How to Optimally Deploy a Stent Provisionally in a Bifurcation

John Ormiston
MBChB, FRACP, FRACR, FCSANZ, FAPSIC, FACC, FRCP, ONZM
Medical Director Intra
Professor, University of Auckland School of Medicine
Interventional Cardiologist
Auckland New Zealand

TCT AP
Sunday 28th 2019
Coronary Theater Level 1
7.08-7.16
8mins

Disclosure Statement of Financial Interest

John Ormiston have a potential conflict of interest

Advisory board and minor honoraria Boston Scientific

A provisional single-stent strategy
In randomized studies
has
A lower long-term mortality
than
systematic dual stenting in bifurcations

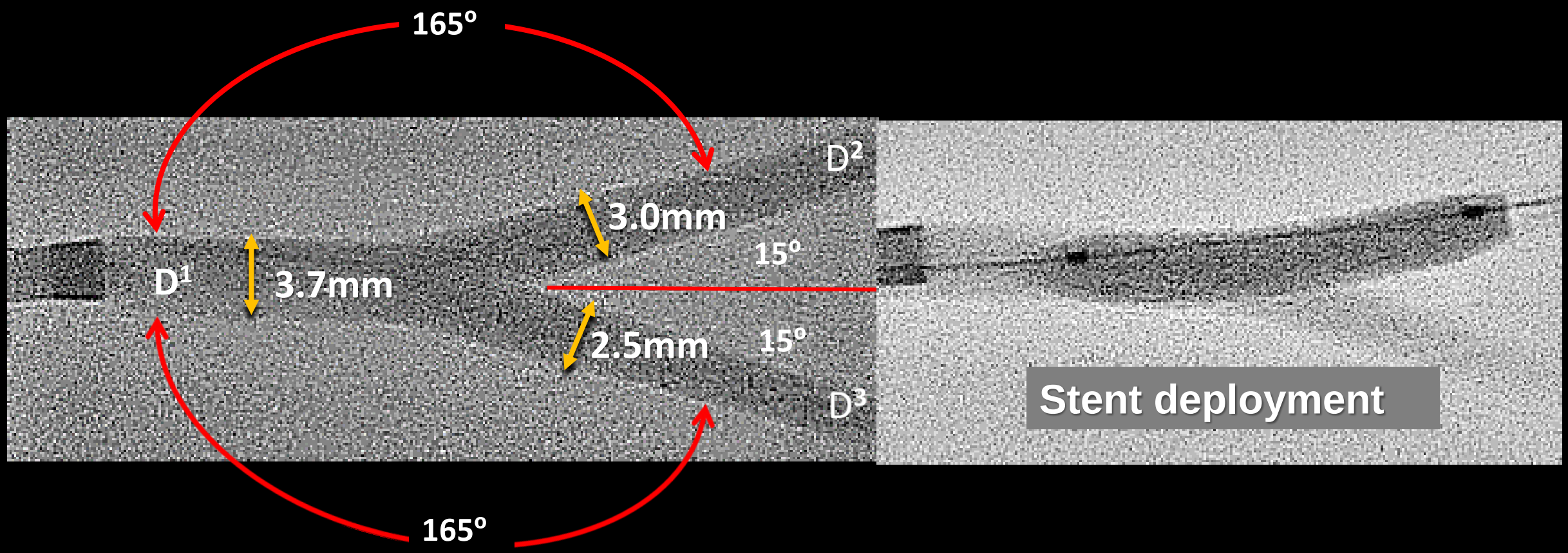
5 yr follow-up of the Nordic 1 and BBC 1
Behan et al EHJ 2016

The best method of provisional stent deployment in a bifurcation is debated

Aims

To determine for a single stent provisional bifurcation strategy the best deployment and post-dilatation strategies

Stents were deployed in bifurcation phantoms



Dimensions follow Finet's modification of Murray's Law [$D^1=0.67\ (D^2 + D^3)$]

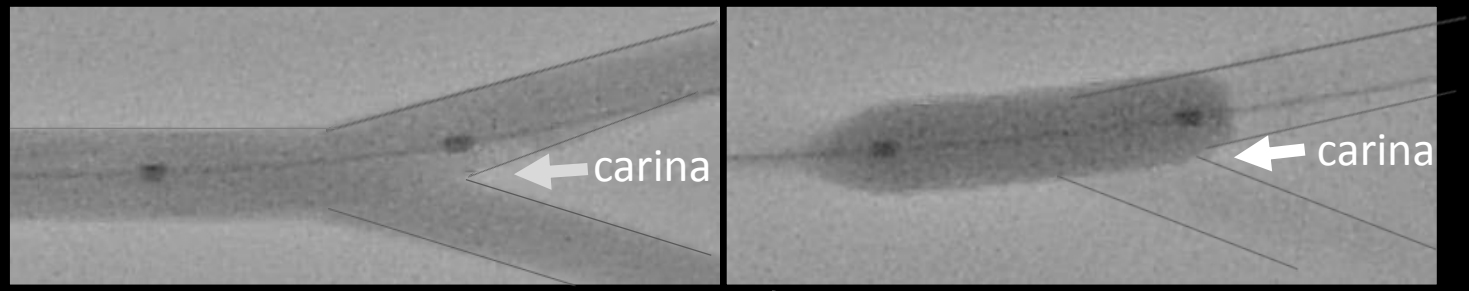
Phantoms were 3D printed using the material, Polyjet FLX9850-DM

Some definitions

First POT

Proximal Optimization Technique

Olivier Darremont



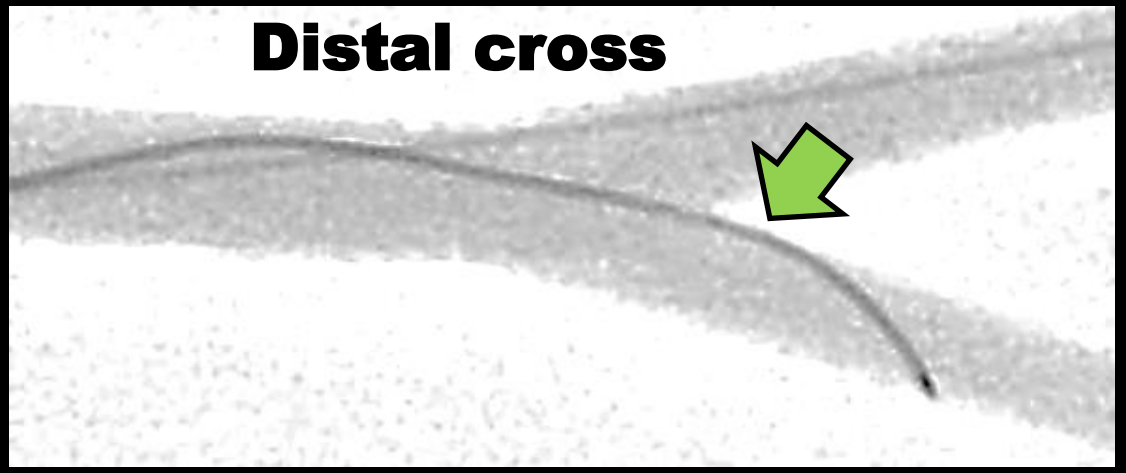
Refers to post-dilatation immediately after stent deployment

