Finite element analysis of BIFURCATION STENTING

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INTRODUCTION

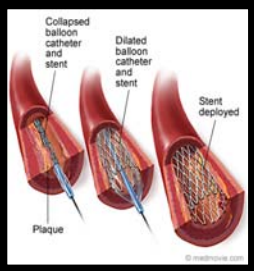
49% of all European deaths are associated with cardiovascular diseases

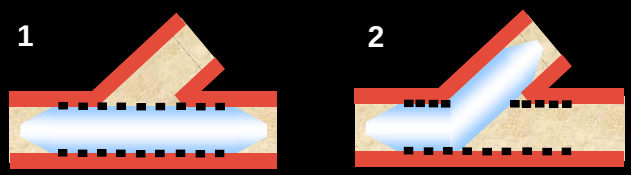
More than one million stent implantations every year

Stenting bifurcation lesions remains a problem (many proposed techniques)!

Investigated technique: 1) stent implantation in main branch

2) balloon inflation to improve side branch access



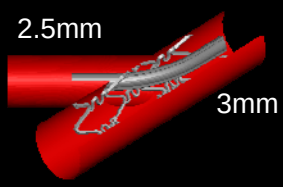


METHODS

Comparison of 2 stents (Cypher™ and Multi-Link Vision™): 3D model created with pyFormex

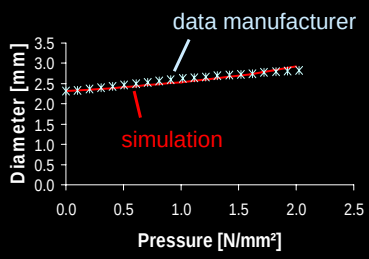
Validated balloon model (trifolded Raptor™)

ABAQUS finite element solver



Angle of intersection: 45°

Cypher™ Multi-Link Vision™



RESULTS

The balloon enlarges the stent opening ➡ optimized accessibility

Negative impact on main branch scaffolding

More advanced techniques and/or dedicated devices seem necessary!

CONCLUSIONS + FUTURE WORK

Numerical modeling offers interesting insights in complex stenting techniques

Other (in clinical practice) proposed techniques will be investigated

This may lead to improved stent designs and optimized interventional techniques

Experimental validation (micro CT)