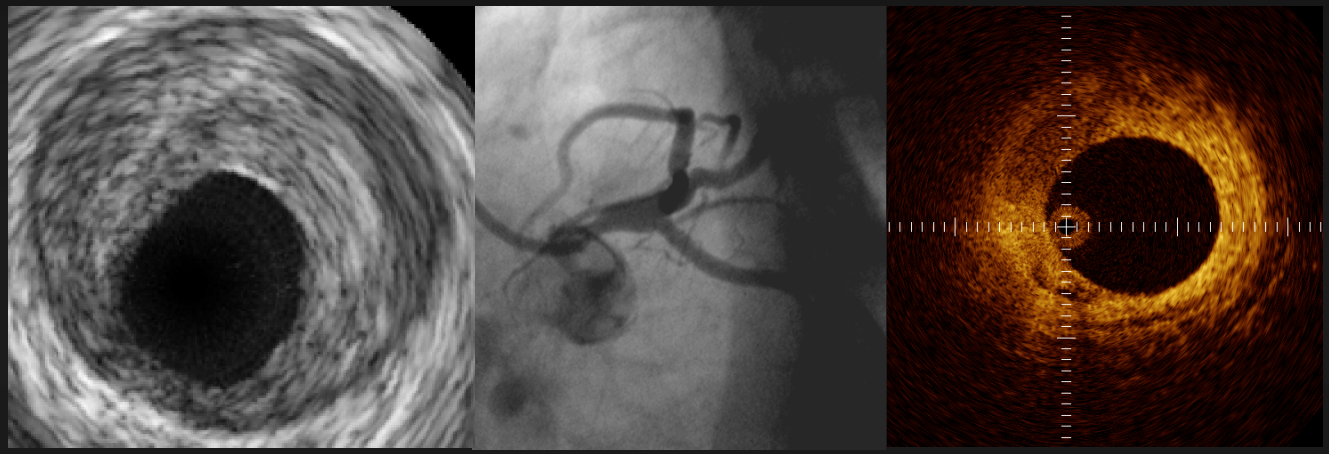
Left Main PCI

Clinical and technical considerations



Ran Kornowski, MD, FACC, FESC
Rabin Medical Center and Tel Aviv University, Israel

השתלמות בצנתורי לב ואחיות וטכנאי חדר צנתור
החוג לקרדיולוגיה התערבותית, 6 ליולי 2010

LM PCI: Why is it such a big issue?

- Because…
  - the myocardial jeopardy is extensive and does not leave much room for fault consequences.
  - it can be technically challenging.
  - it demands proper planning and substantial expertise.
  - it operates within the ‘dark gray zone’ of current revascularization guidelines (Class IIb indication).

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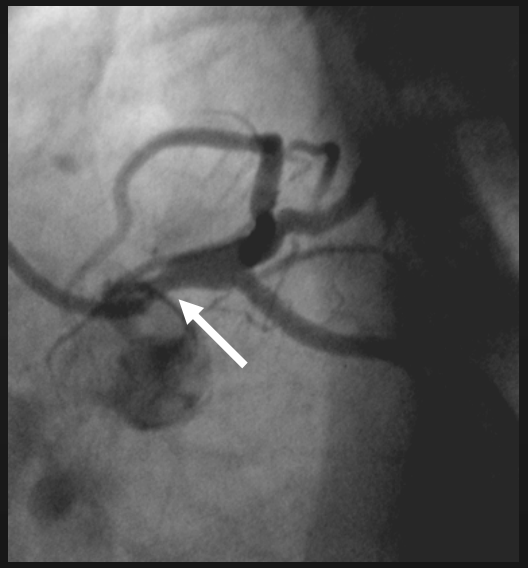
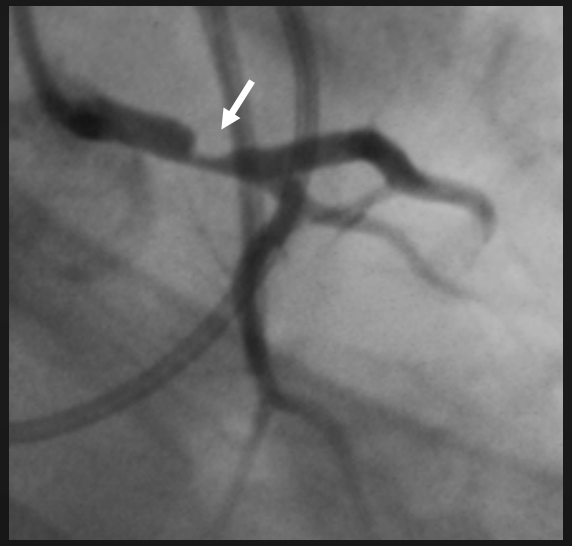
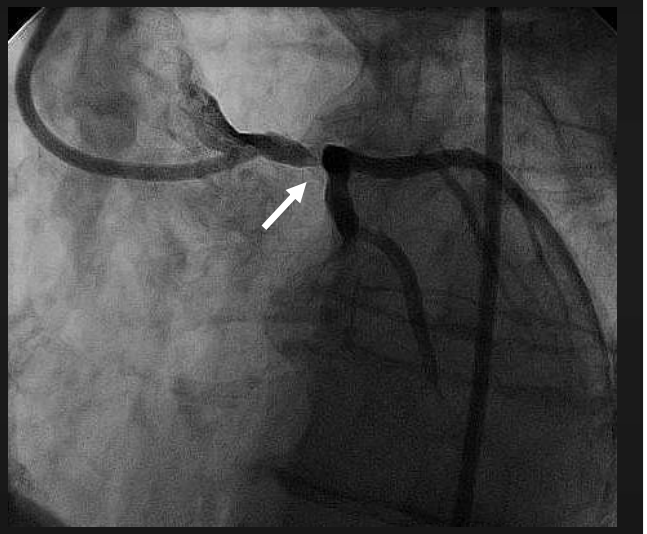
Anatomic variations