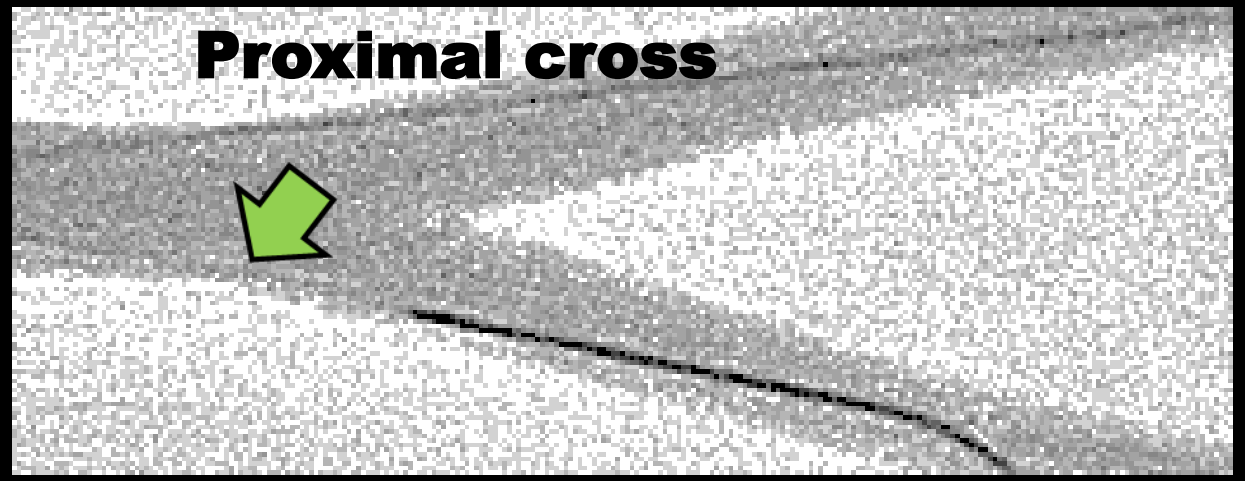
- Inflation of a short balloon sized to the proximal vessel just proximal to the carina (C)
- The entire proximal MB stent should be post-dilated
- Reduces risk of accidental abluminal rewiring
- Improves proximal stent apposition
- Facilitates side-branch access

Definitions continued

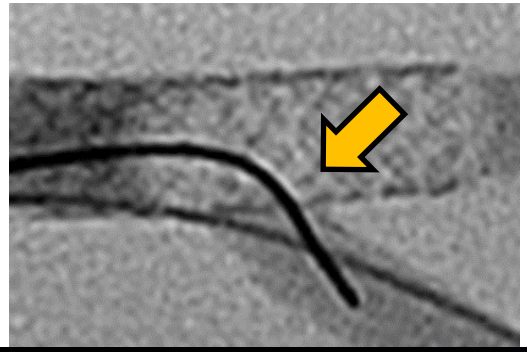
Wire crossing to the SB can be distal or proximal

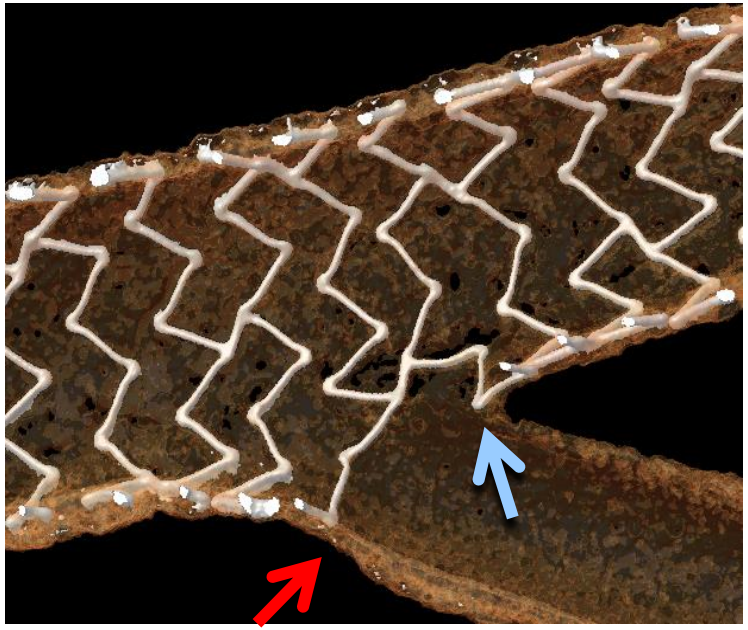
Can be determined by OCT in vivo



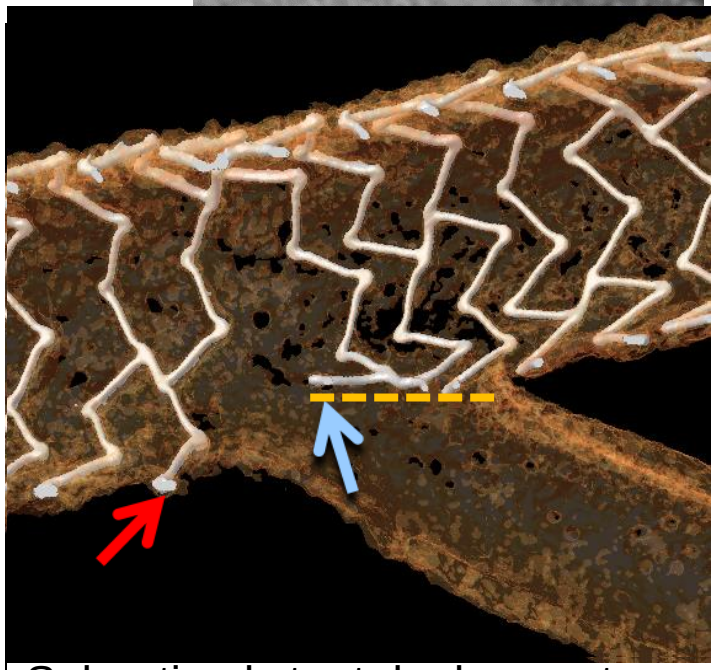


Best scaffolding of the ostium is when the SB wire crosses distally near carina (checked with OCT) before SB dilatation





Excellent expansion with distal crossing near carina before kissing post-dilatation
Clearance struts from SB ostium
Protrusion of struts to SB (red arrow)



