DK culotte

Double-kissing culotte technique for coronary bifurcation stenting

■ *EuroIntervention* 2020;16:e724-e733



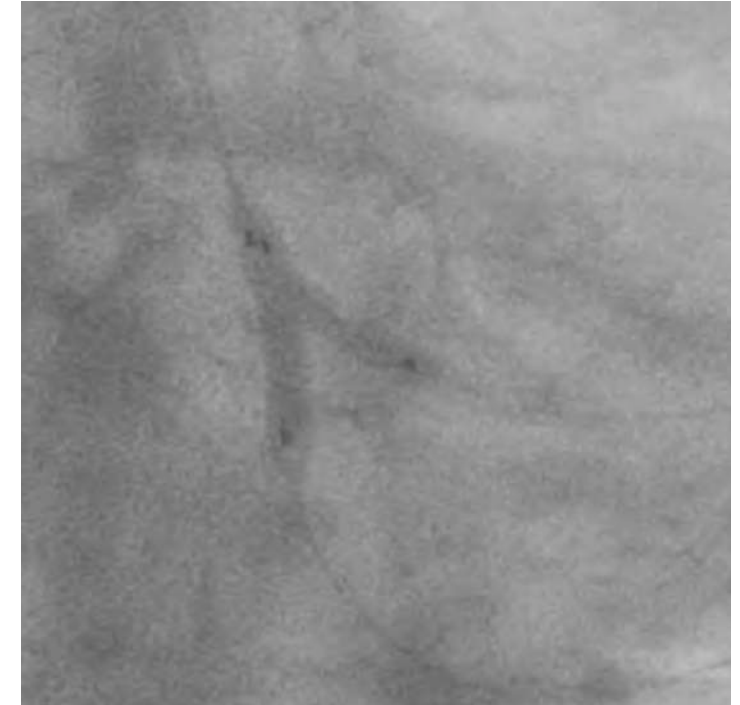
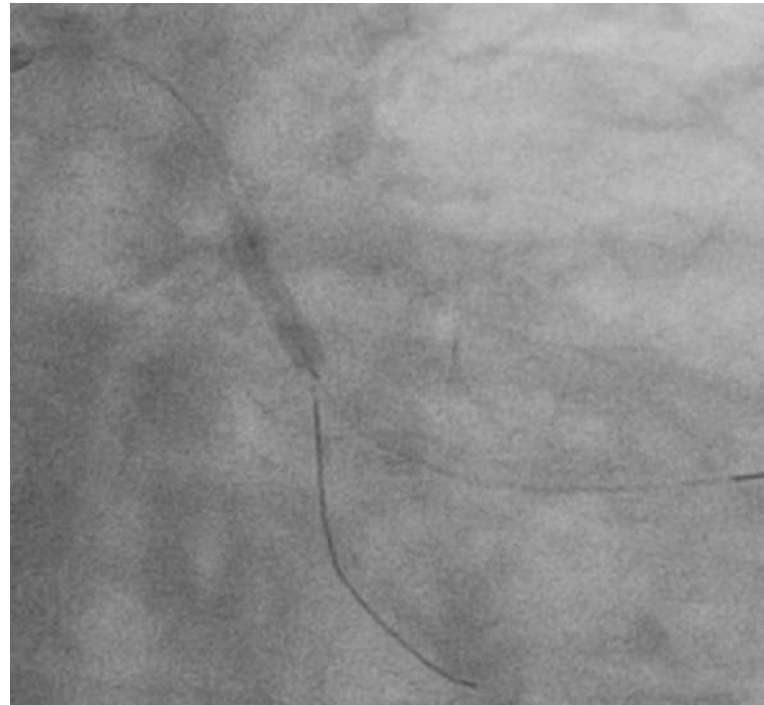
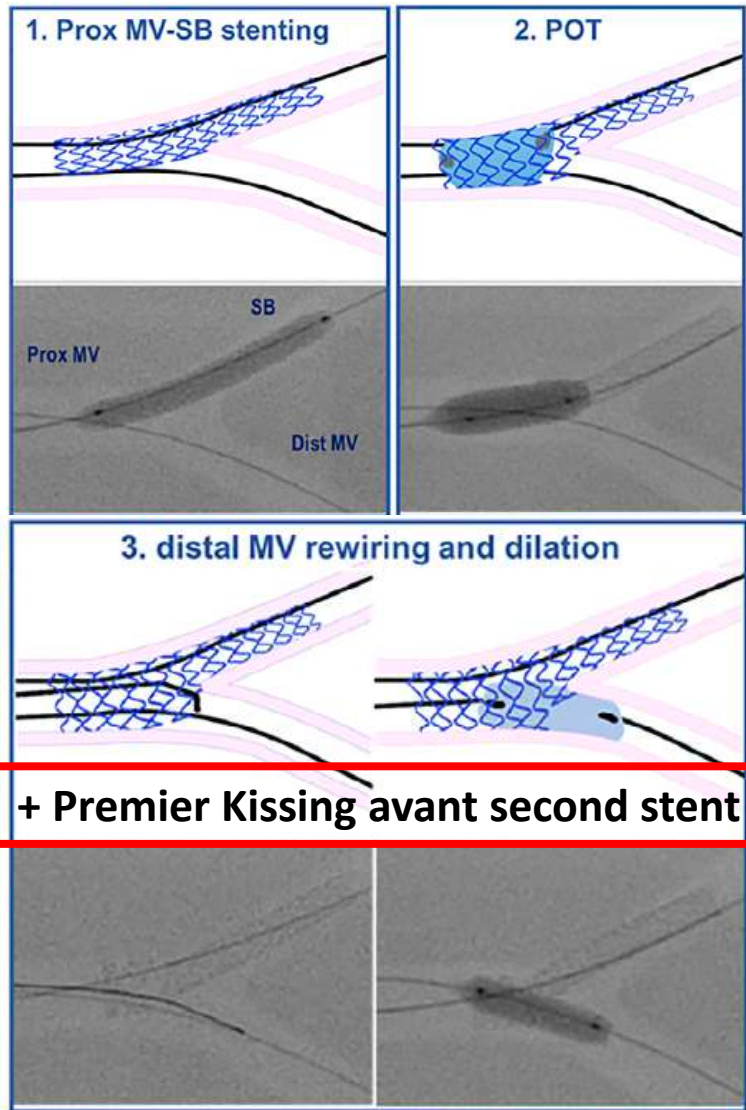
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Bifurcation à deux stents: DK culotte