Ostial stenosis



Mid shaft stenosis

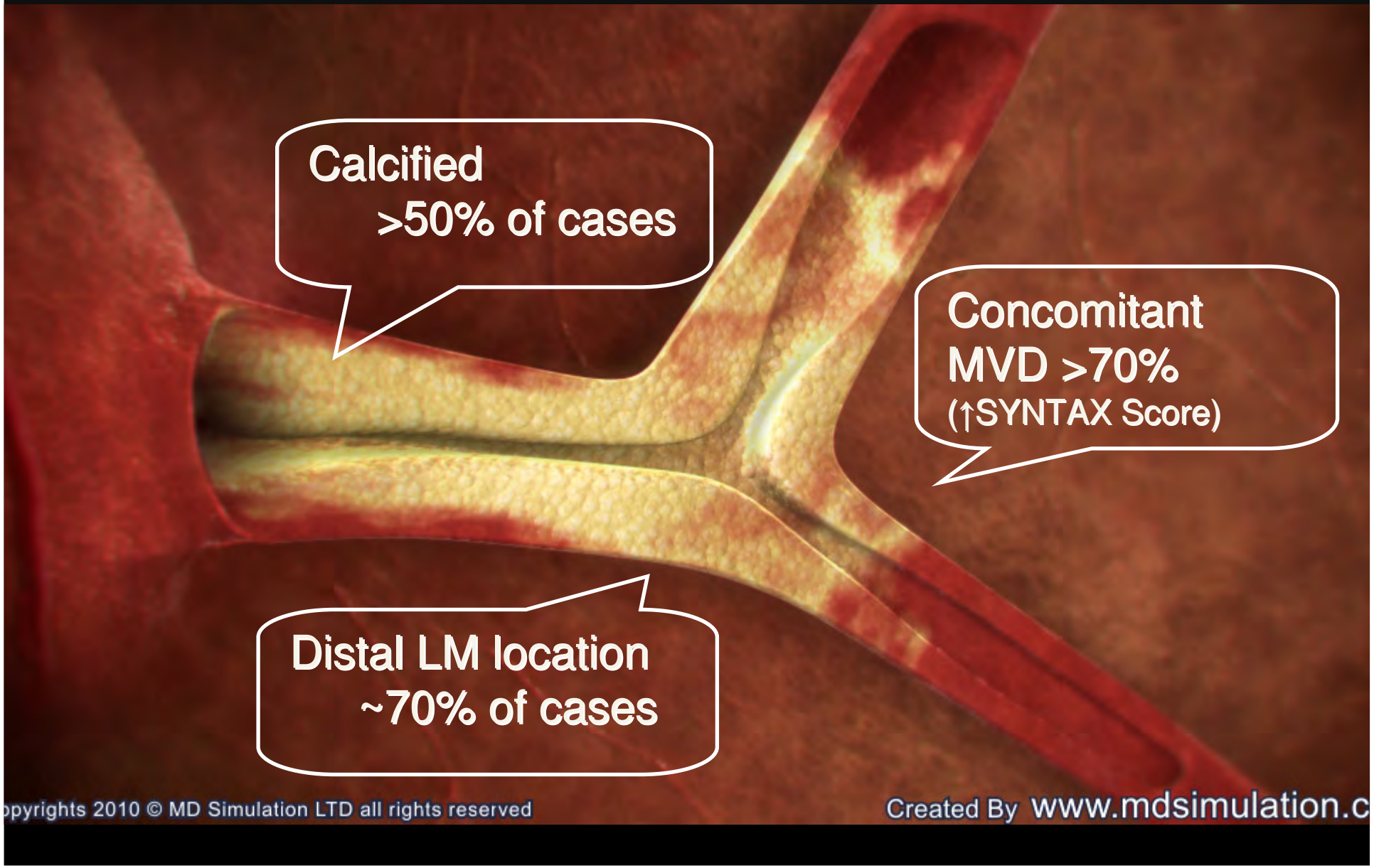


Distal stenosis

Impact on prognosis

- Co-Morbidity
  - Elderly patient
  - LV Function
  - Associated valvular pathology
  - Emergent presentation
  - Shock
  - Diabetes mellitus
  - Renal dysfunction
  - ↑ EuroScore
  - ↑ SYNTAX Score

Left main complexities



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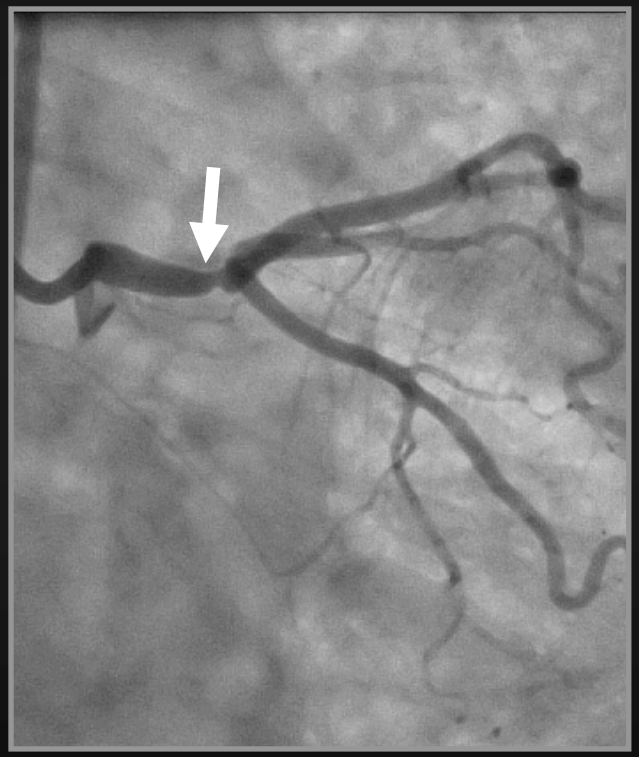
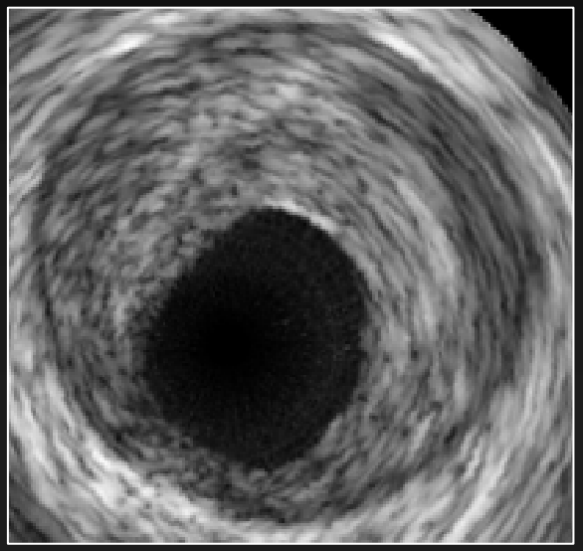
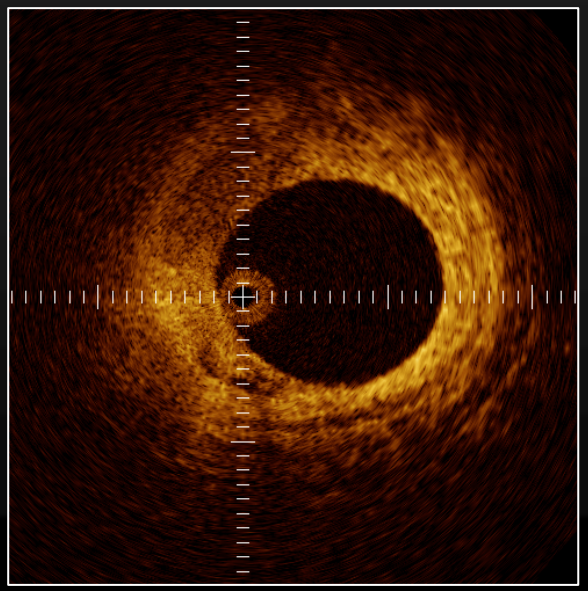
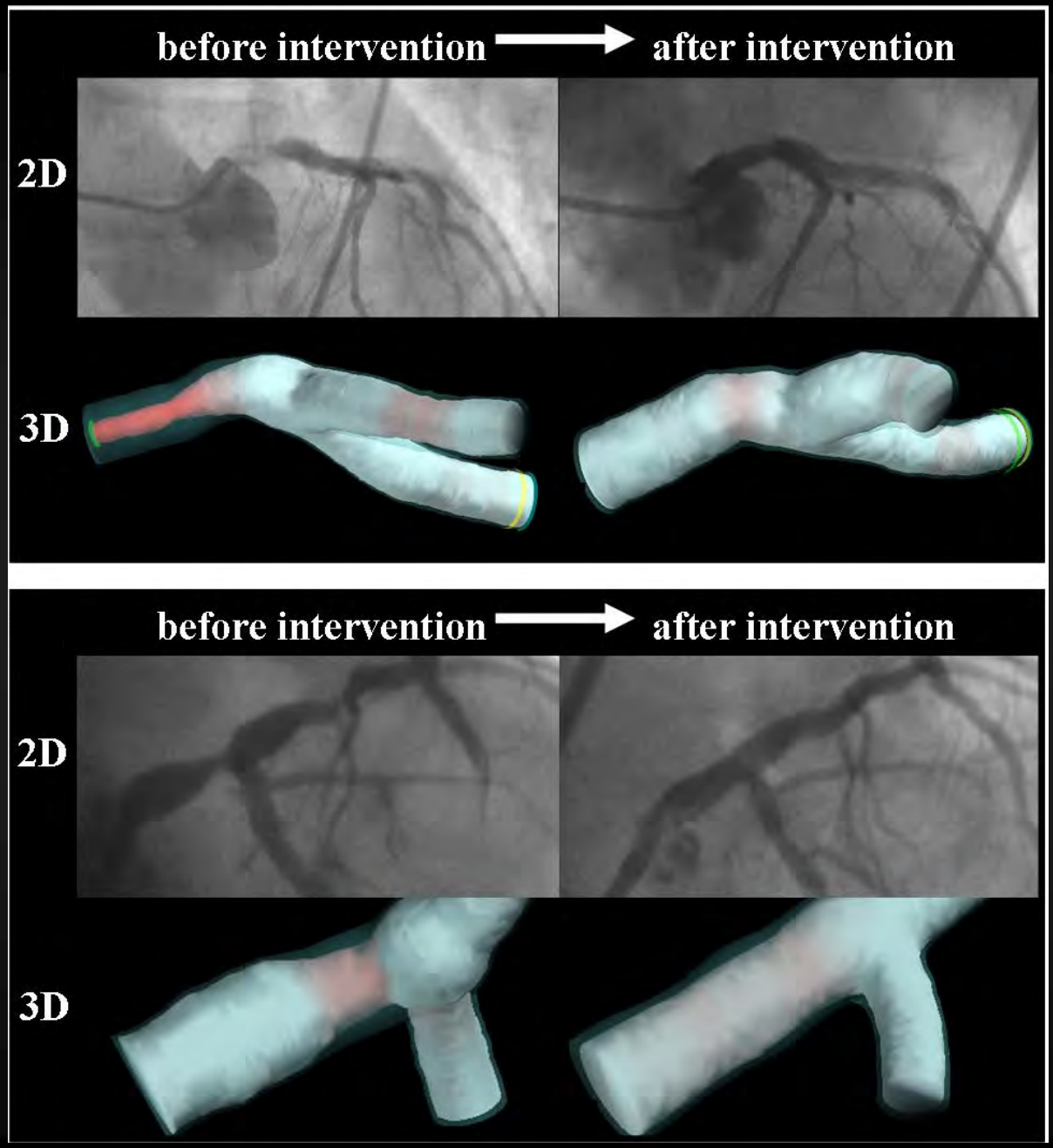
Left Main assessment: *Imaging Modalities*