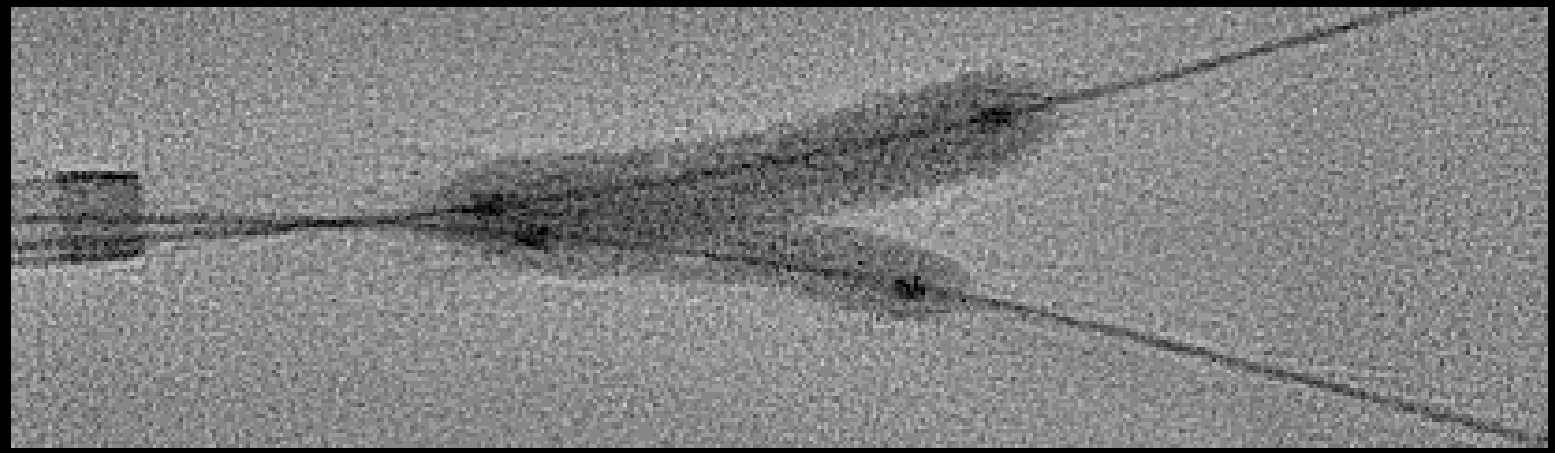
Suboptimal stent deployment with proximal crossing

Note neocarina (yellow line)
Poor clearance struts from SB
No SB protrusion of struts

Ormiston EuroInterv 2015

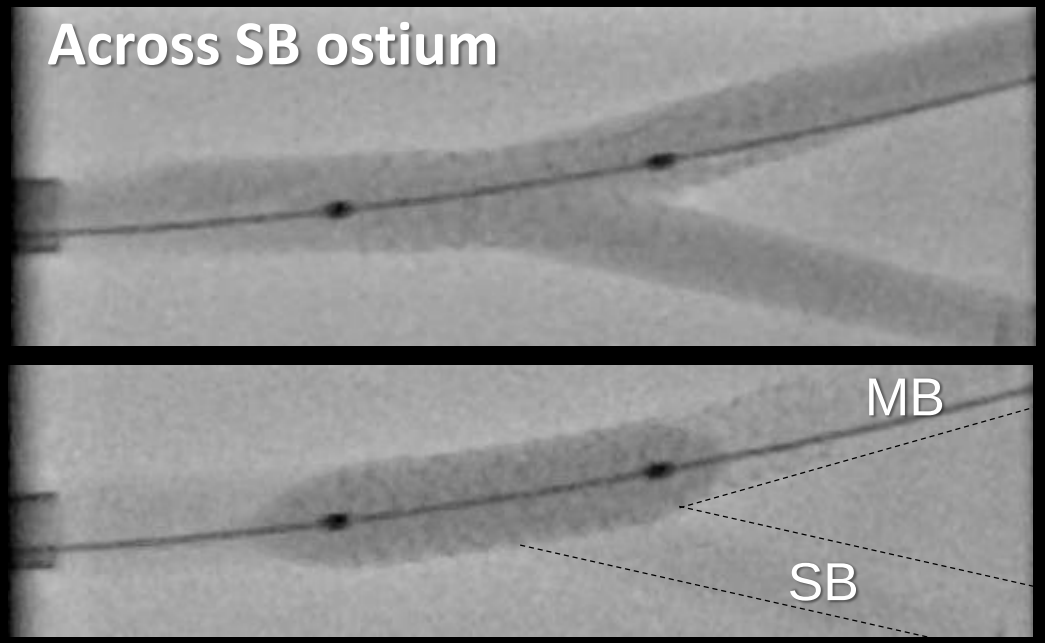
Kissing balloon post-dilatation

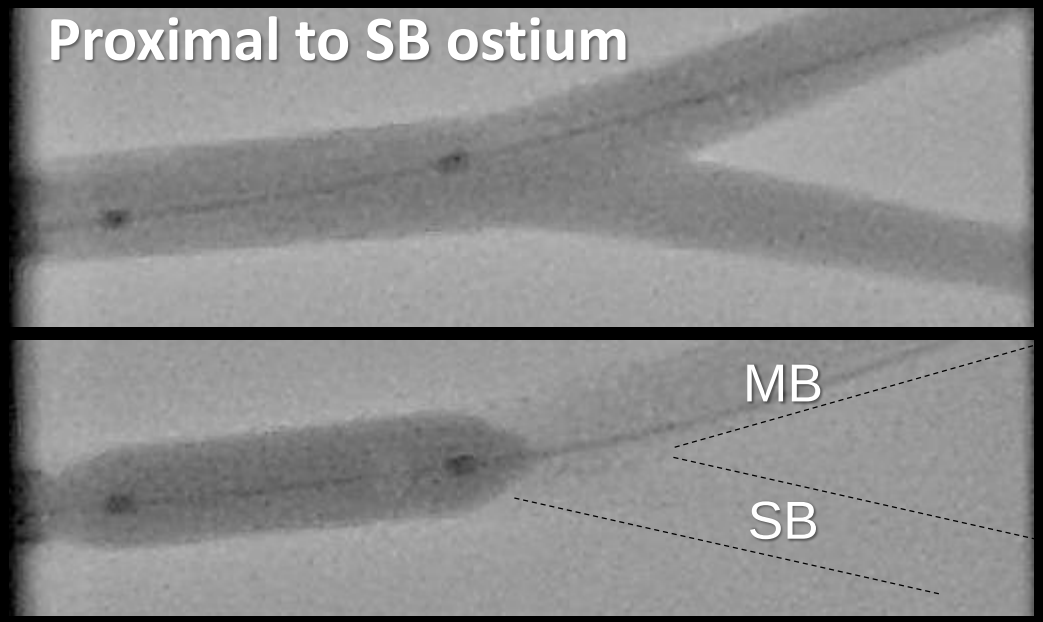
- Simultaneous inflation and deflation of balloons
- Sized to distal MB and to SB (3.0 and 2.5mm)



Re-POT or final POT after SB dilatation

Re-POT across the SB after SB dilatation has been proposed to optimize provisional stent deployment *(Finet JACC Int 2015)*