Double-kissing culotte technique for coronary bifurcation stenting

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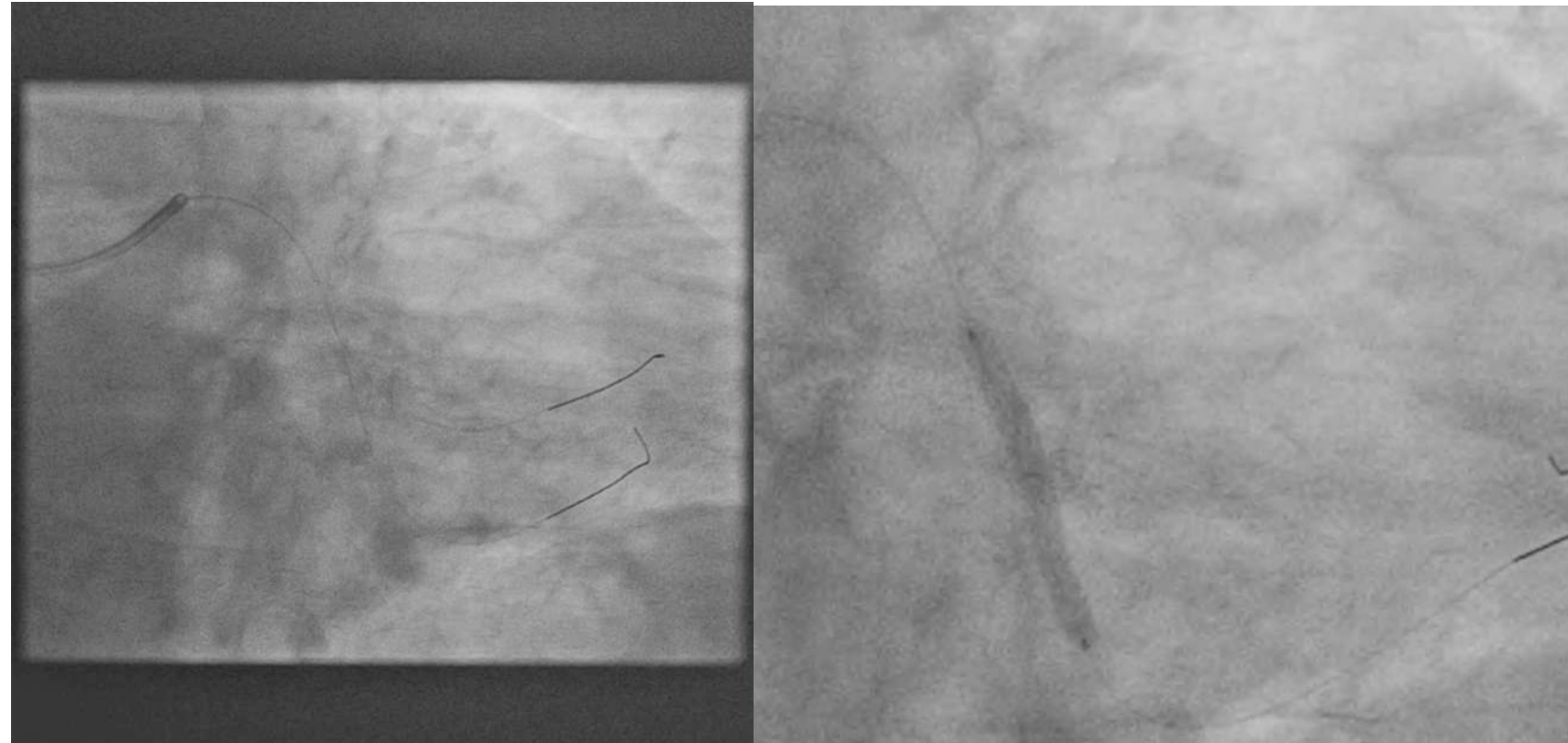
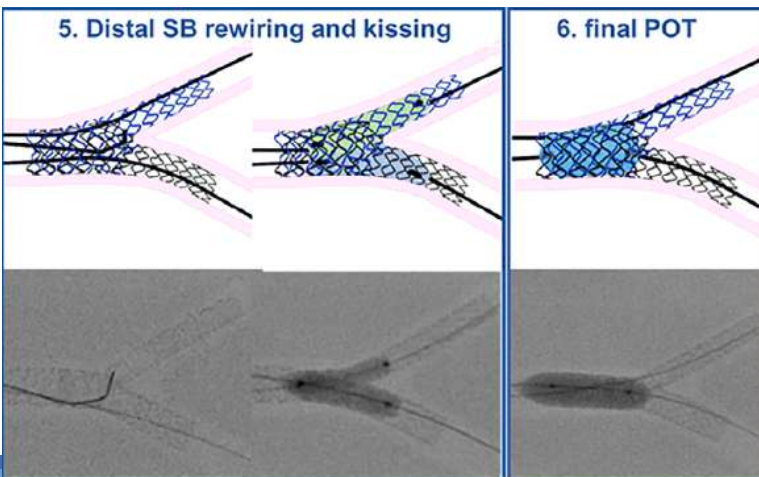
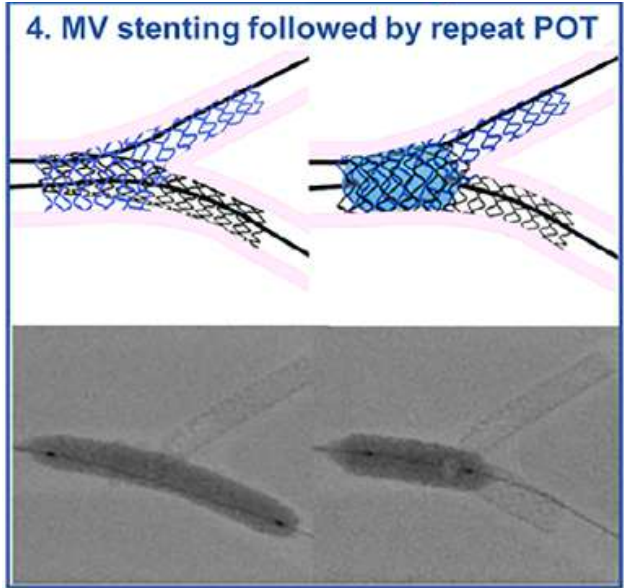
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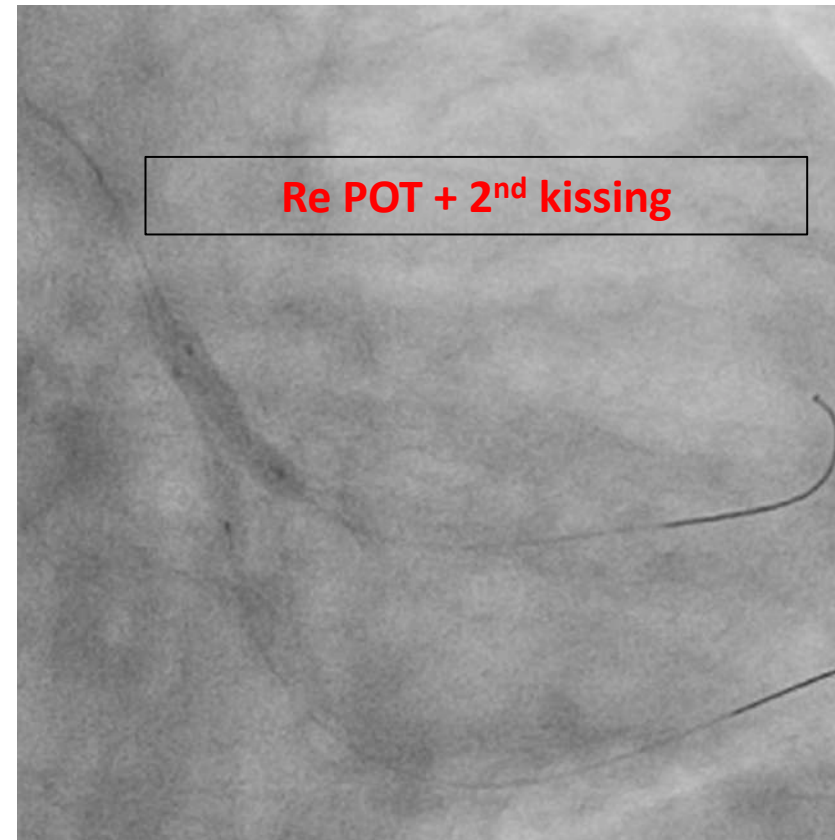
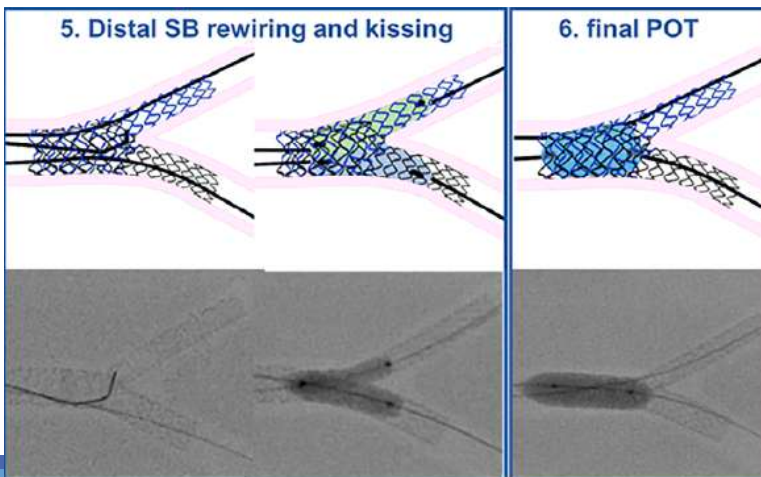
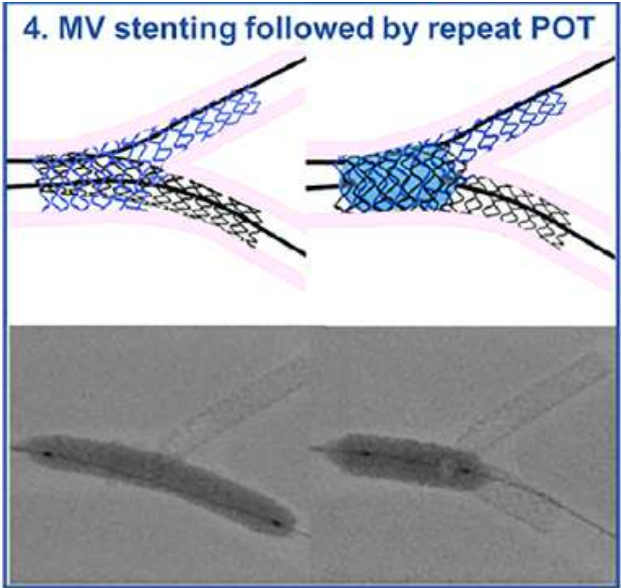
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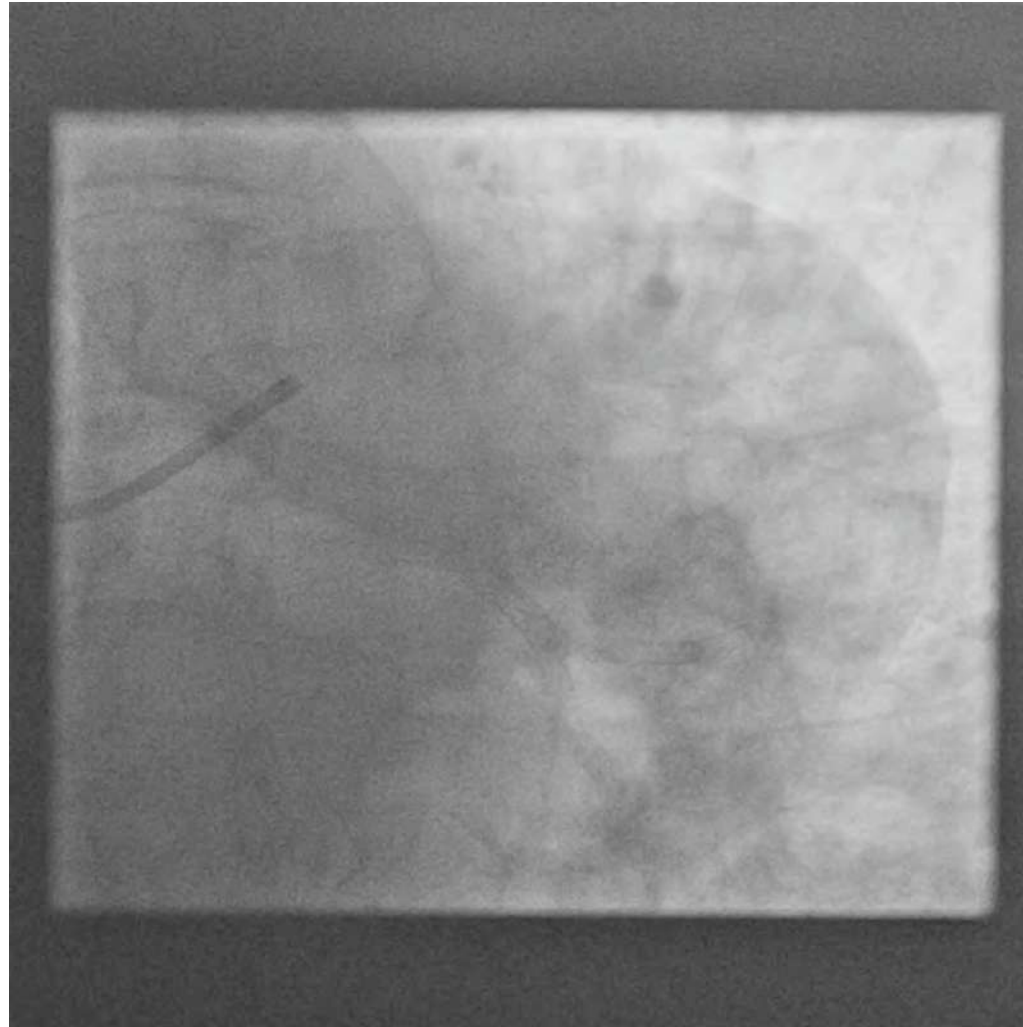
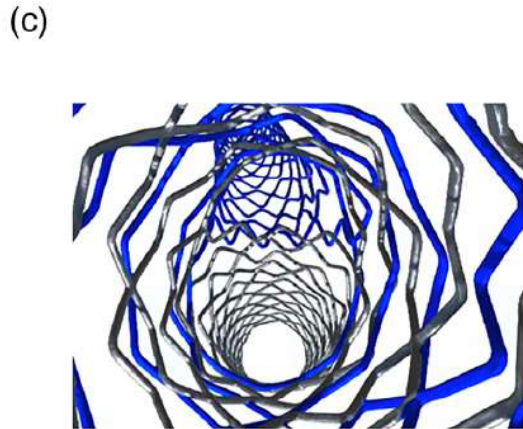
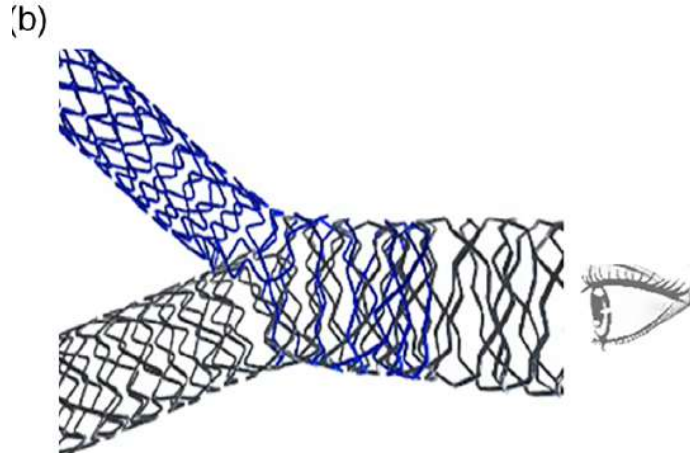
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Bifurcation à deux stents: DK culotte