Left Main 3D Angio



Dvir D, …Kornowski R, Cardiovasc Revasc Med (in press)

Fundamental issues

- CABG vs. PCI
- Procedural safety and effectiveness
- PCI planning is mandatory
- Long-term consequences

Favorable vs. Unfavorable LMD for PCI

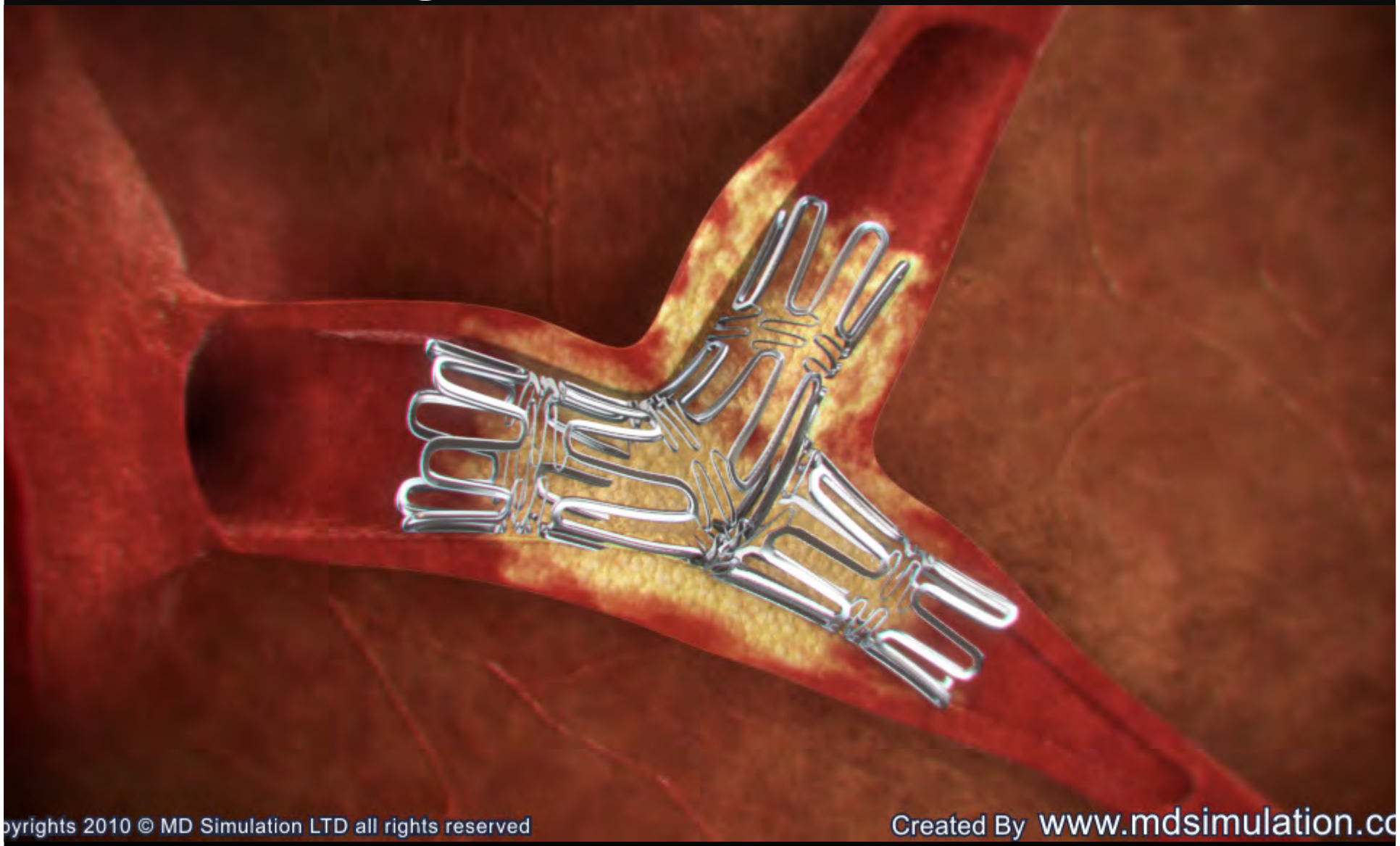
Favorable for PCI

- Ostial LMD
- Mid shaft LMD
- Isolated LMD
- LM diameter≥3.5mm
- Patent RCA
- No/mildly calcified
- Good LV function