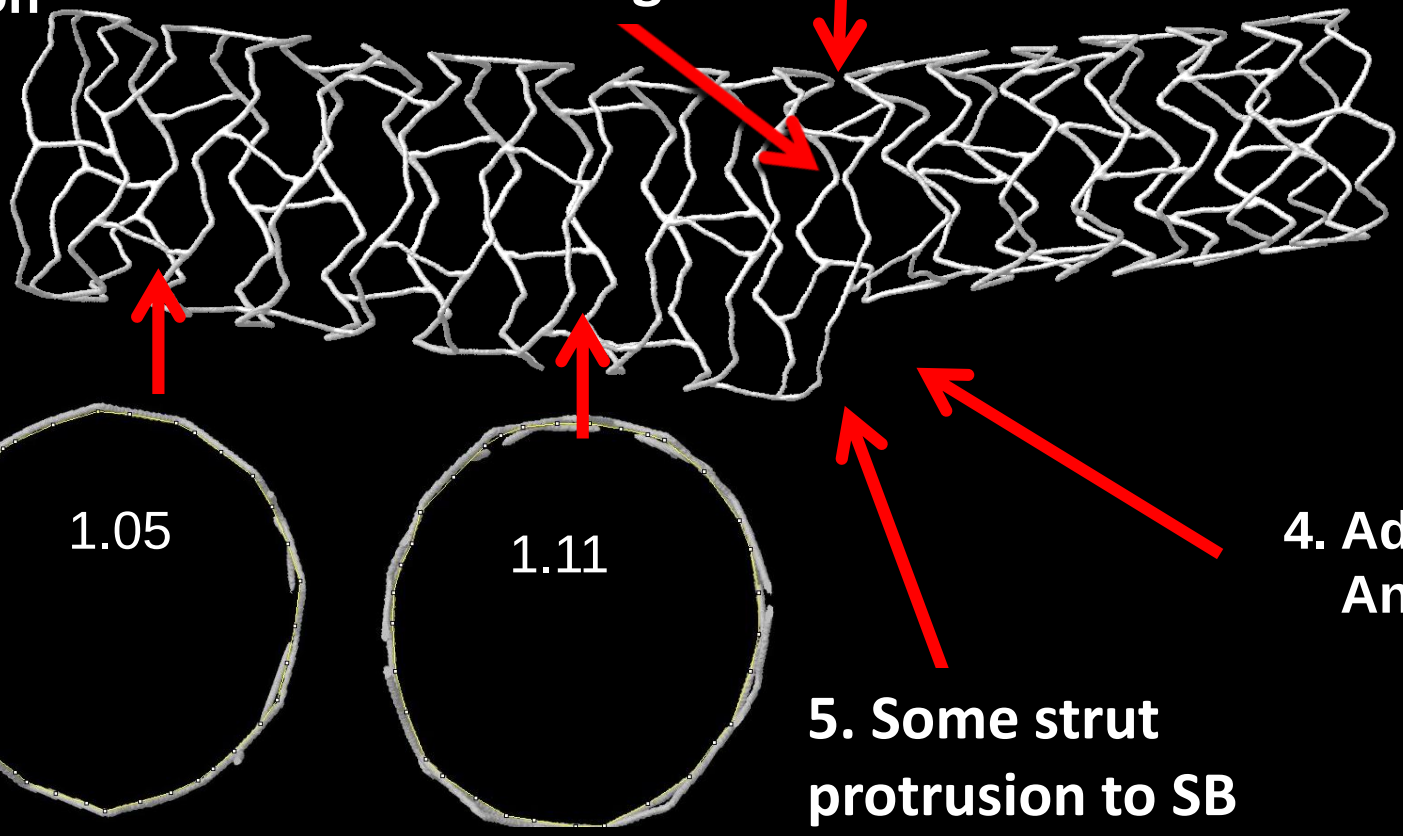
We aimed to compare KBPD and/or re-POT after provisional stent deployment

Optimal single stent deployment entails

1. Full expansion

2. No metallic narrowing

3. No malapposition



4. Adequate SB opening
And no metallic carina

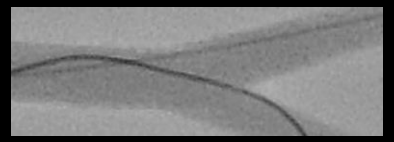
5. Some strut protrusion to SB

6. Minimal ellipticity proximally

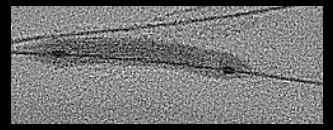
Investigation bench plan

Deploy stent in main branch Then first POT

Cross with wire distally



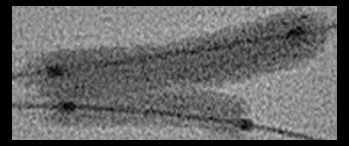
SB dilatation (no kiss)



Final POT across SB

Final POT proximal to SB

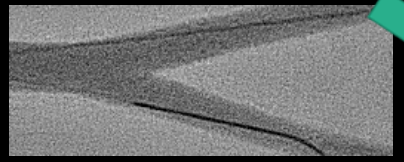
SB dilatation (then kiss)



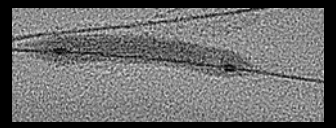
Final POT across SB

Final POT proximal to SB

Cross with wire proximally



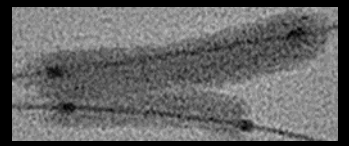
SB dilatation (no kiss)



Final POT across SB

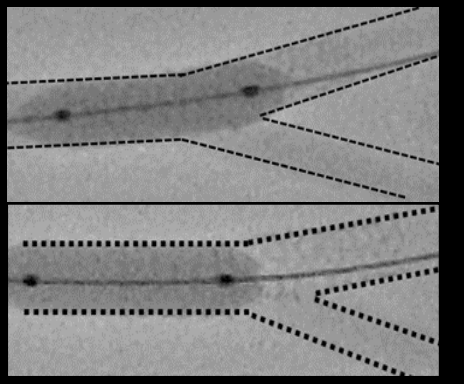
Final POT proximal to SB

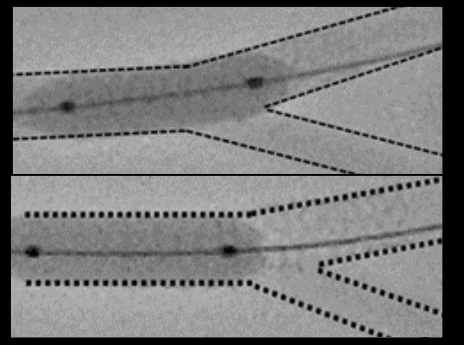
SB dilatation (then kiss)