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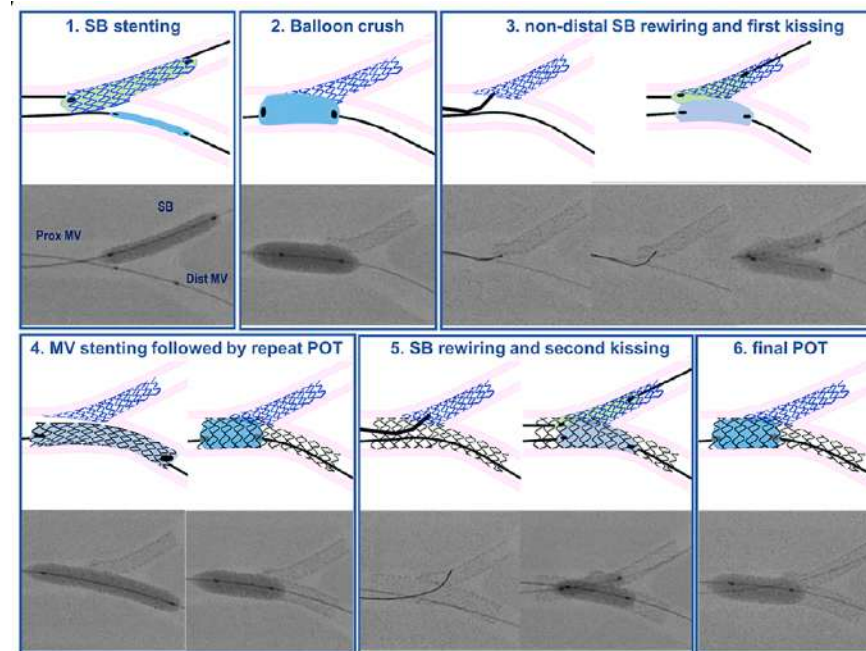
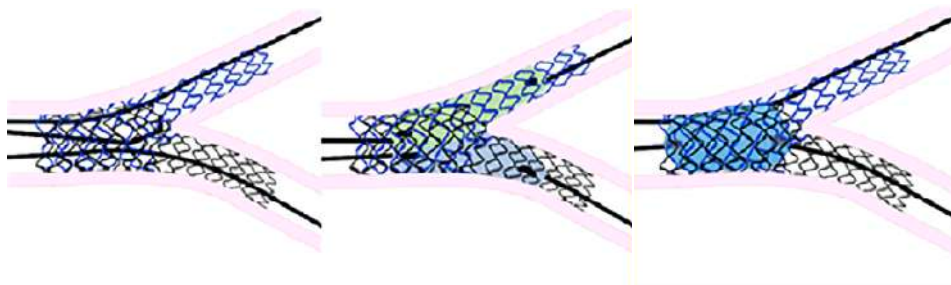
Bifurcation à deux stents: comment