Problematic for PCI

- Distal LM
- Ostial LAD/LCX involvement
- Sharp LAD/LCX angles
- Heavy calcification
- LM diameter<3.5 mm
- Associated MVD
- Occluded RCA
- Poor LV function
- Associated valve pathology

PCI Strategies

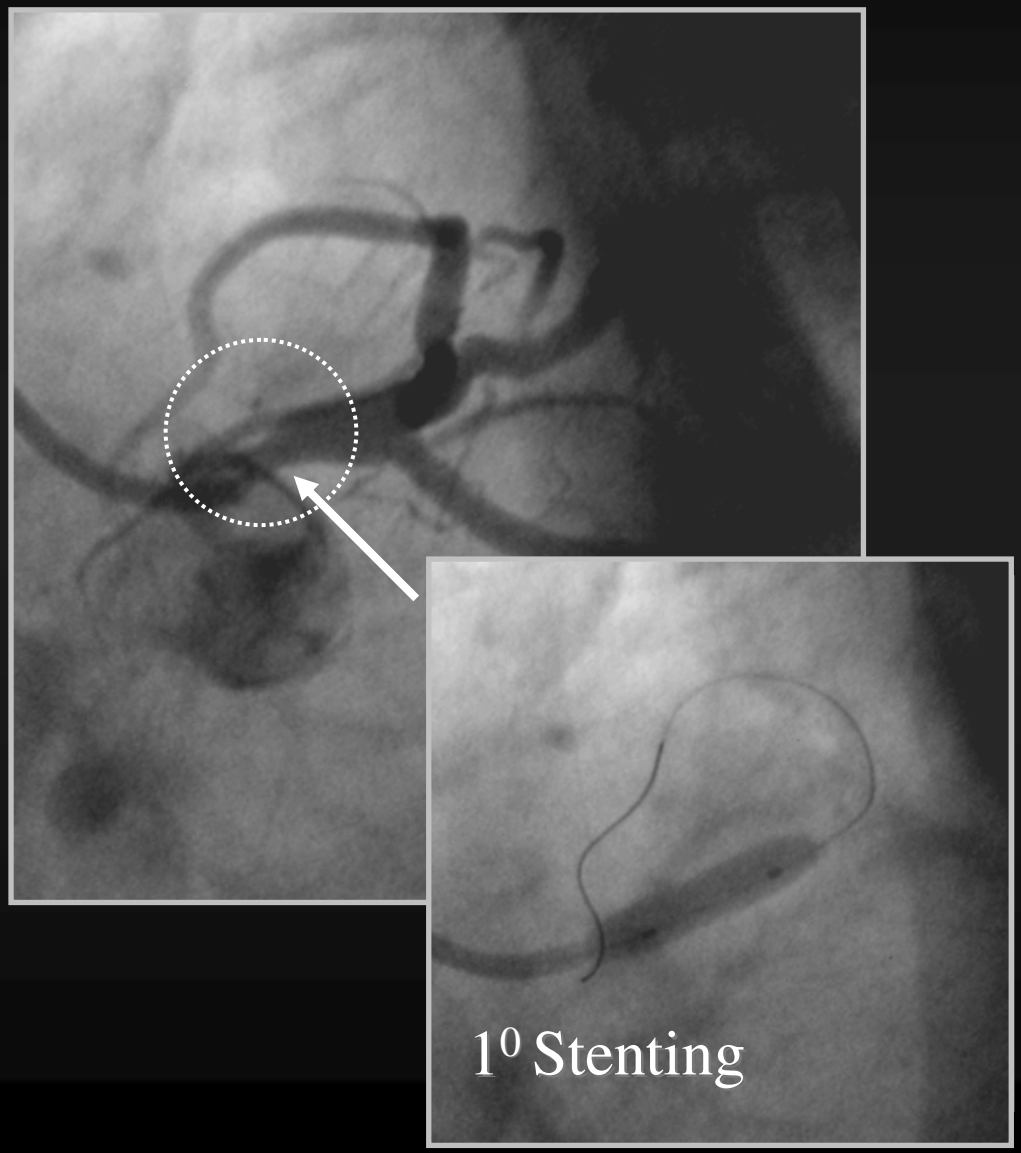


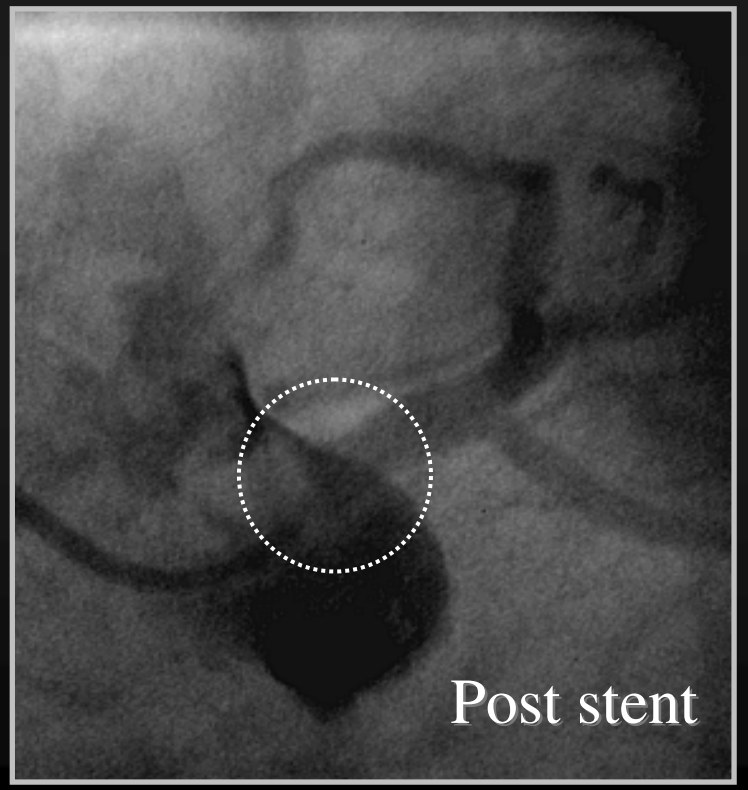
PCI Considerations in Left Main PCI

- Strategies in PCI
  - Direct vs. Non-direct stenting
  - Need for lesion debulking (+/-)
  - Bifurcation techniques
- Adjunctive technologies
  - Intravascular ultrasound
  - Directional or Rotational atherectomy
  - DES vs. BMS
- Late outcome
  - Long-term Clopidogrel or Prasugrel administration
  - Repeat angiography or cardiac CTA