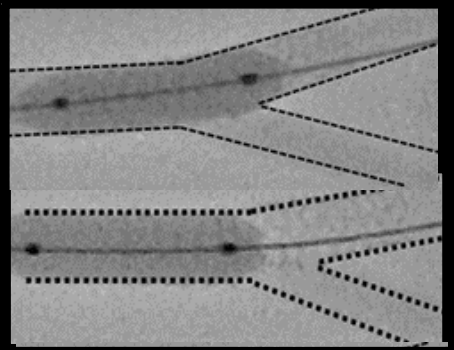


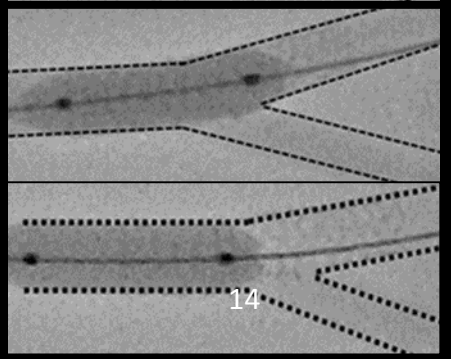
Final POT across SB

Final POT proximal to SB





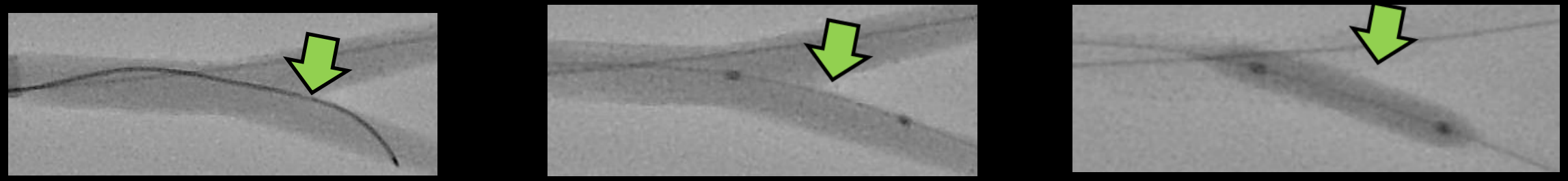


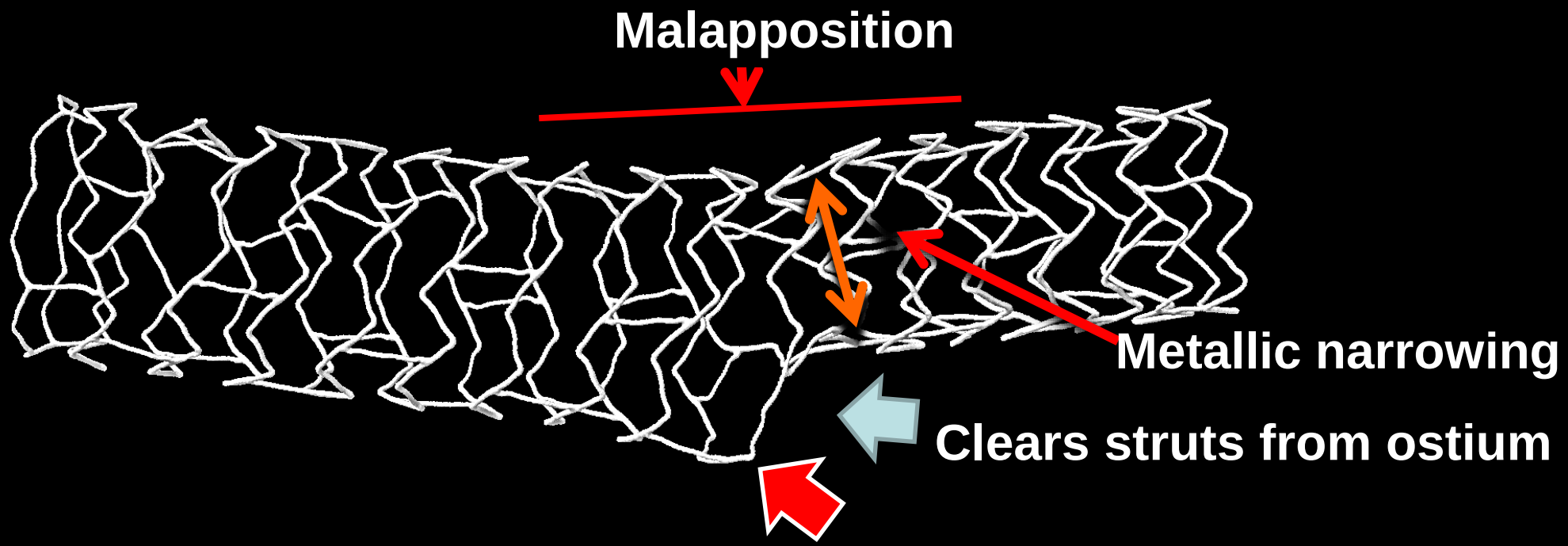


Side-branch dilatation after distal cross

Causes stent distortion

Ormiston CCVI 1999

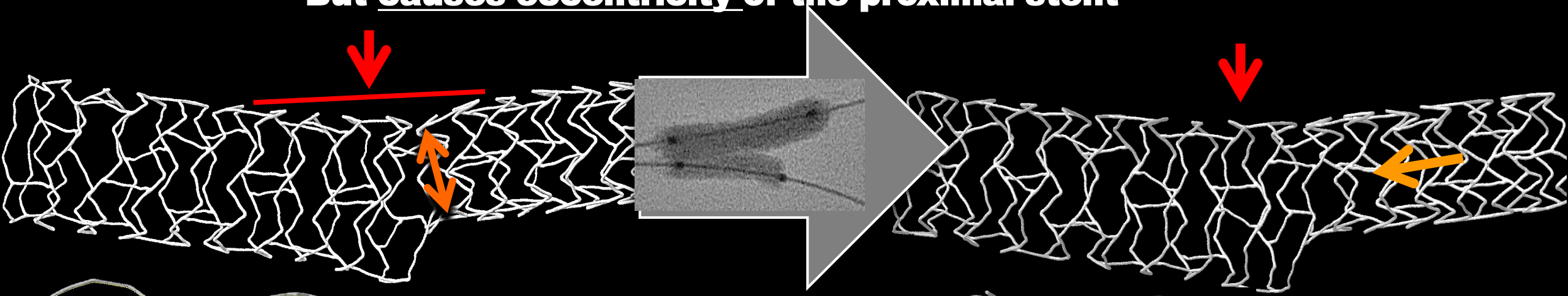




Kissing balloon post-dilatation

Corrects malapposition and metal narrowing without altering SB ostial size or strut protrusion to SB

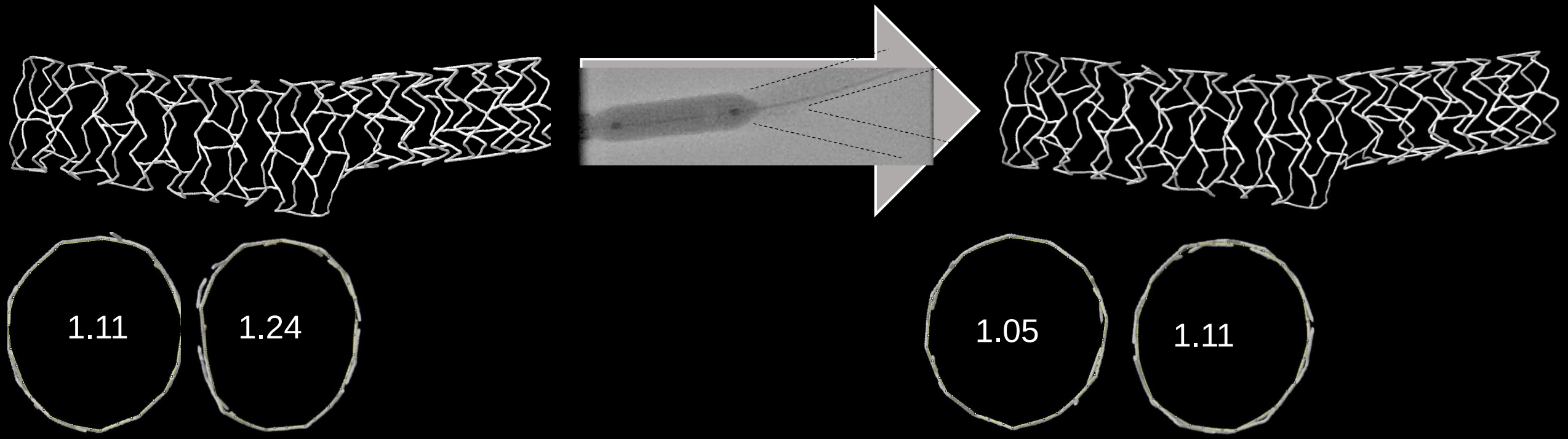
But causes eccentricity of the proximal stent



