Peter Mortier

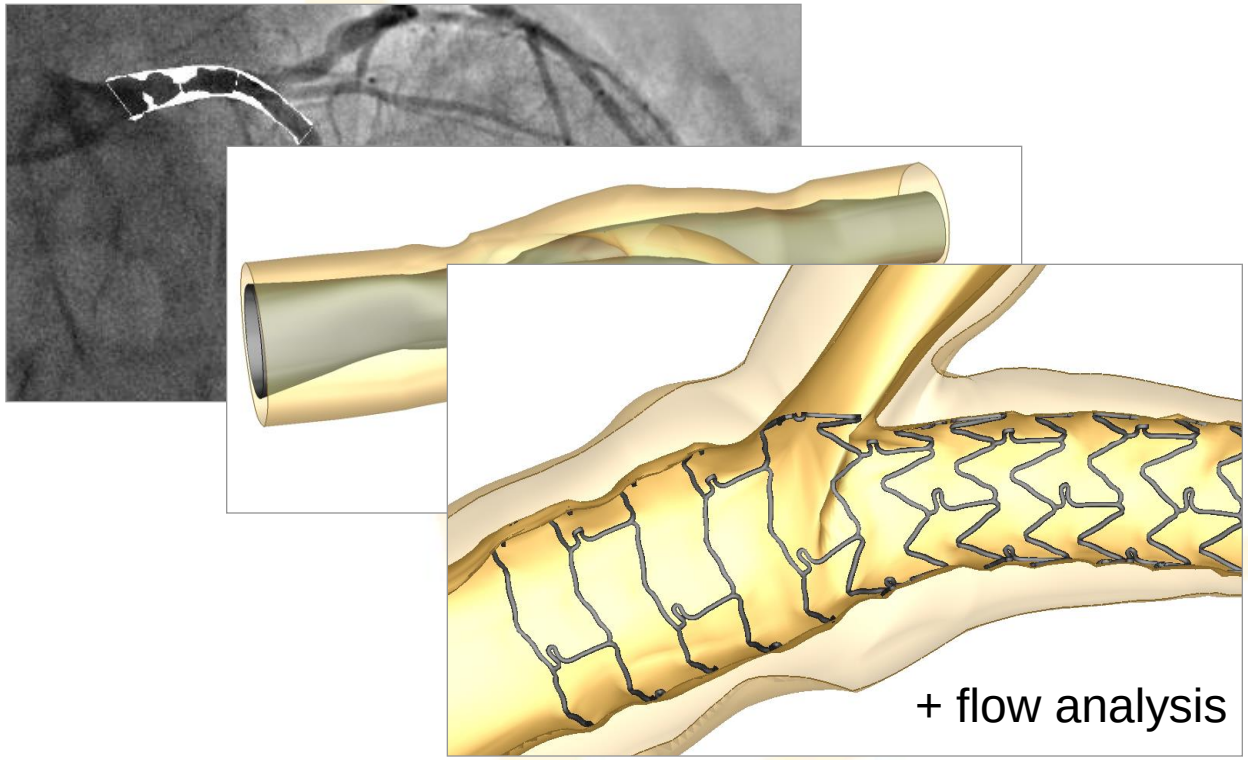
Patient-specific bifurcation stenting modelling for educational purposes

European Bifurcation Club

EBC

[1] IBiTech - bioMMeda
Ghent University, Belgium
[2] FEops, Gent, Belgium

The ultimate dream



Predict outcome

Personalized treatment approach

Dreaming is good, but …

Why not?

- Imaging does not provide sufficient information, modalities need to be combined
- Several time-consuming steps
- Complications are the result of a large number of factors
- …

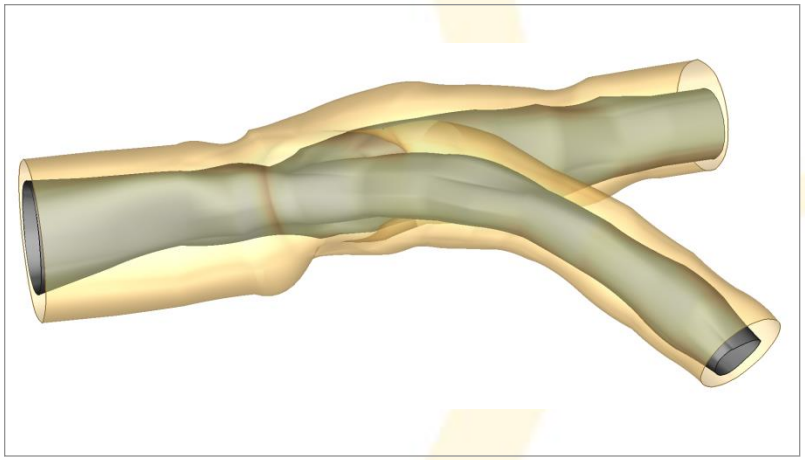
Why patient-specific modelling?