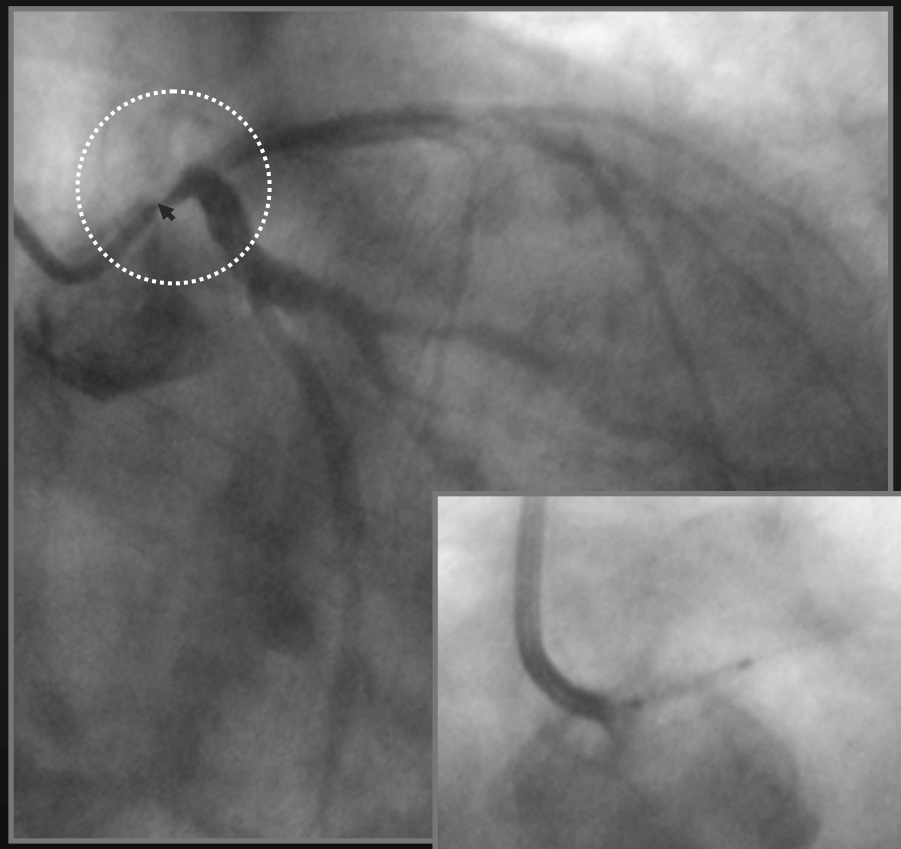
Ostial LM Stenting

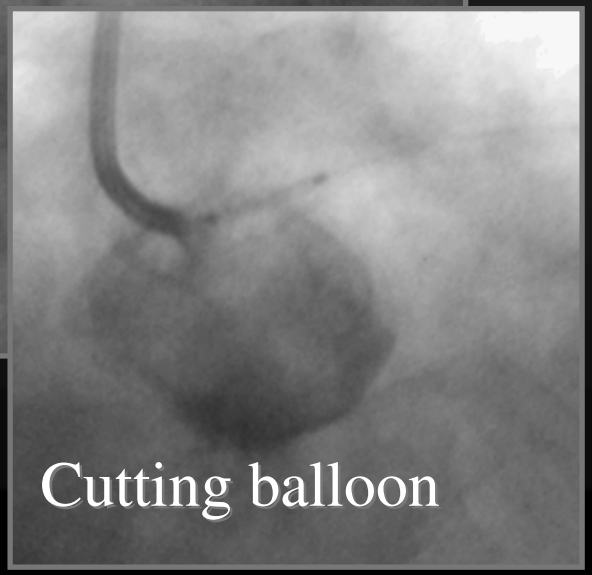
- Debulking or cutting?
  - •Calcification
- Stent positioning
- DES vs. BMS?
- Optimal expansion
  - ➢IVUS Guidance