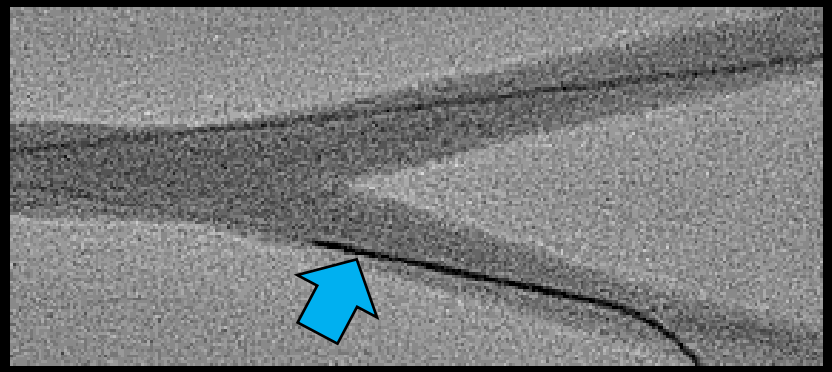
Ellipticity ratio

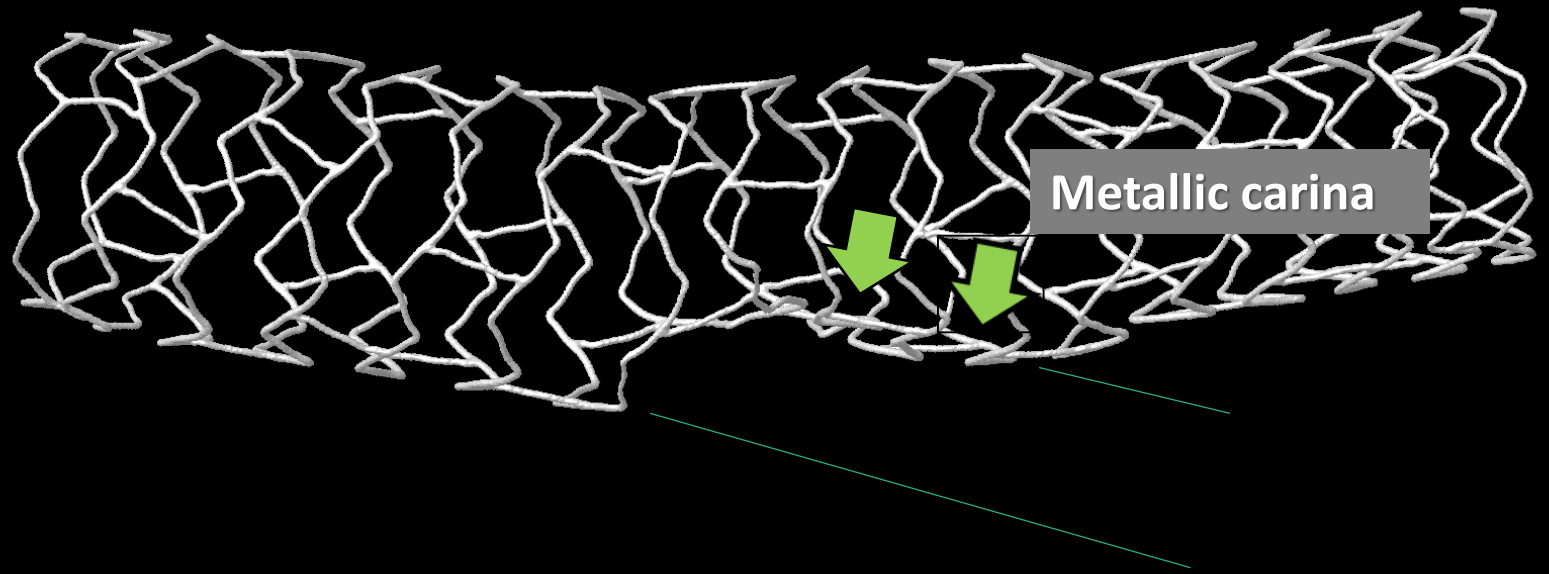
Ellipticity ratio

Proximal final POT after KBPD restores proximal stent circularity

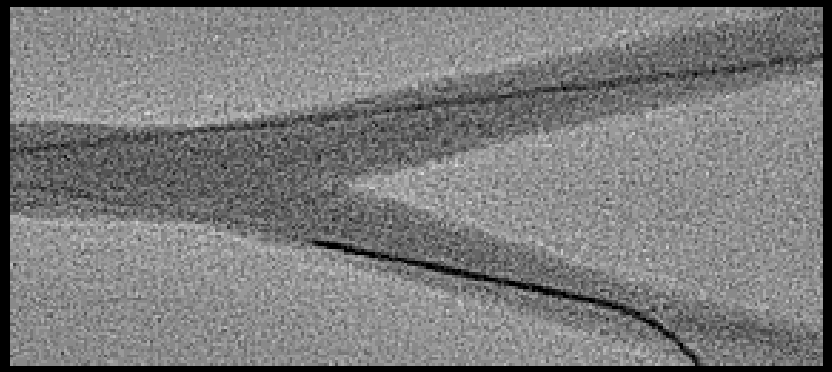


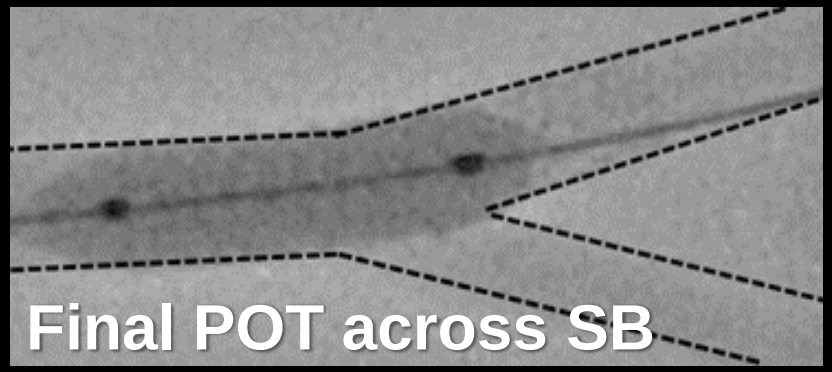
Proximal wire cross and SB balloon dilatation causes a metallic carina