EDUCATIONAL AND RESEARCH PURPOSES

- to communicate EBC guidelines
- to show what not to do
- to better understand differences between stent platforms
- to understand the impact of different treatment strategies

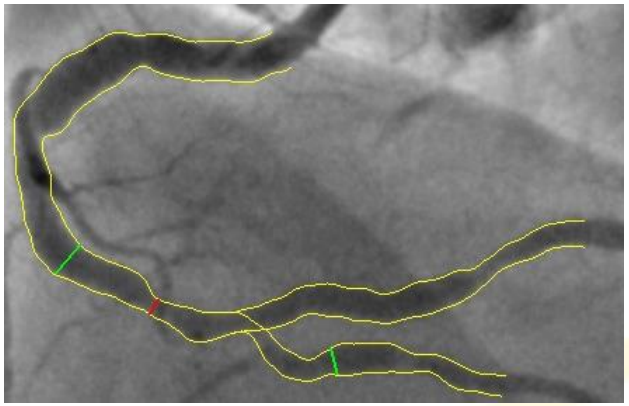
Patient-specific bifurcation models

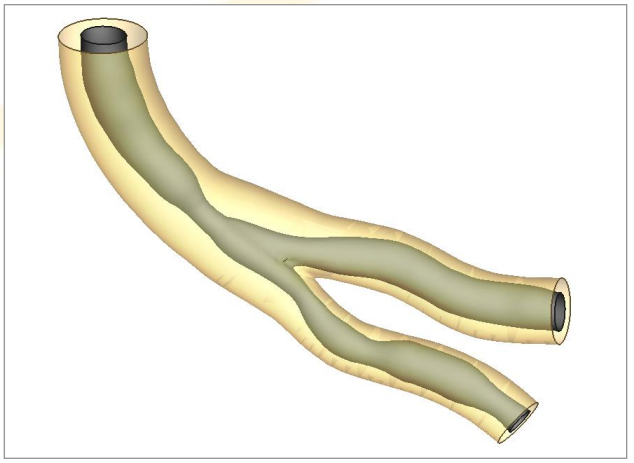
John Doe 1



MSCT + IVUS (J. Wentzel, Rotterdam)

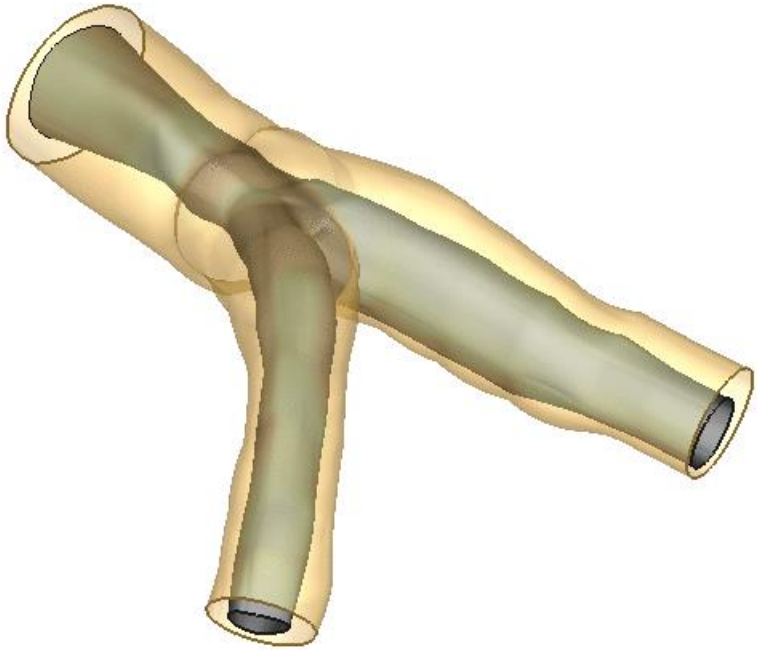
John Doe 2

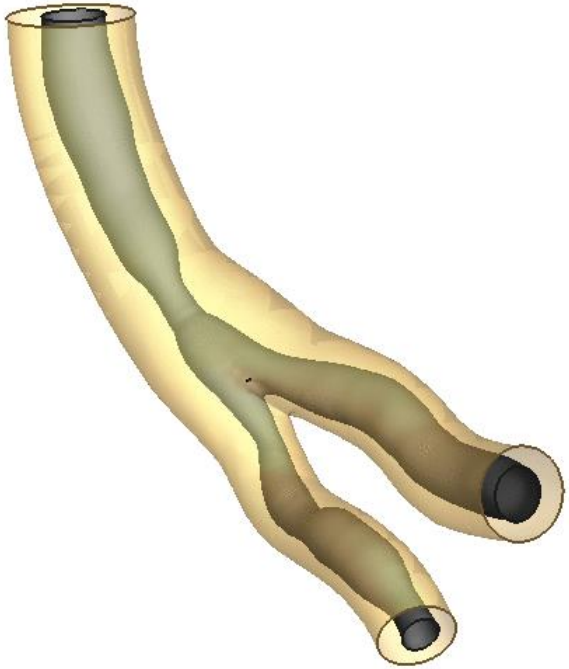




3D QCA (S. Tu, Medis)