DOUBLE KISSING CULOTTE

DOUBLE KISSING CRUSH

Double-kissing culotte technique for coronary bifurcation stenting

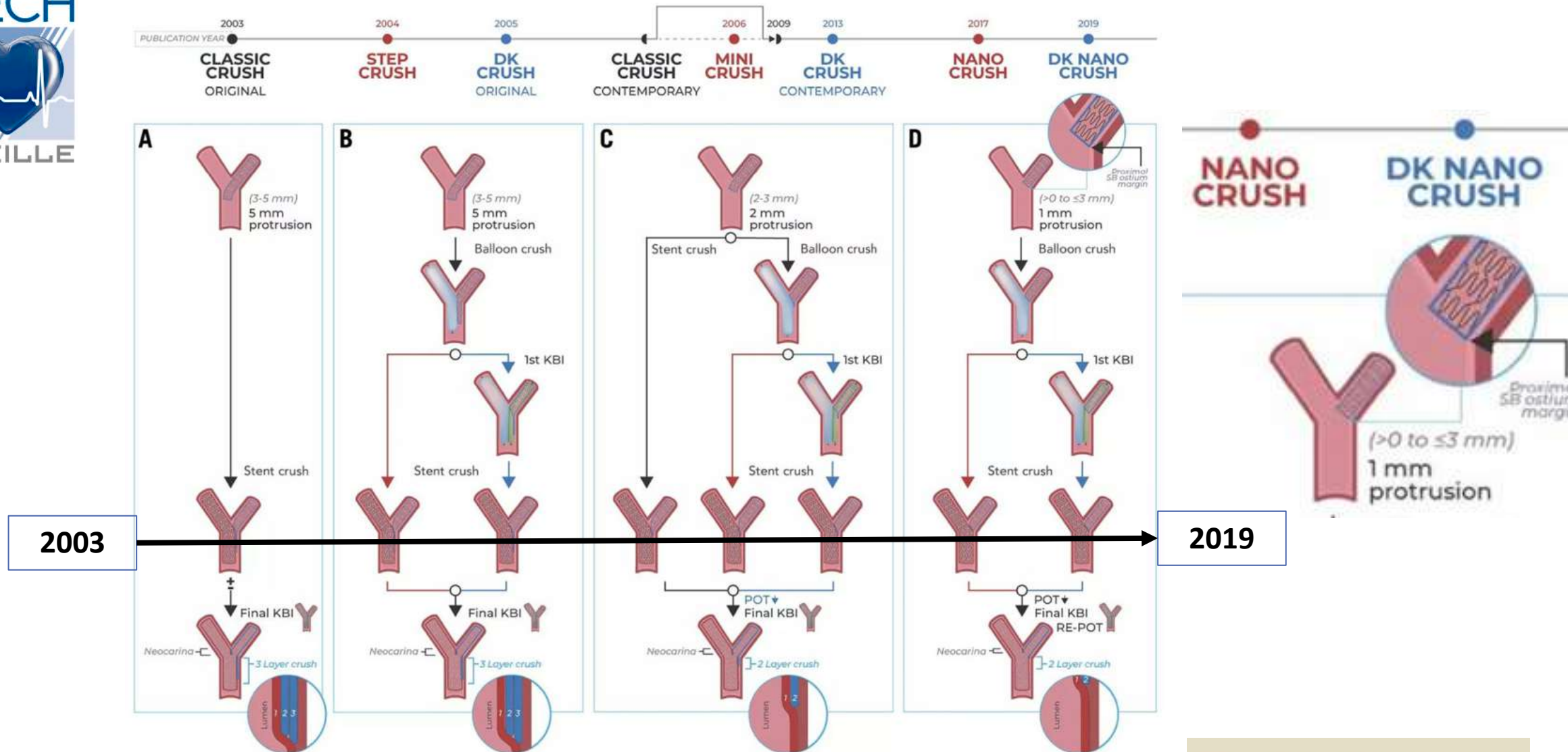
■ EuroIntervention 2020;16:e724-e733



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Evolution du Crush jusqu'au DK NANO CRUSH

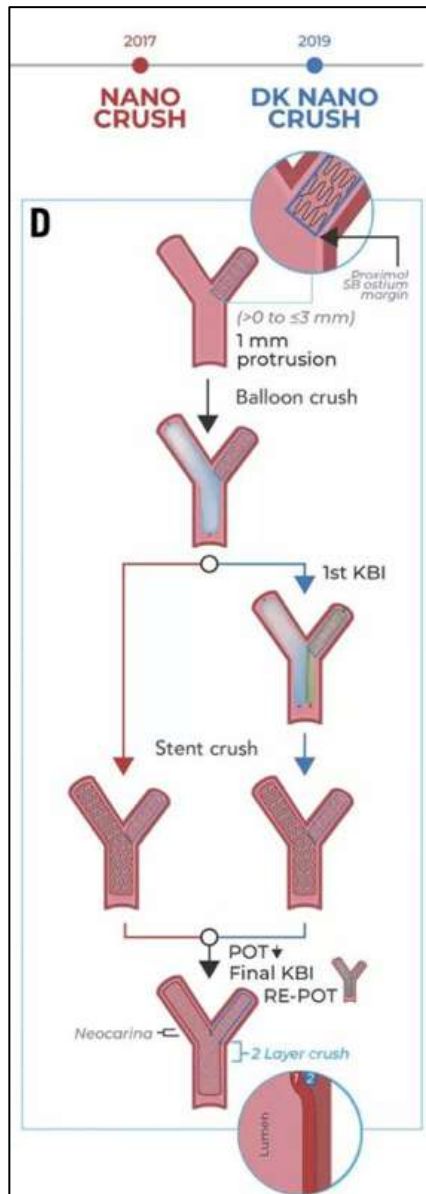


Crush techniques for PCI of bifurcation. Moroni *et al.* 2021

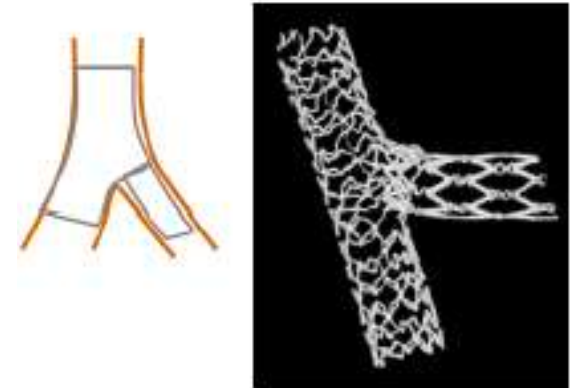
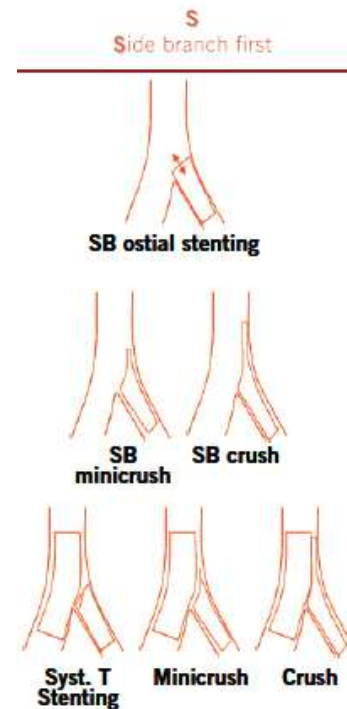