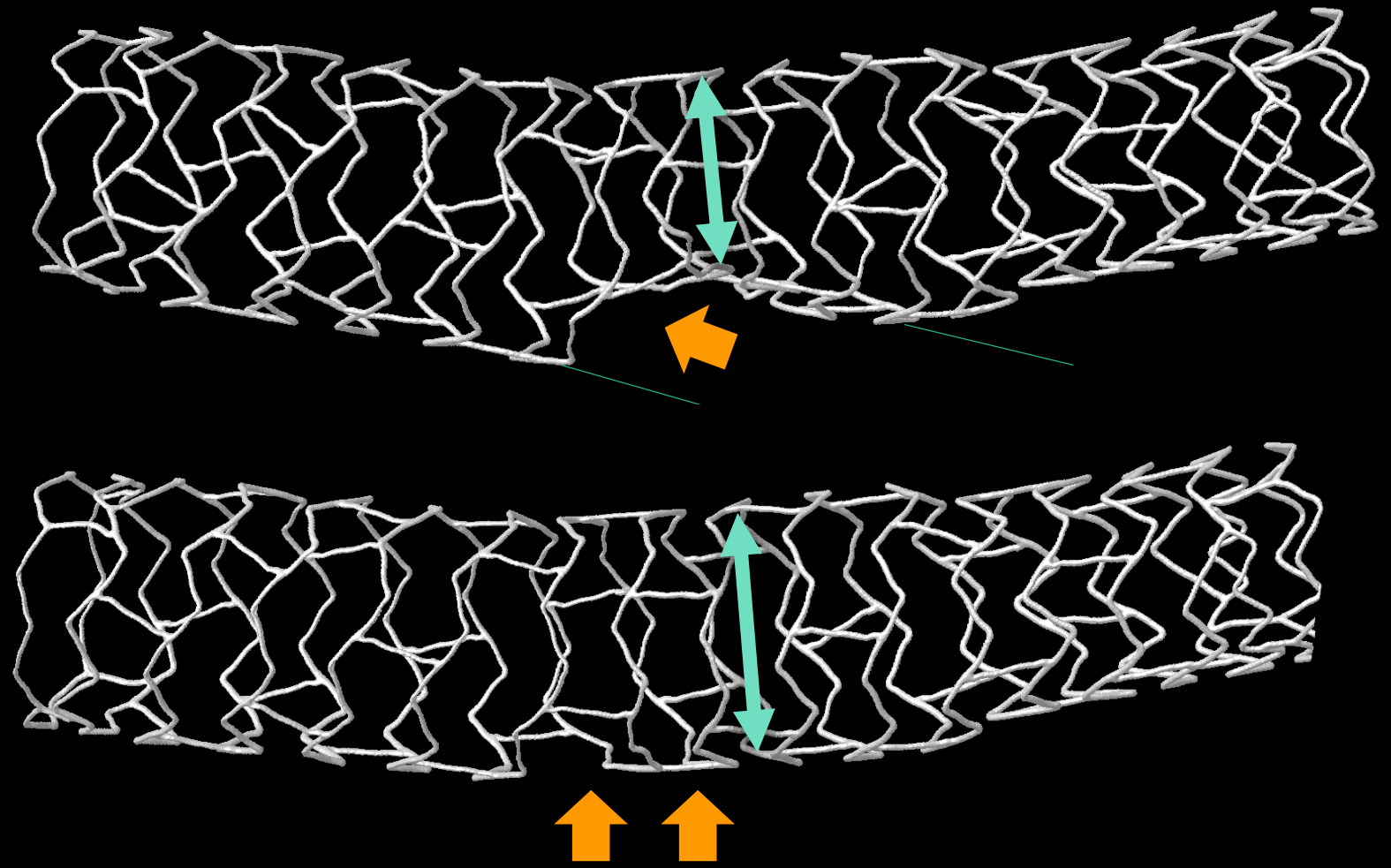




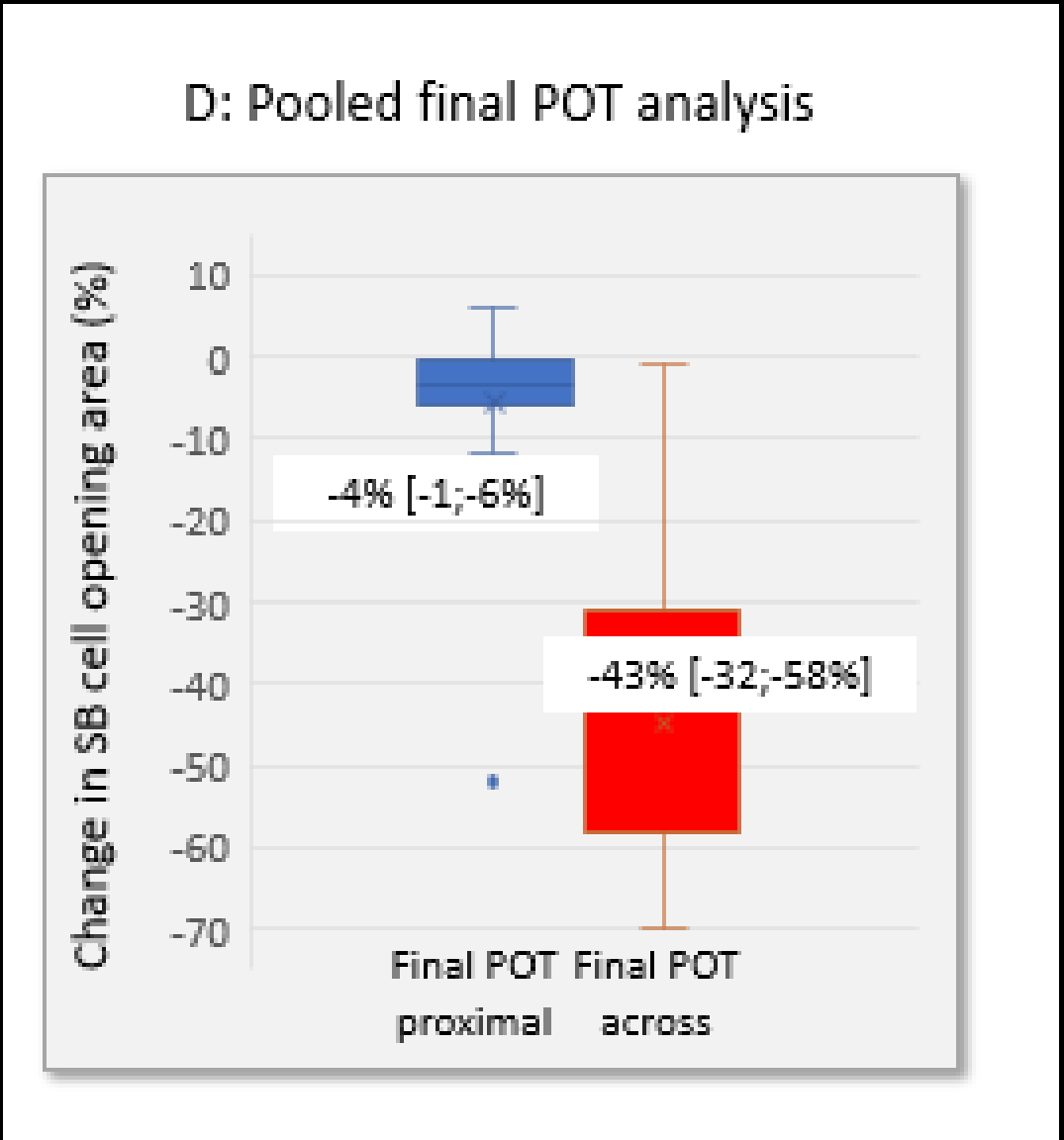
POT across the SB corrects metallic narrowing but reduces ostial size