Patient-specific bifurcation models





Stent sizing

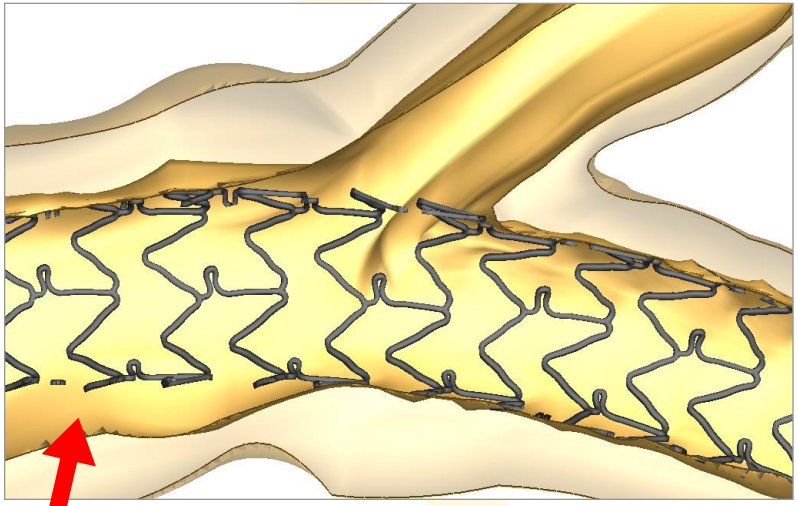
Consensus from the 5th EBC meeting

“In single stent technique, the primary stent should be sized according to the distal main vessel diameter”

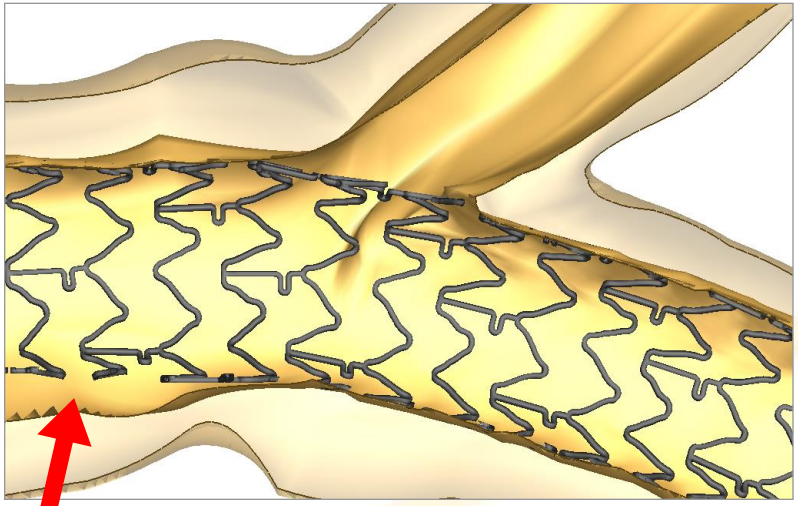
Sizing based on **distal** vessel diameter	⟺	Sizing based on **proximal** vessel diameter
• less carina shift		• more carina shift
• lower risk on dissection		• higher risk on dissection
• more malapposition		• less malapposition

Stent sizing

3.0mm



3.5mm



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Sizing based on **proximal** vessel diameter

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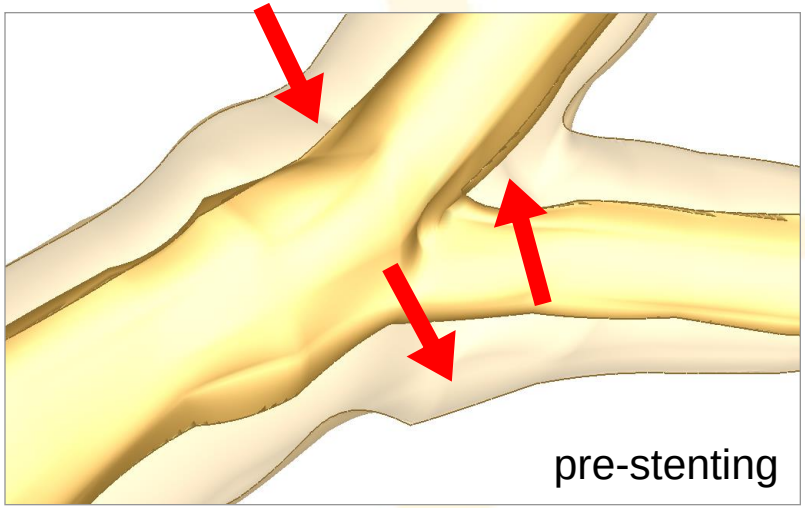
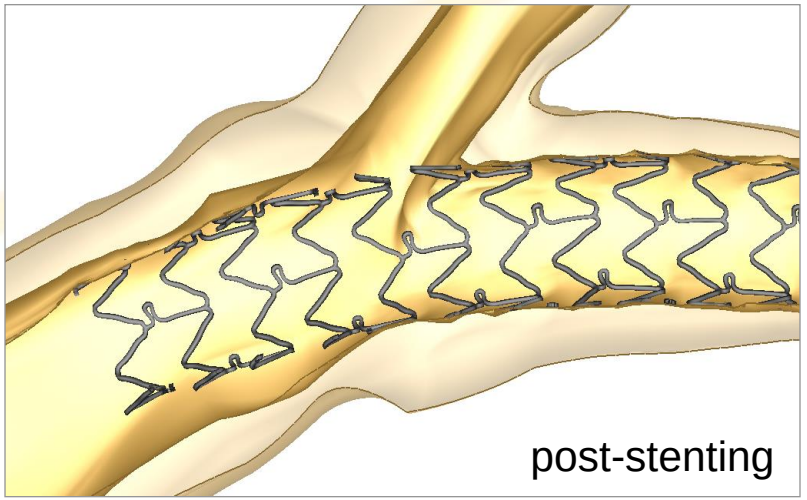
Carina shift