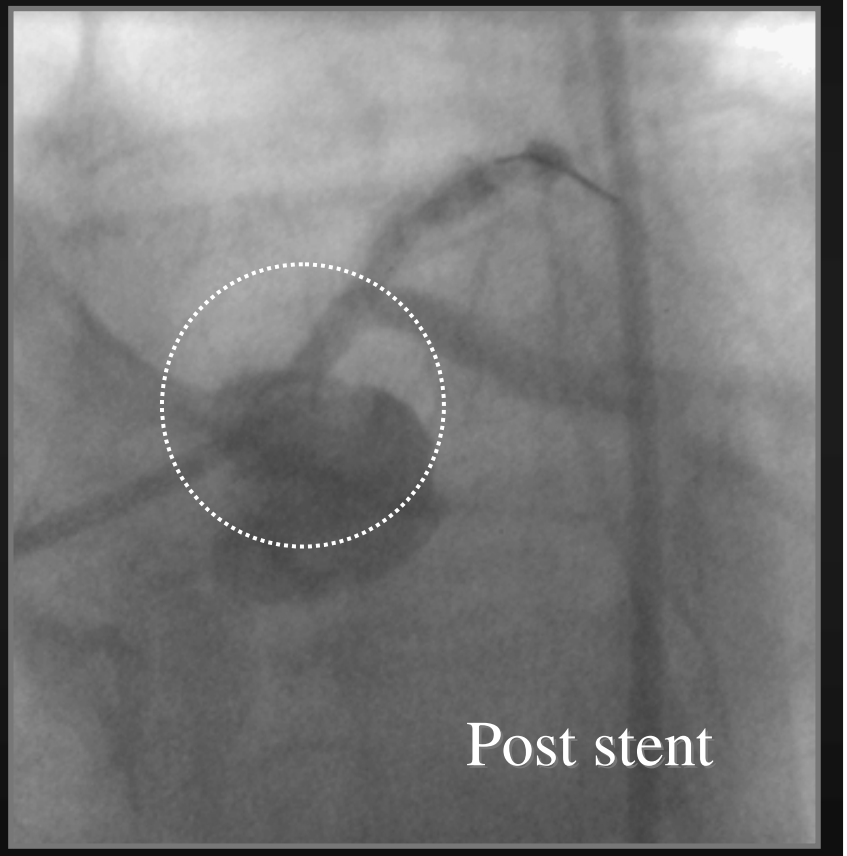




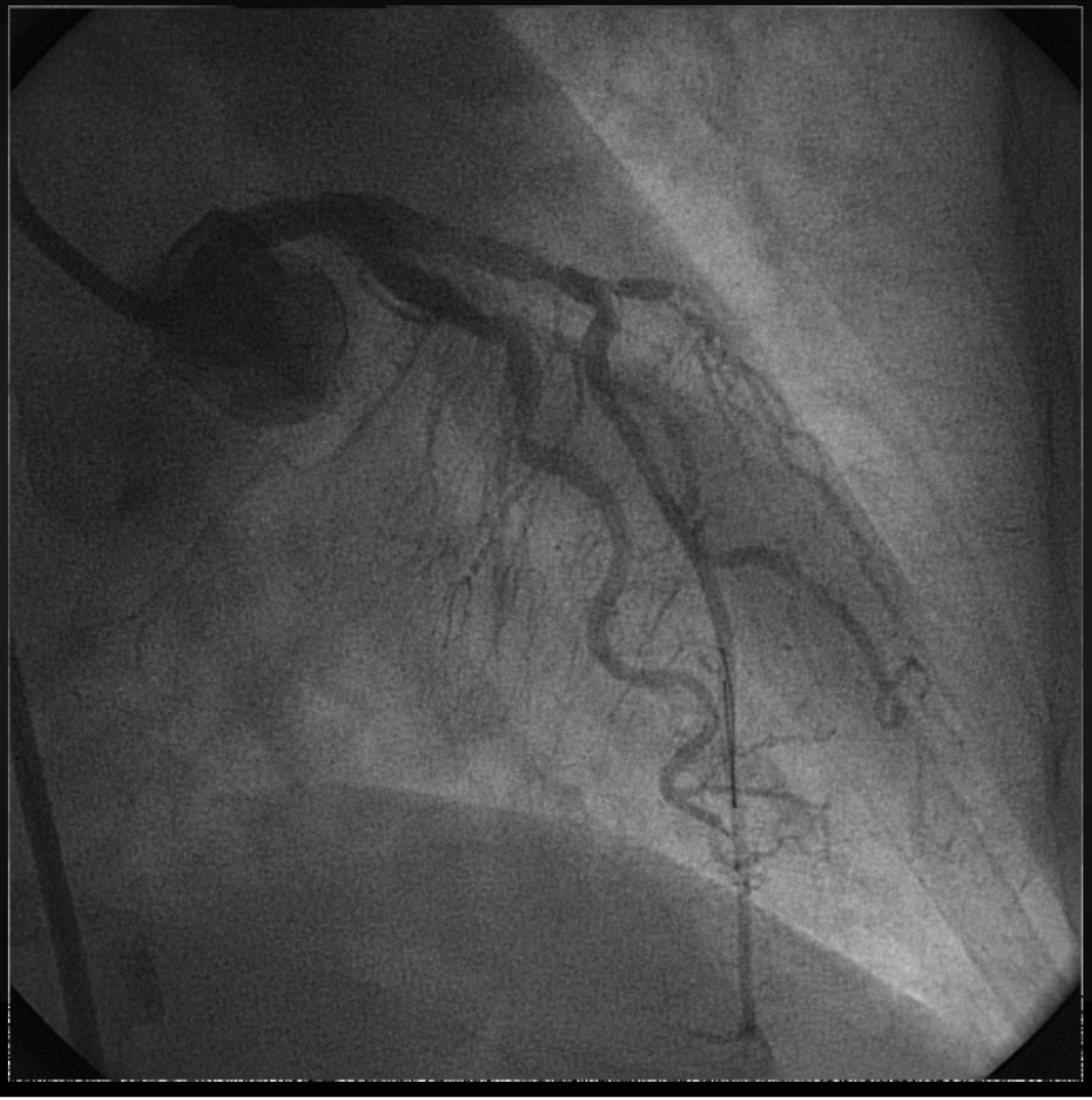
Ostial and mid LM Stenting





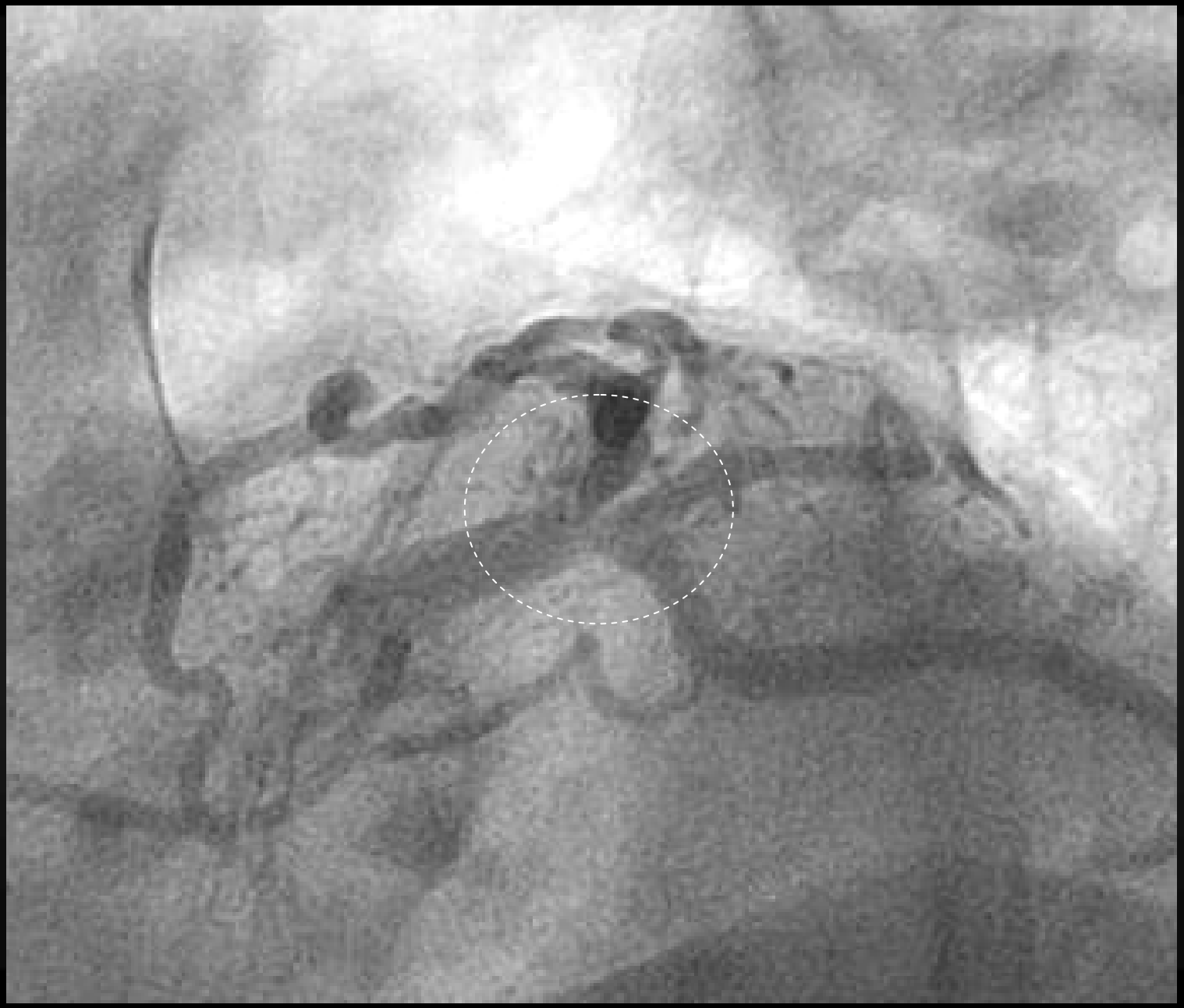


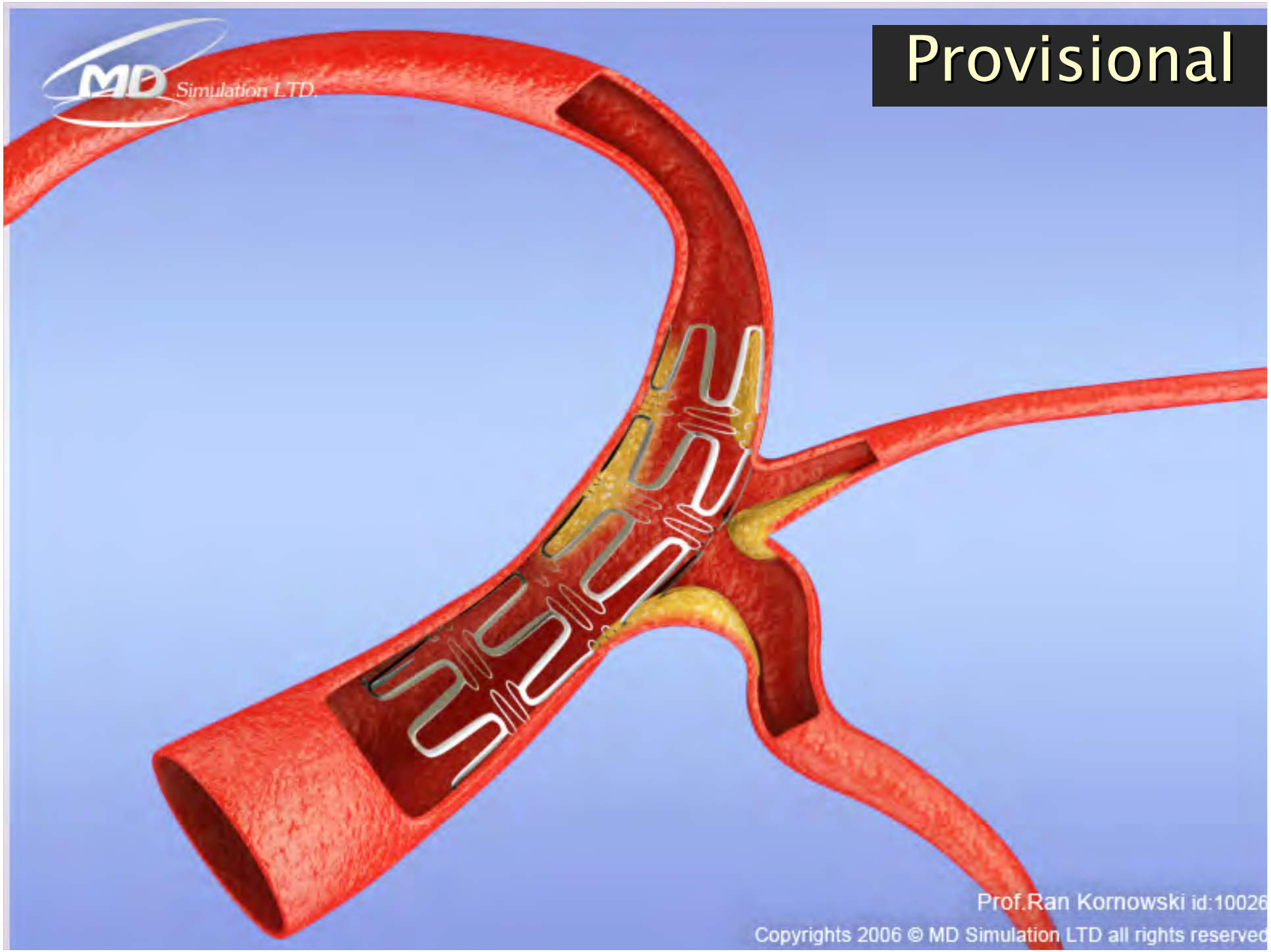
Diffuse-calcified LM stenosis



Challenges in distal LM stenting

- Major determinants of procedural success:
  - Vessels diameters (LM and LAD/LCX)
  - Angle between LM to LAD/LCX
  - Presence of an intermediate branch
  - Plaque distribution
  - Plaque composition and amount of calcification
  - Potential for plaque shifting
  - Need for lesion “preparation”