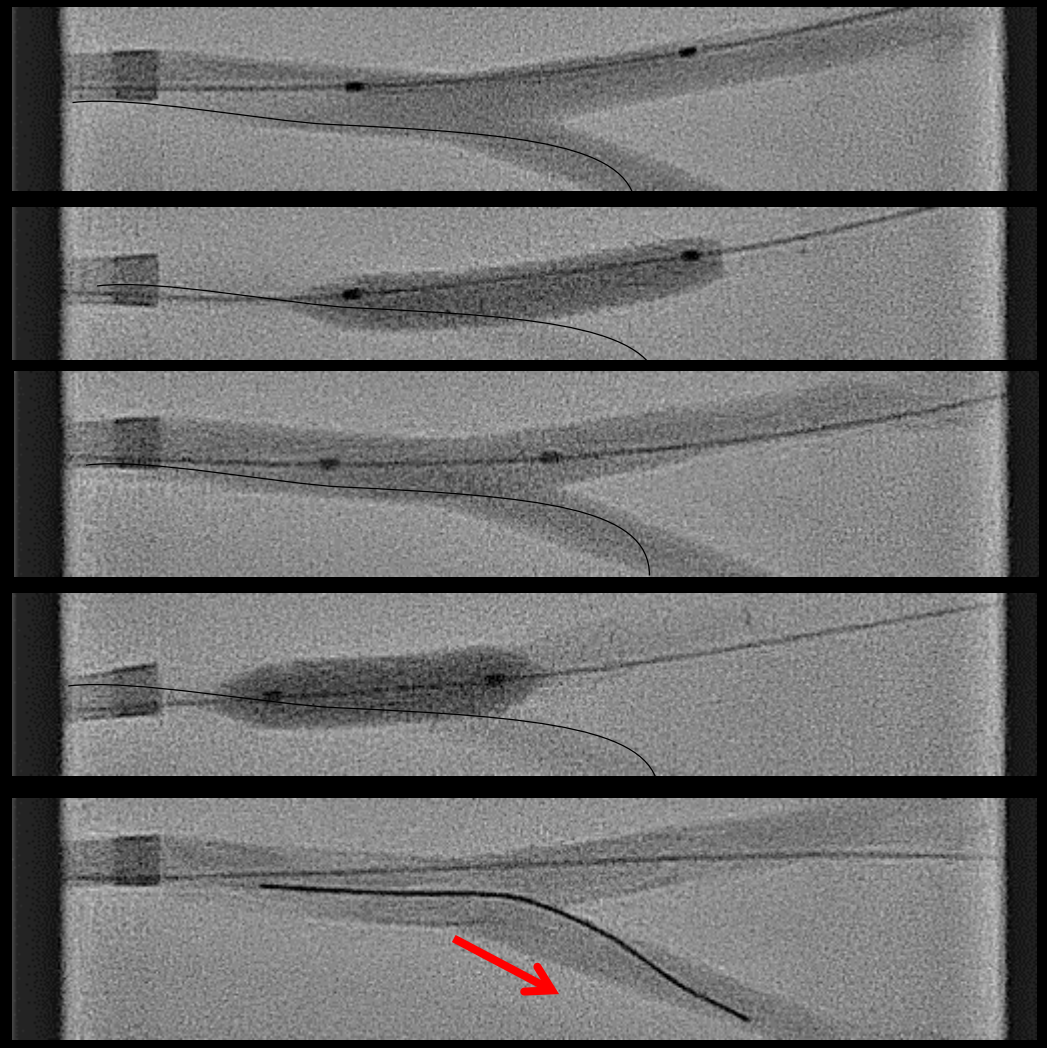


Final POT across the SB causes the SB ostium to narrow



Lene Nyhus Andreasen

Optimal strategy for provisional stent deployment in a bifurcation



Wire both branches and position stent across SB

Stent sized for distal main branch
Deploy stent trapping SB wire

Position balloon sized to proximal MB up to carina for first POT

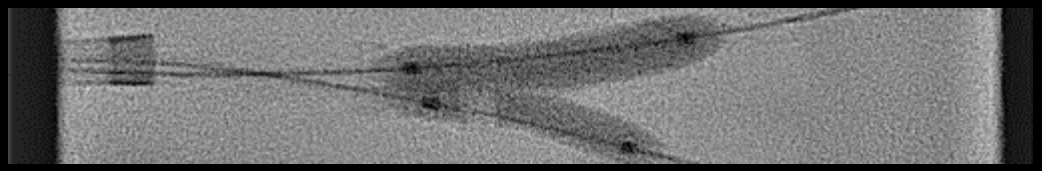
First POT – dilate entire proximal MB stent

Rewire SB through side of stent distally
Check crossing site with OCT
Remove trapped wire

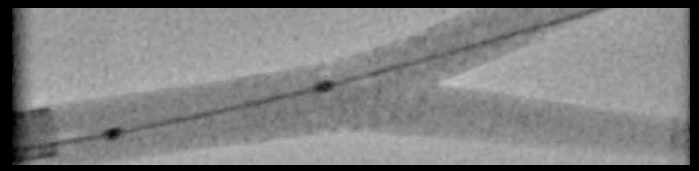
Optimal strategy for provisional stent deployment in a bifurcation (cont)

Inflate SB balloon sized to SB

Inflate MB balloon sized to distal MB

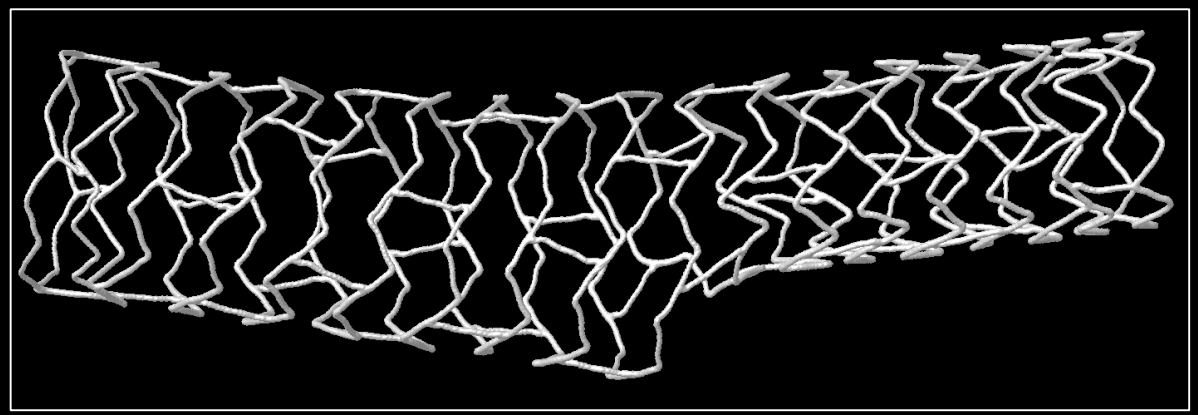


Kissing balloon post-dilatation. Deflate balloons simultaneously



Position re-POT balloon up to SB but not across

Inflate re-POT balloon proximal to SB



Stent fully expanded –no malapposition
No metallic narrowing distal to SB
Adequate SB opening
Some protrusion of struts to SB
Proximal re-POT has restored circularity of proximal MB stent

Conclusions

The optimal post-dilatation strategy for provisional stenting is KBPD followed by final POT proximal to the side-branch

Final POT across the SB causes reduction in SB ostial area