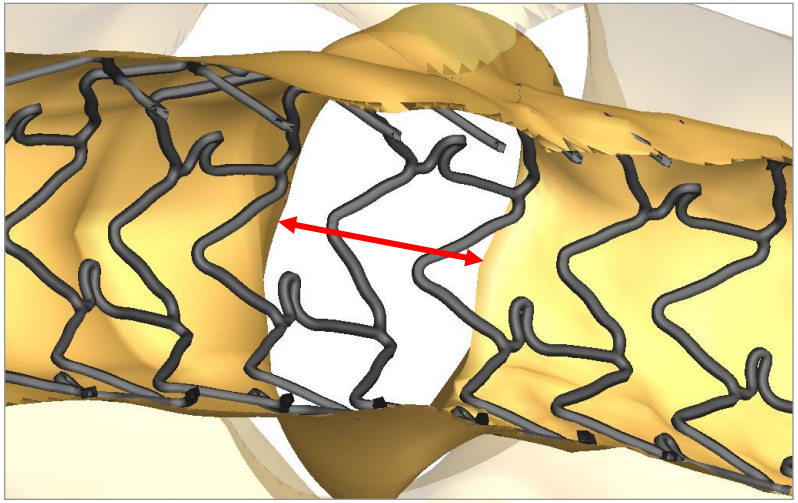
This top view shows a reduction of LCX diameter (circular => elliptic). This is due to a combination of carina shift AND a movement of the lateral wall.





Stent sizing

3.0mm



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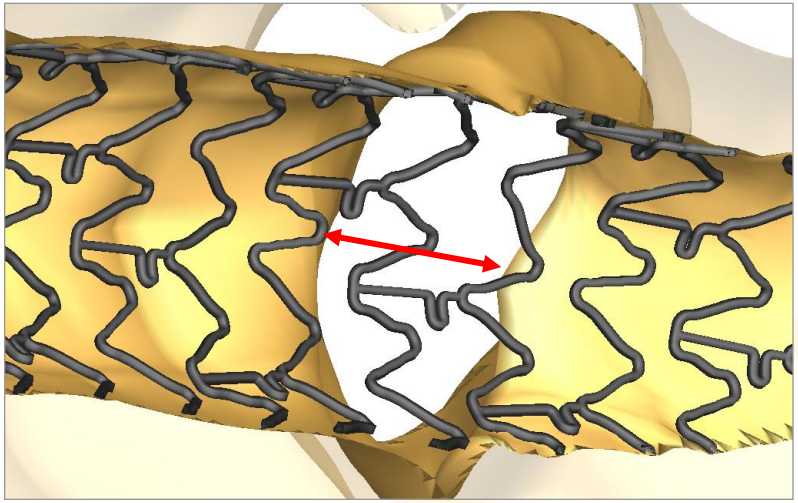

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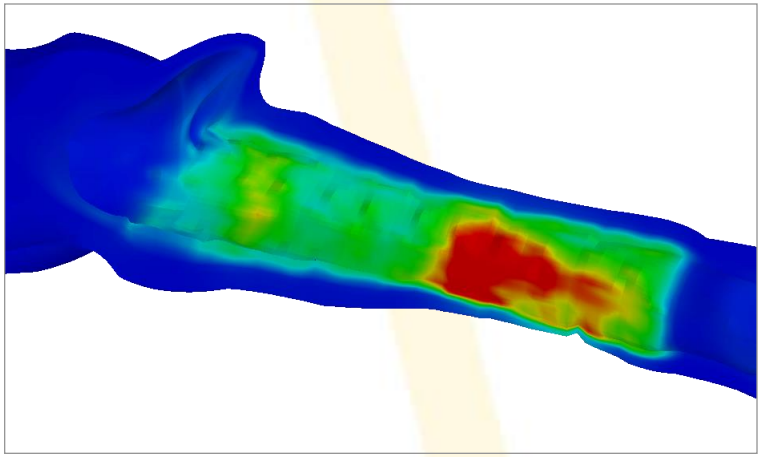
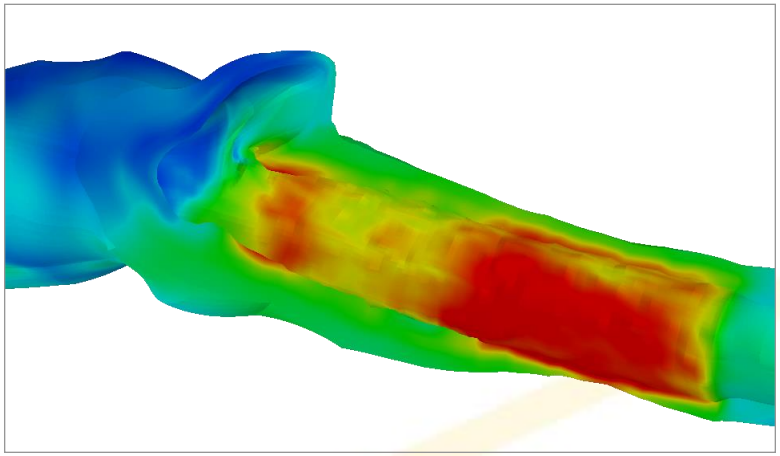


3.5mm



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Sizing based on **proximal** vessel diameter