EuroIntervention

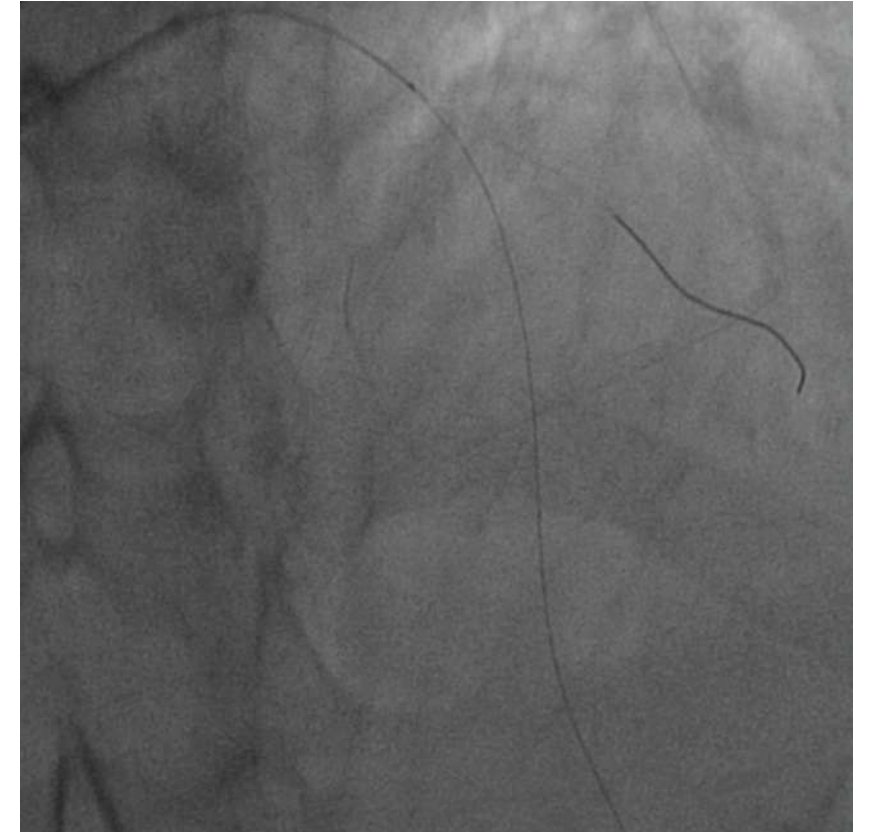
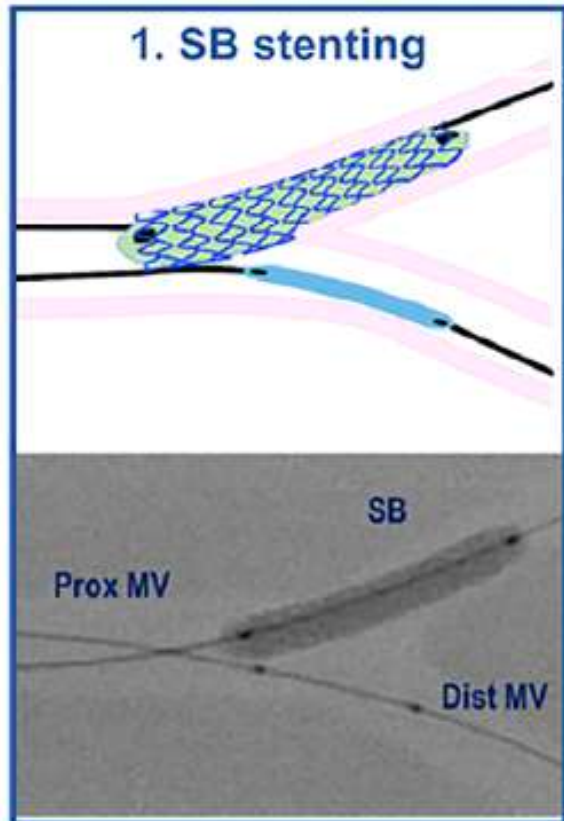
Evolution du Crush jusqu'au DK NANO CRUSH



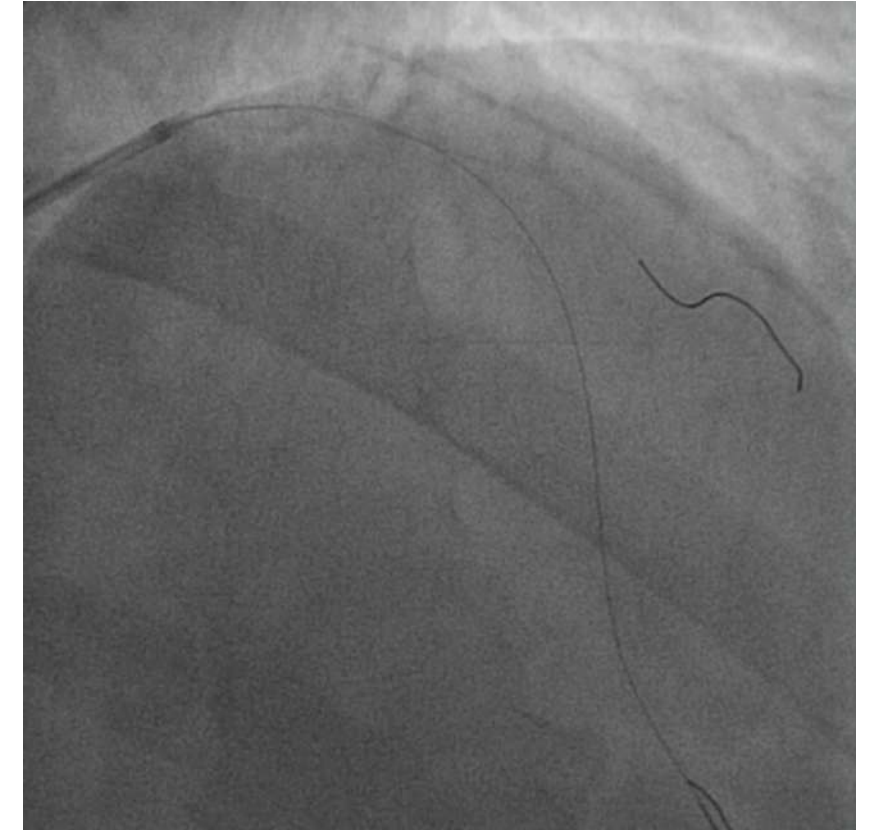
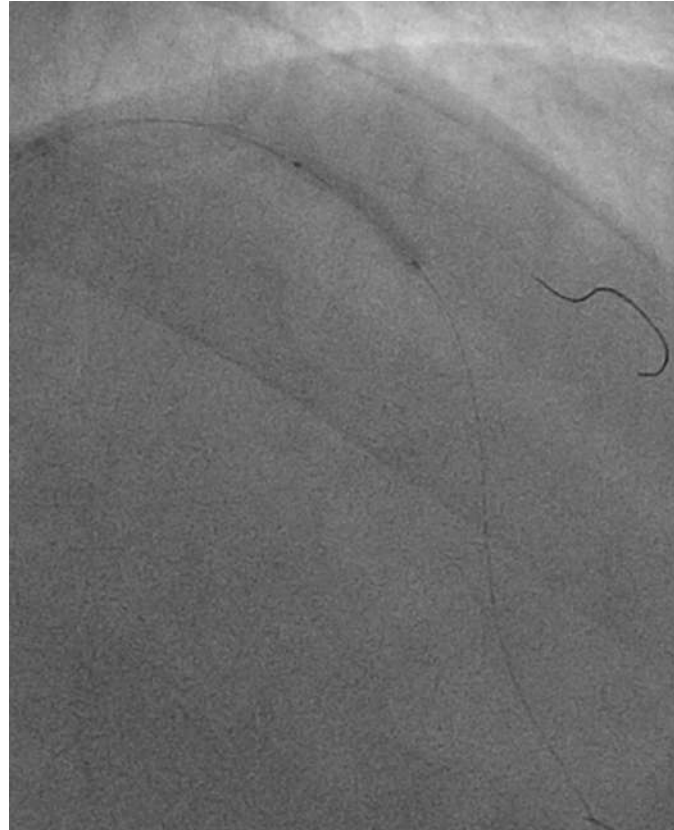
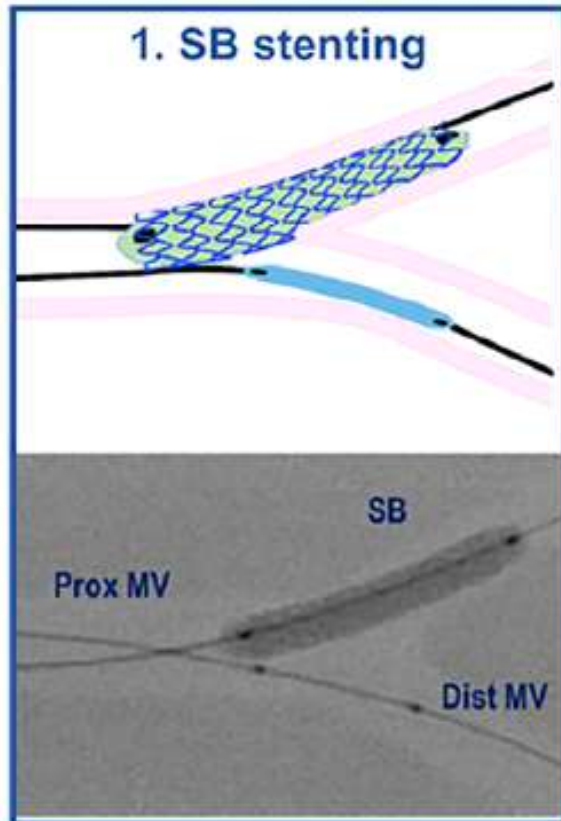
➔ Evolution DK Nano Crush $\simeq$ T stenting systématique ?



Bifurcation à deux stents: DK crush

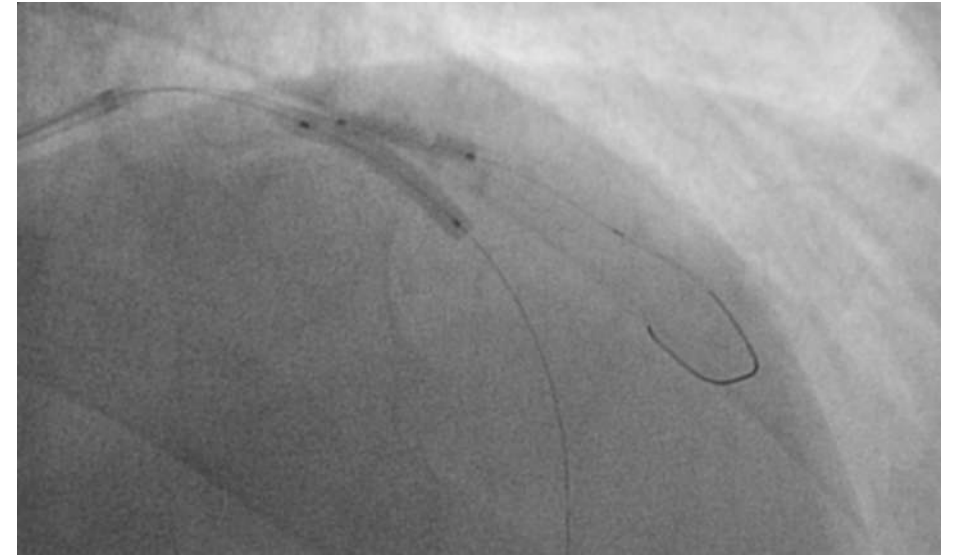
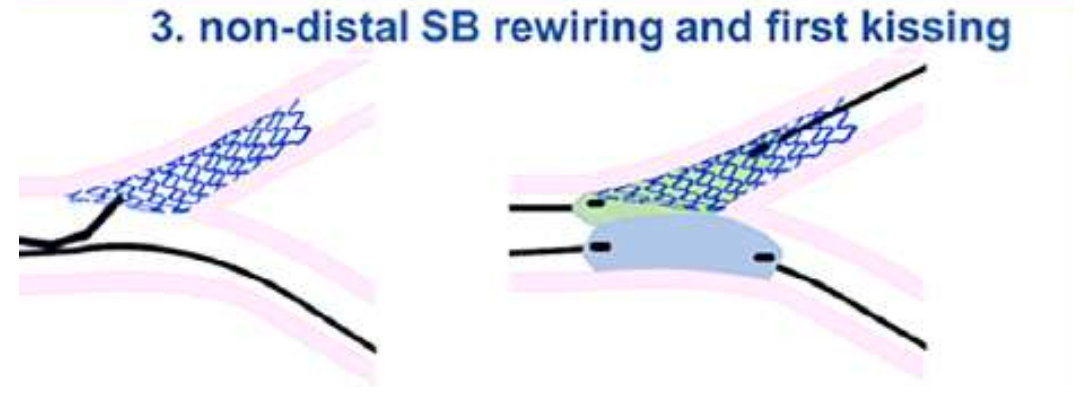
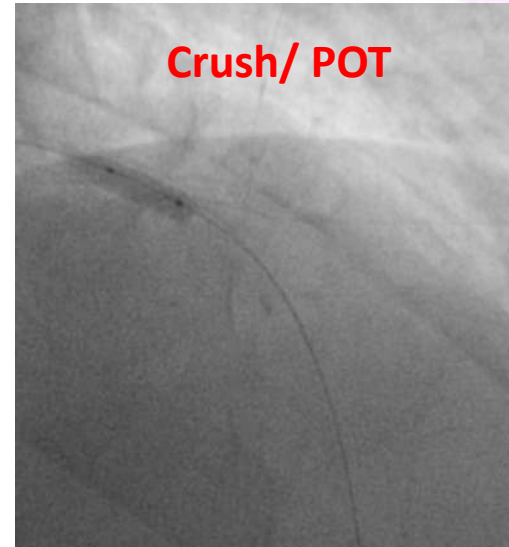
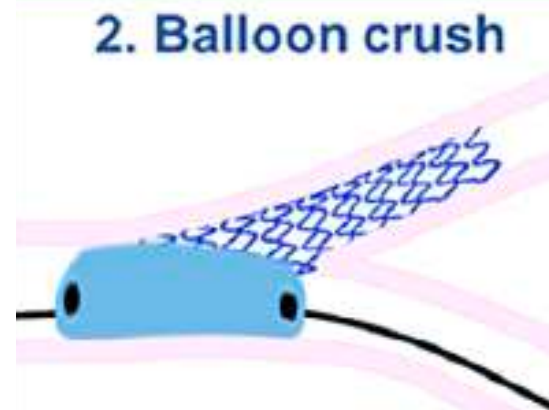
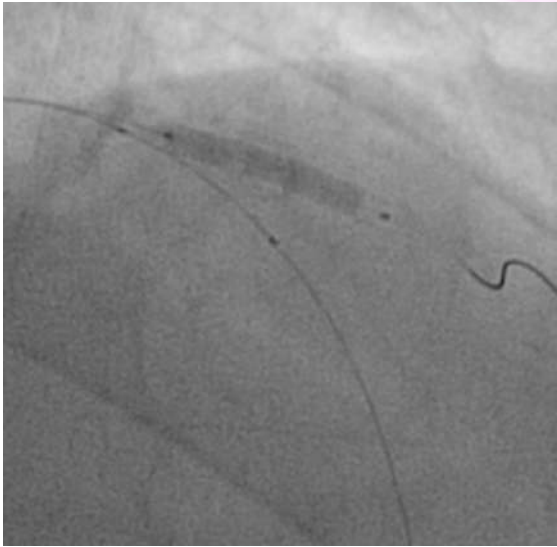
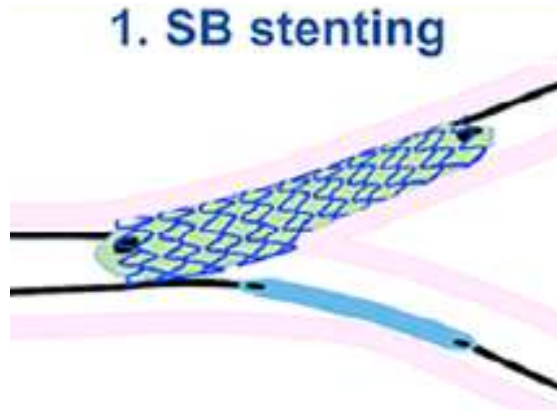