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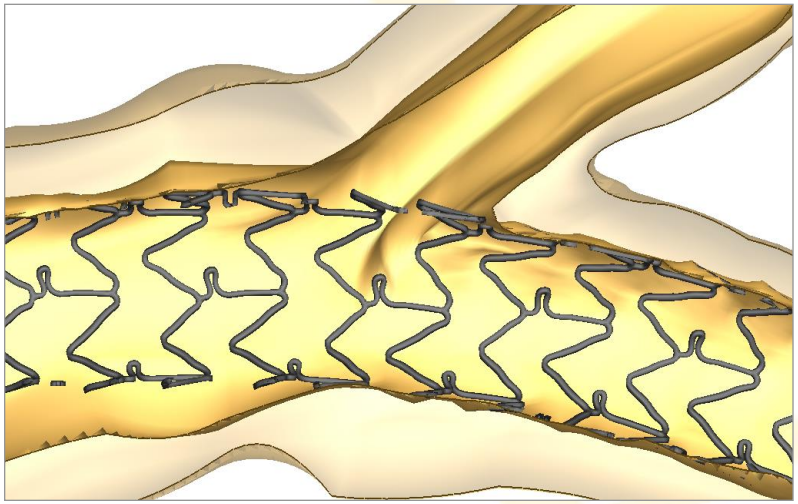
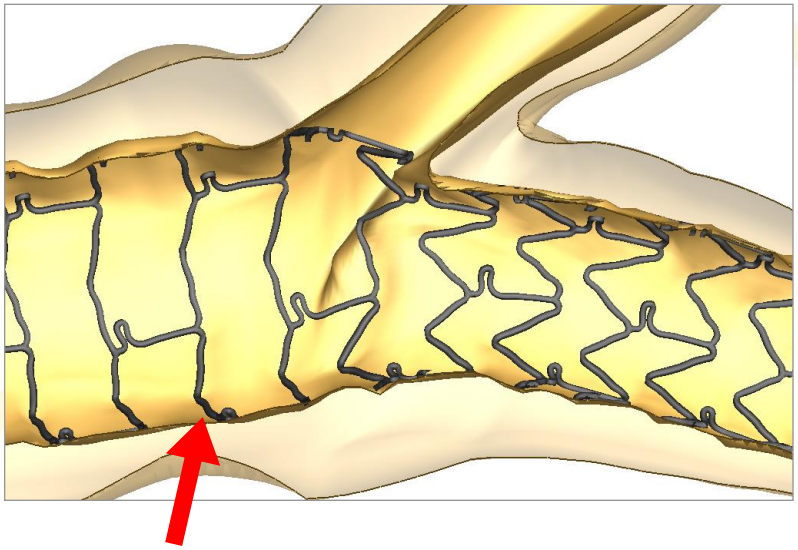
Stent sizing

Being aware of the maximal expansion capacity of the different platforms is crucial when you size the stent according to the distal branch diameter!!!

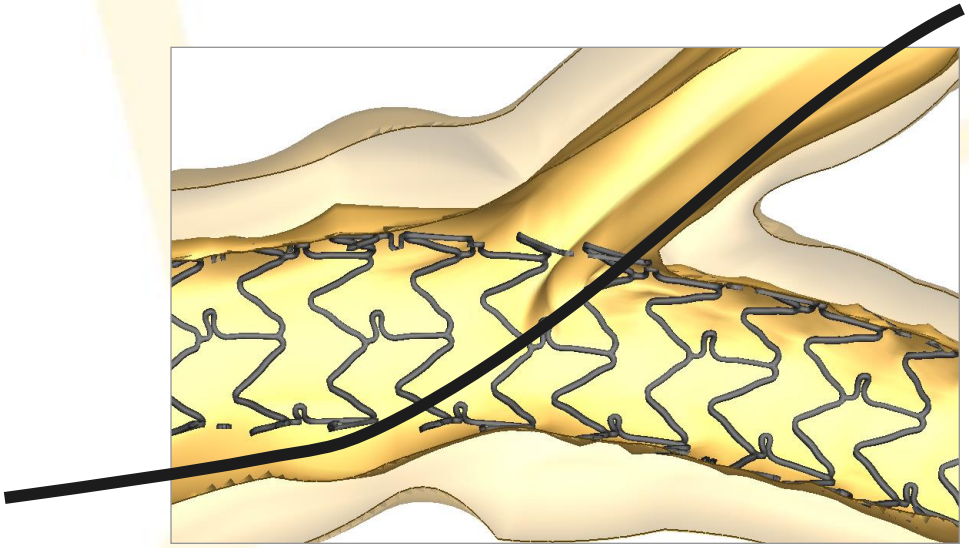




The POT

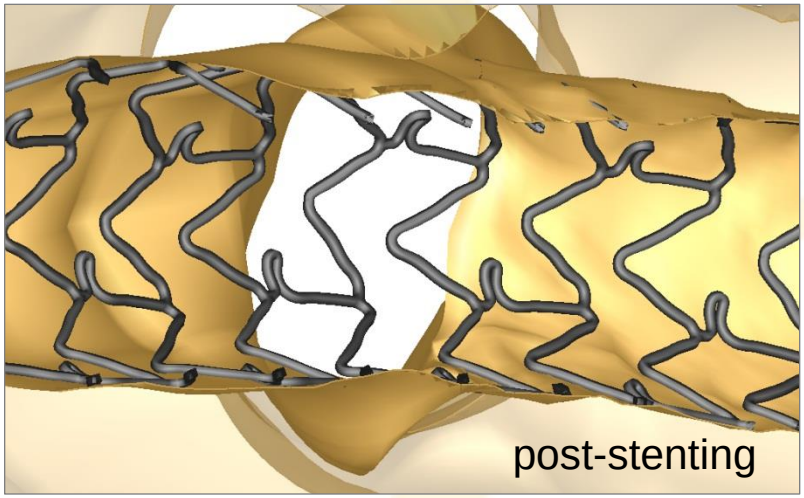
Stent sizing according to the distal branch diameter can lead to serious malapposition, especially in large bifurcations.