Bifurcation à deux stents: DK crush



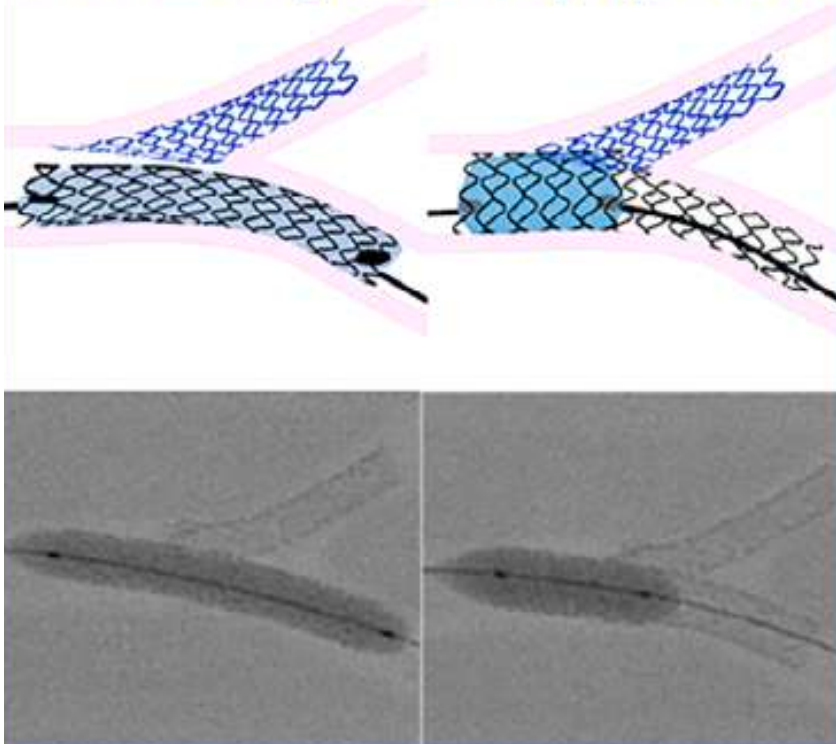
Sub intimal shift

Bifurcation à deux stents: DK crush



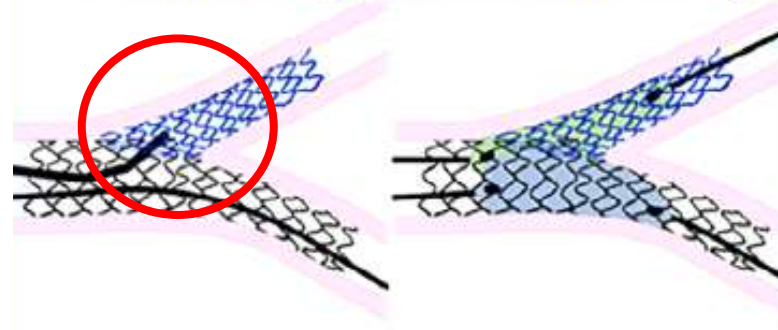
Bifurcation à deux stents: DK crush

4. MV stenting followed by repeat POT

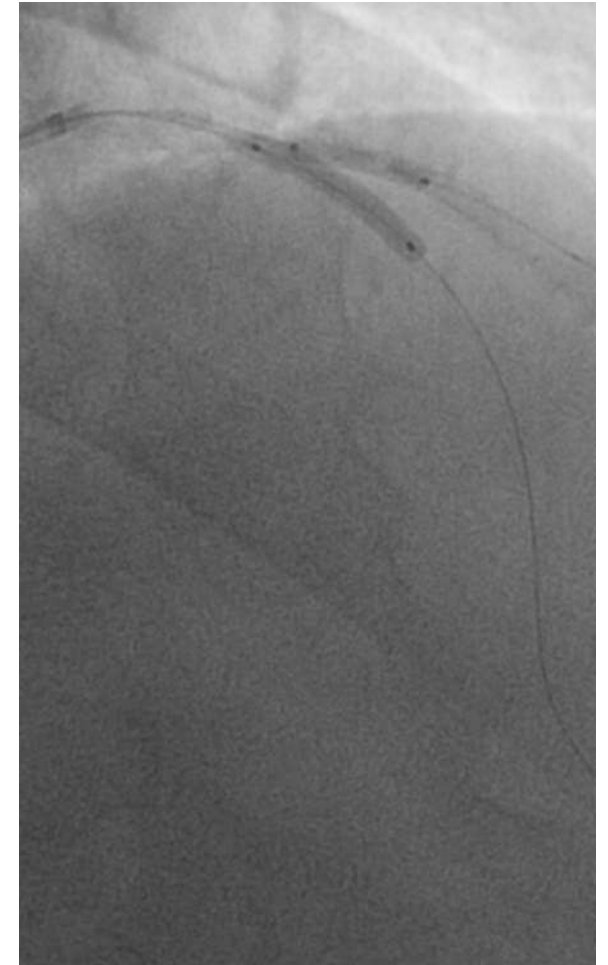
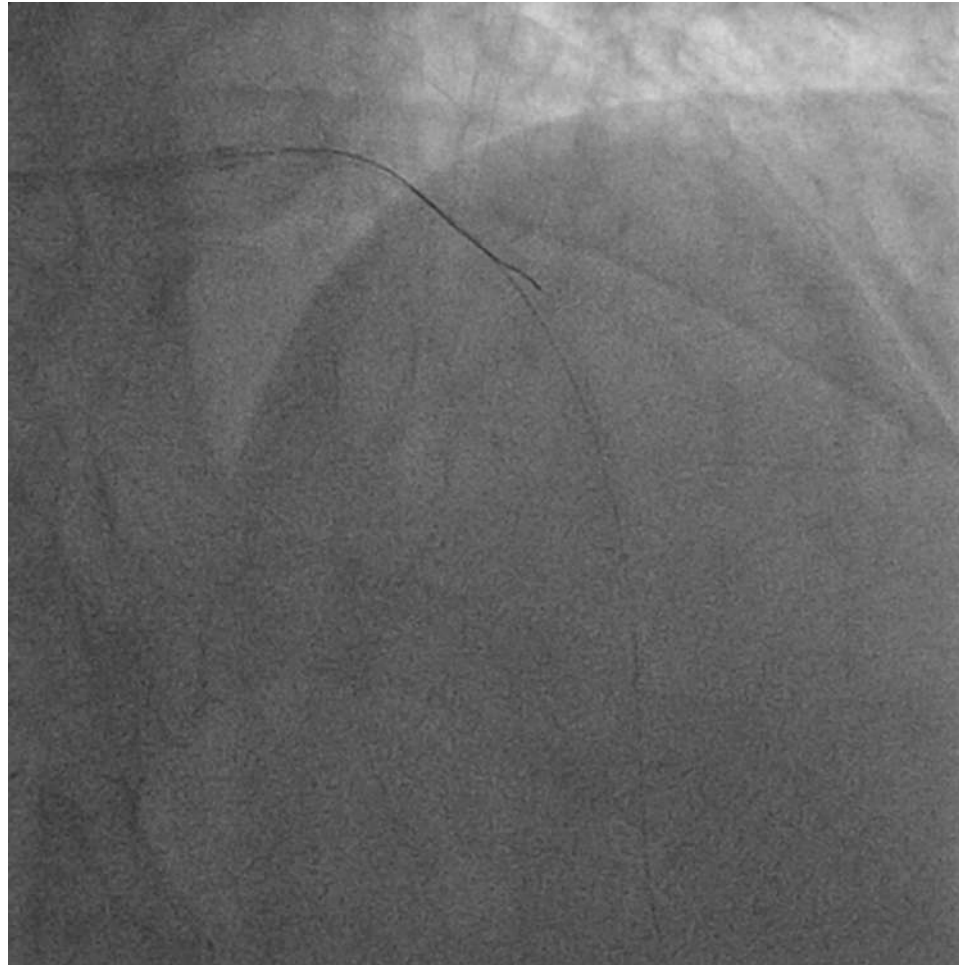
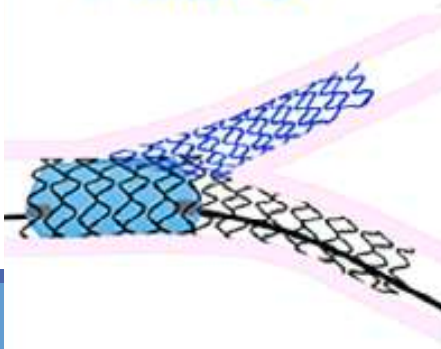