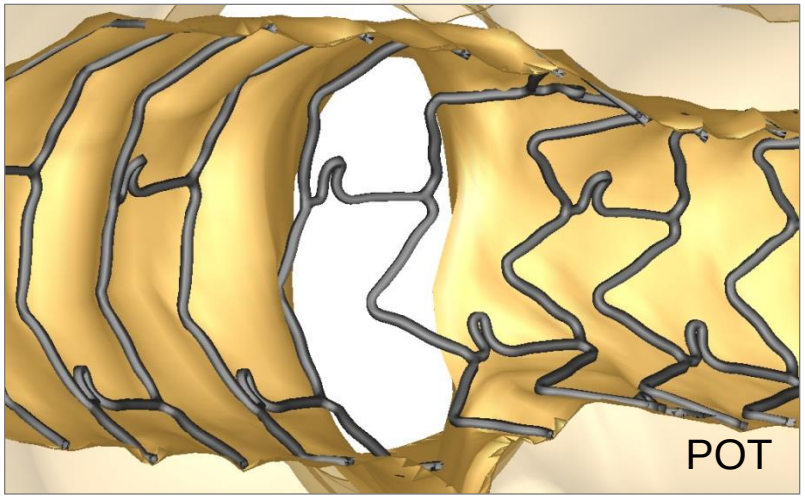
In such cases, proximal optimisation (POT) seems recommended before inserting a wire into the SB.



The POT

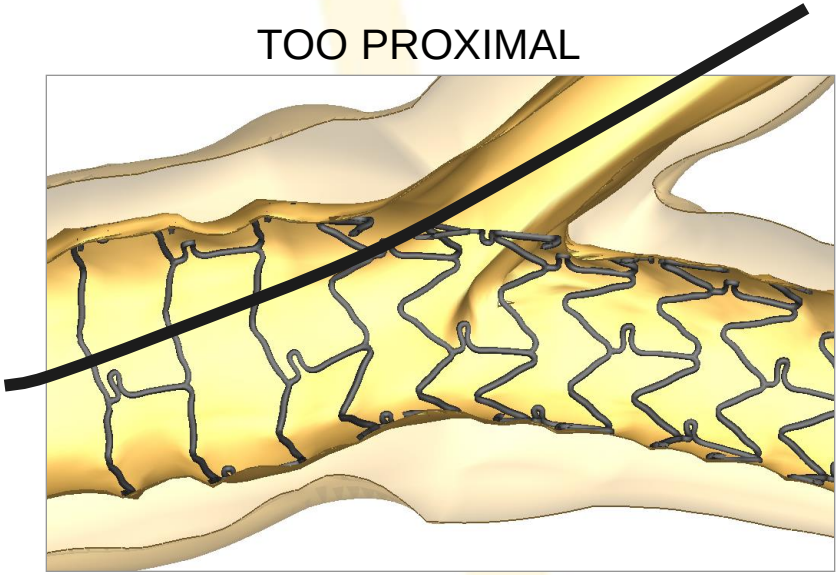
Proximal optimisation seems to reduce the number of cells covering the side branch ostium and also enlarges these cells, possible facilitating side branch access



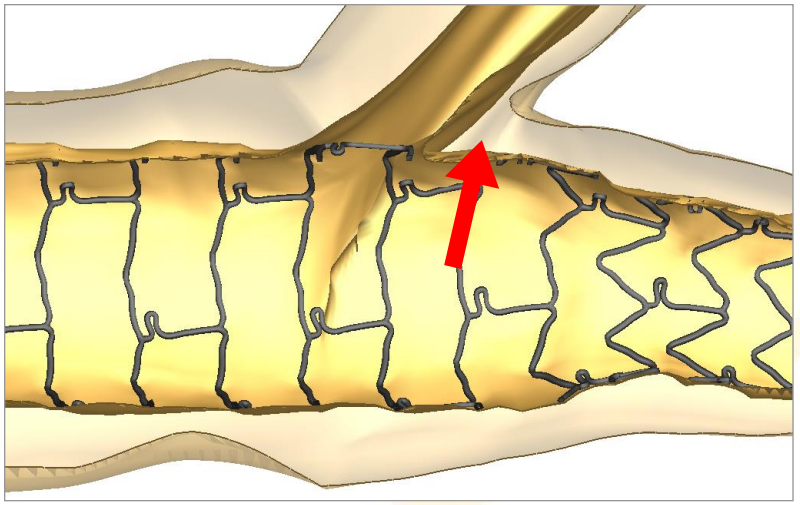


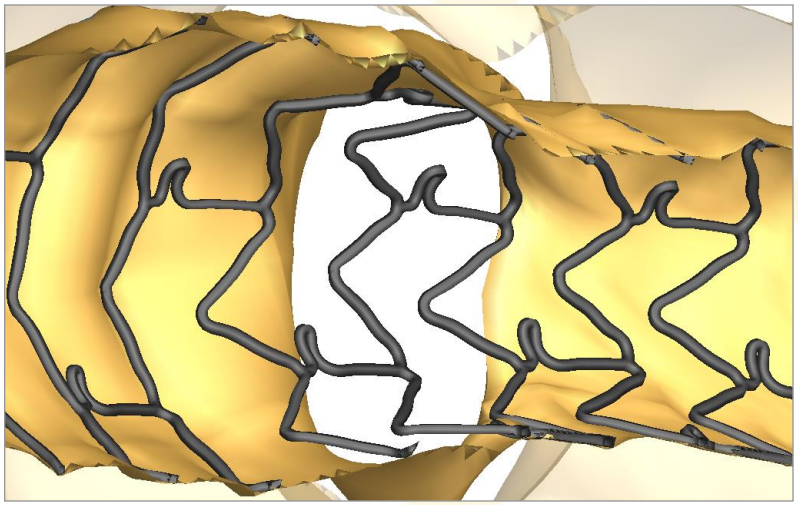
The POT: be careful!

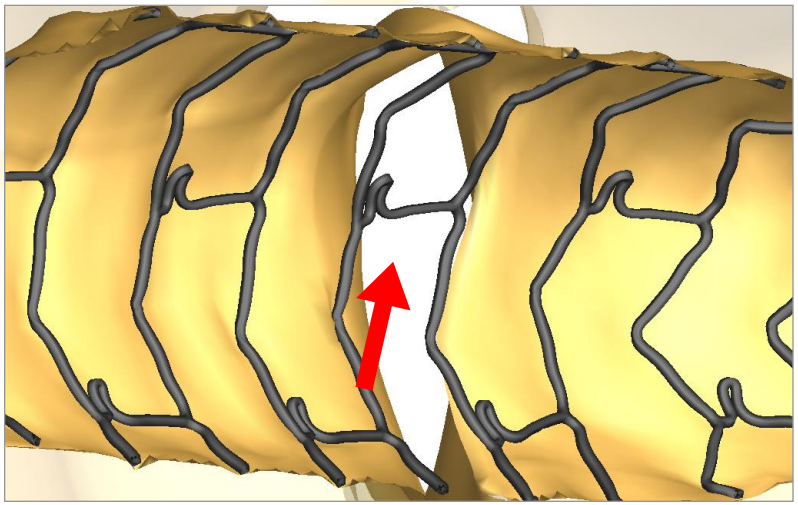
TOO PROXIMAL



TOO DISTAL





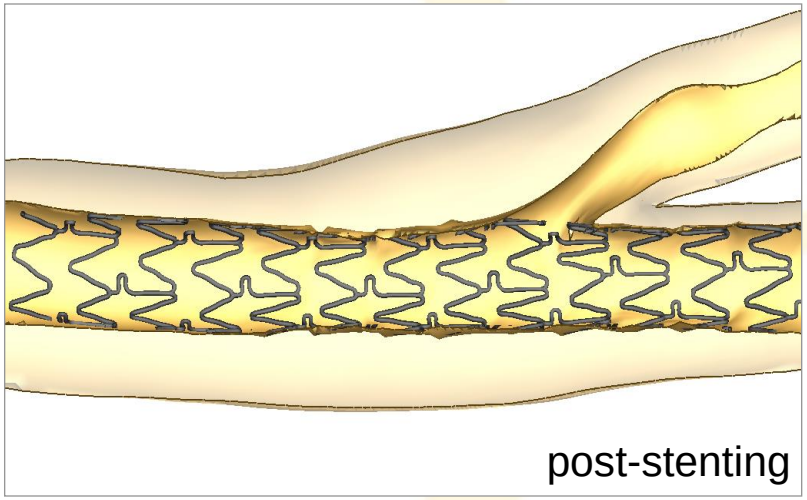


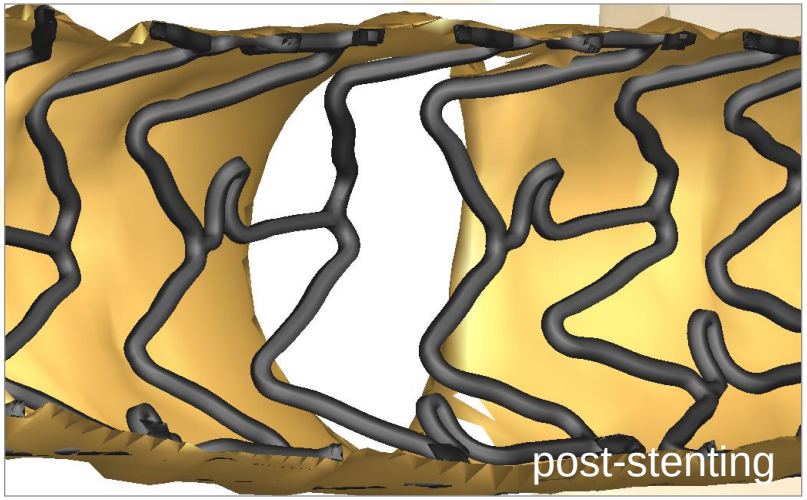
The POT

Second example: smaller bifurcation (RCA)