Bifurcation à deux stents: DK crush

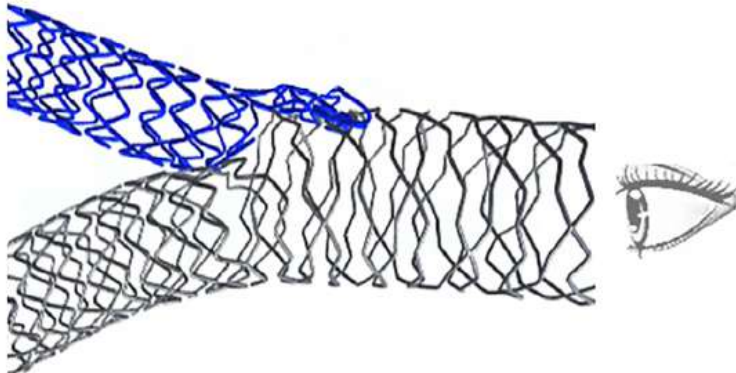
5. SB rewiring and second kissing



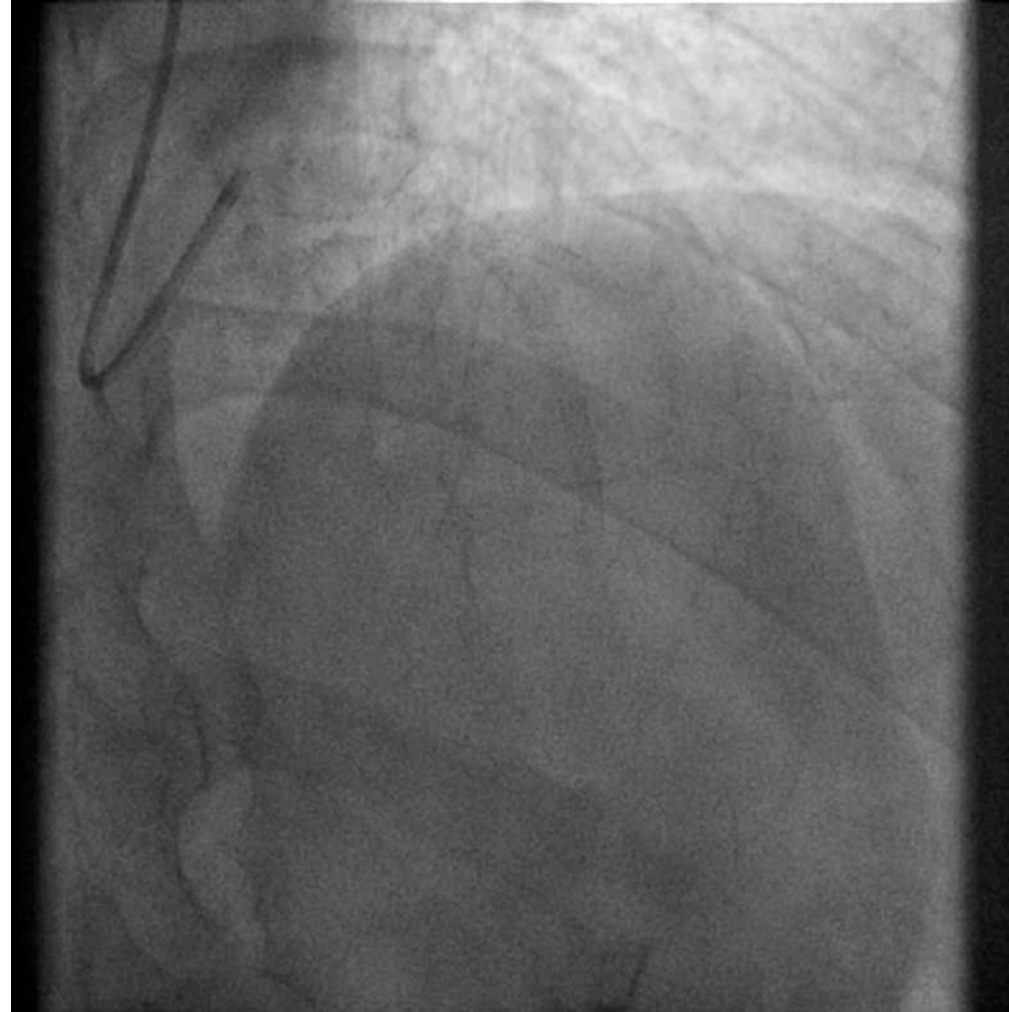
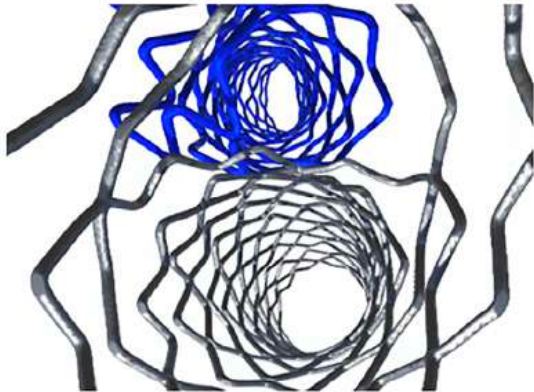
6. final POT



Bifurcation à deux stents: DK crush



(c)



European Bifurcation Club white paper on stenting techniques
for patients with bifurcated coronary artery lesions

Catheter Cardiovasc Interv. 2020;96:1067–1079.

Bifurcation à deux stents

➔ La meilleur technique à deux stents : celle qui est connue et maitrisée par l'opérateur

- Stratégies avec stenting branche fille en premier
- Stratégies avec retrait de guide après stenting
- POT et kissing systématiques après chaque stenting (Double Kissing):
 - DK culotte
 - DK nano crush ➔ $\simeq$ T systématique