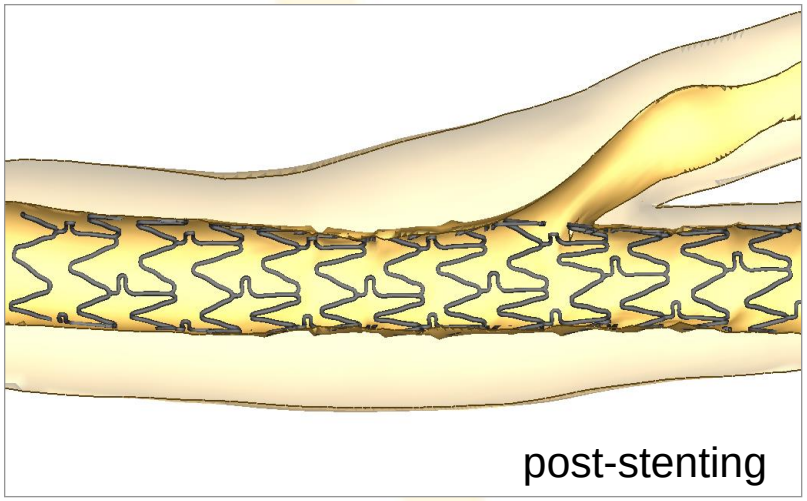
POT seems less crucial for this smaller bifurcation

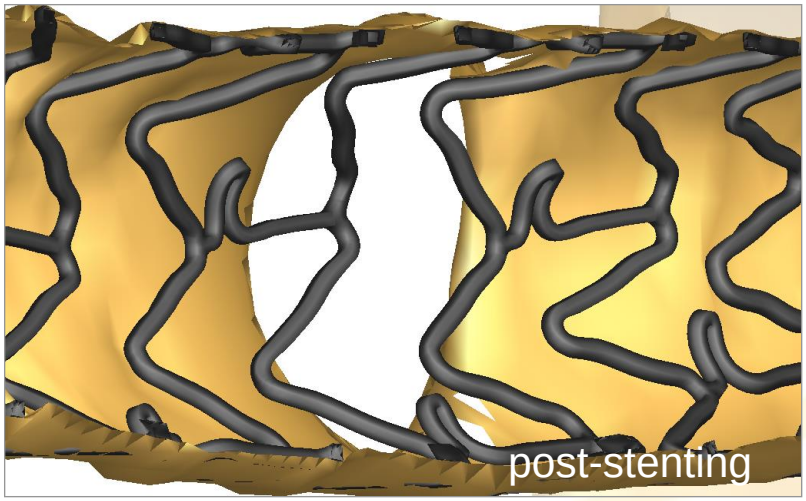
SB opening maybe less relevant

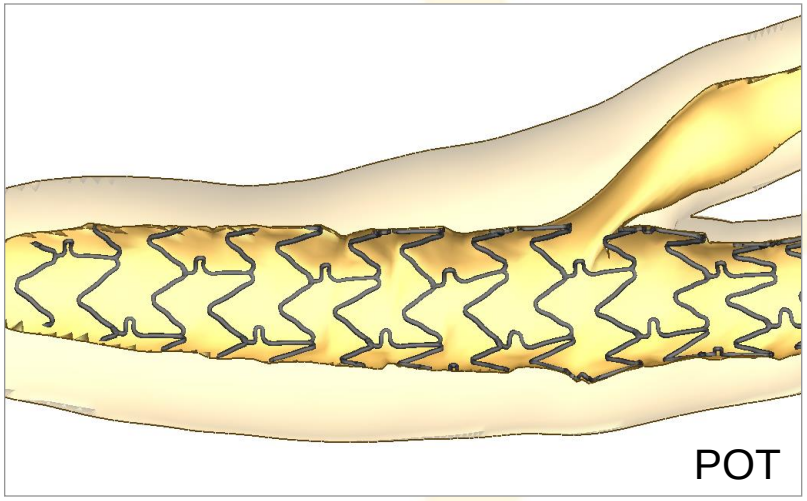


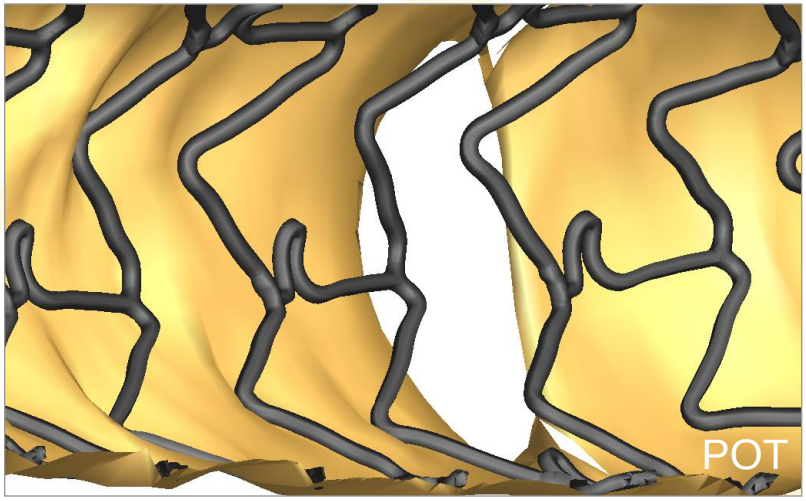


The POT: be careful









Conclusions

Patient-specific modelling for bifurcation stenting:

YES, for research and educational purposes!

Thank you

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