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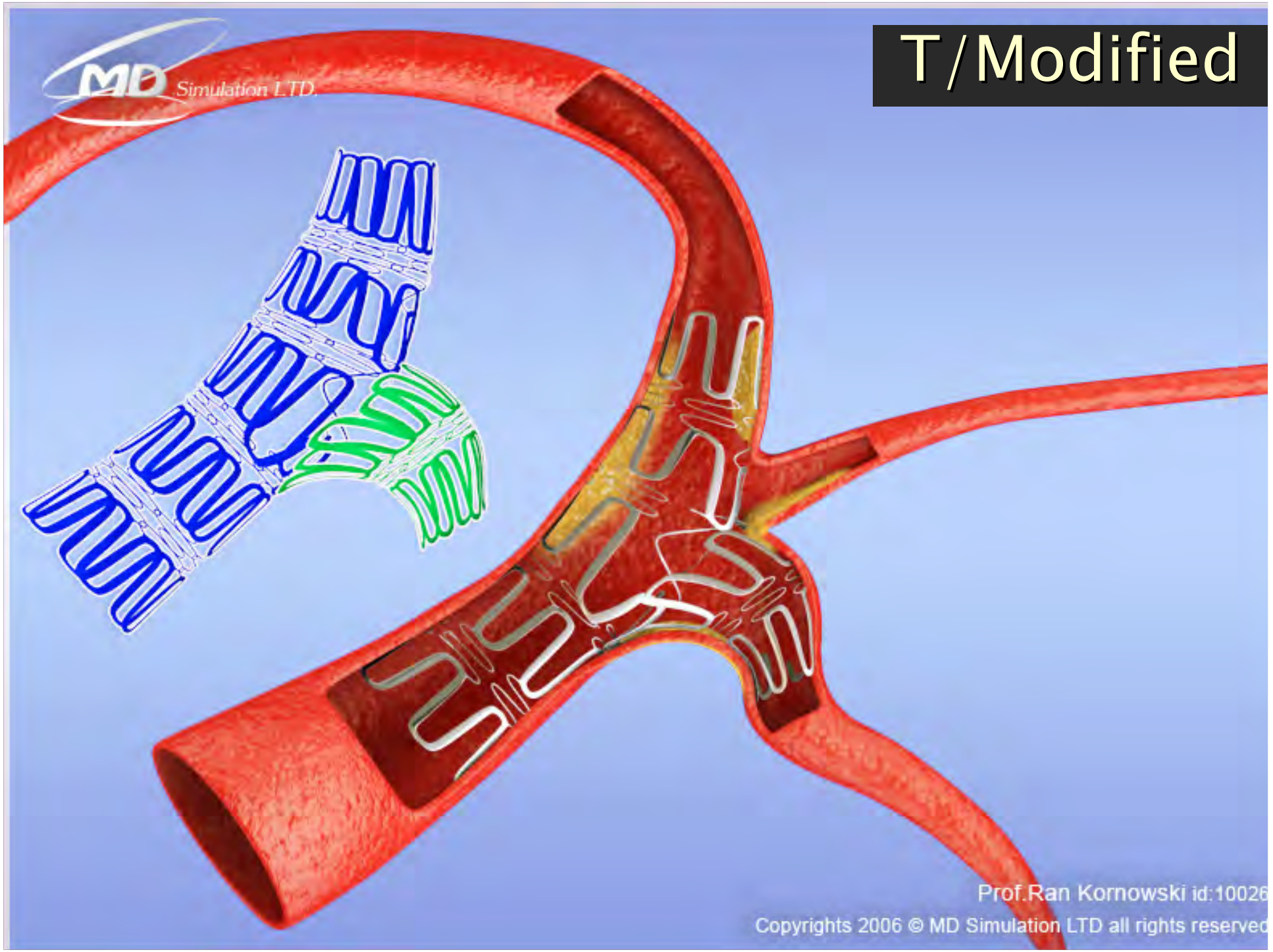
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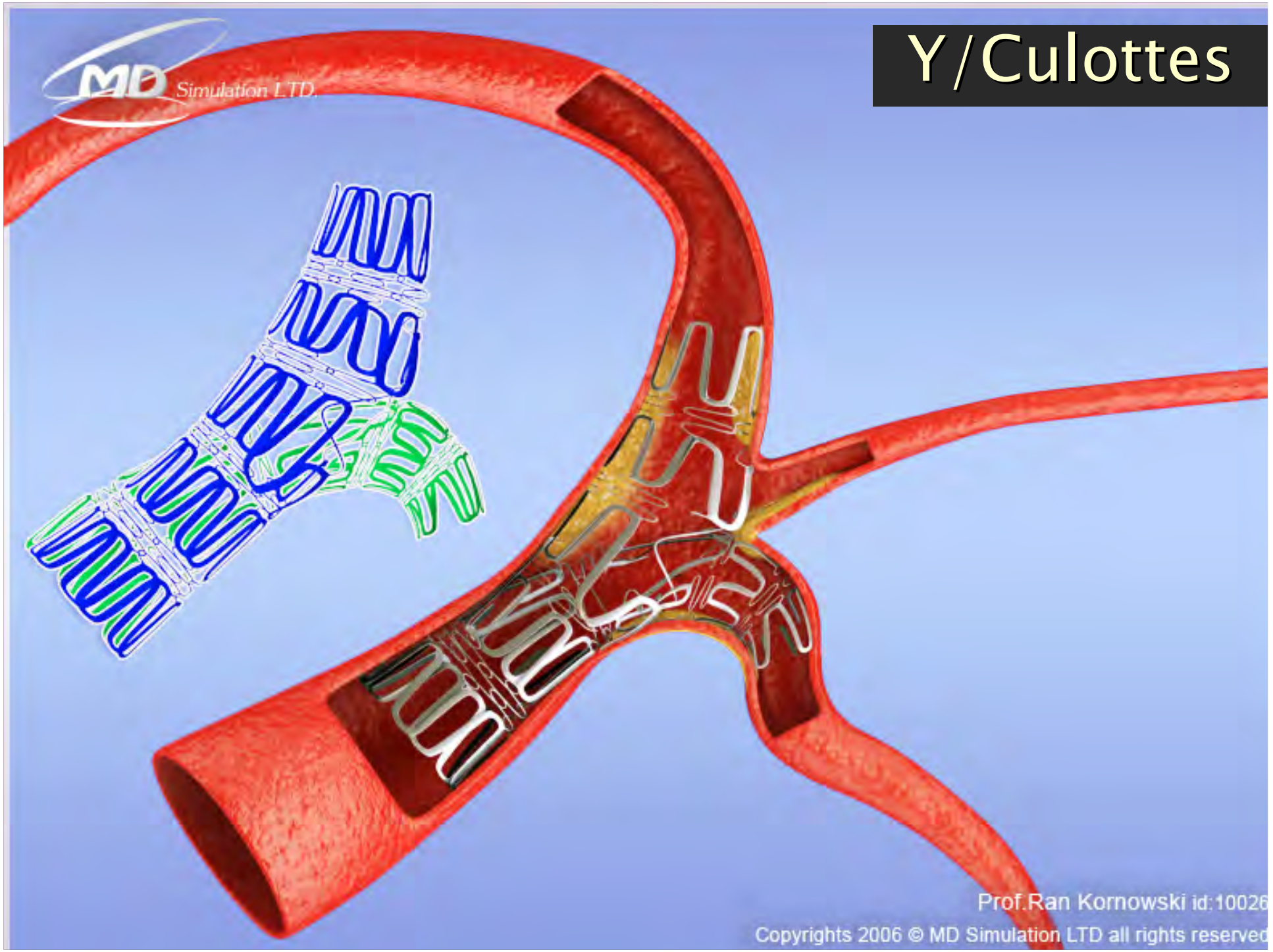
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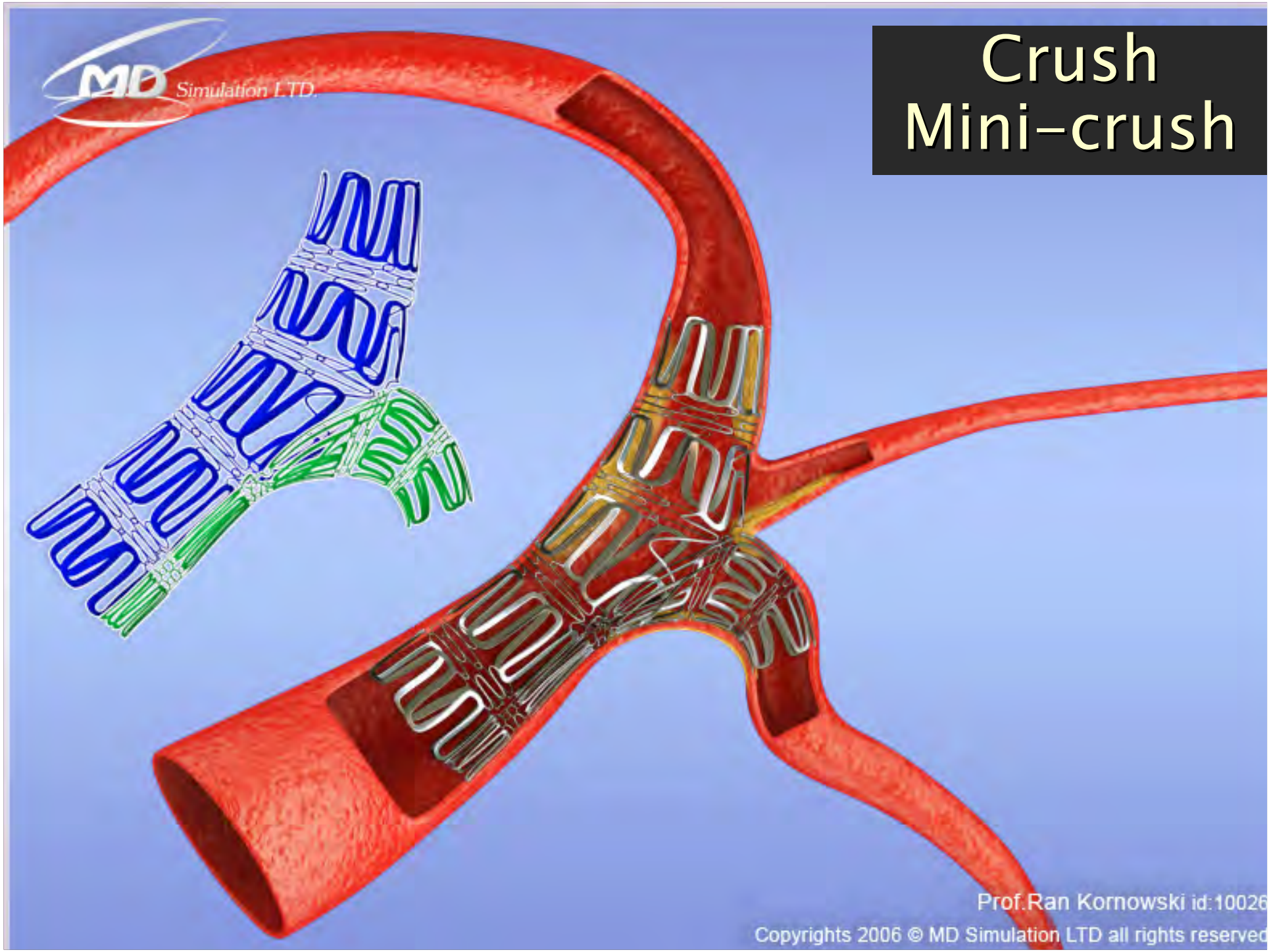
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Mini-crush
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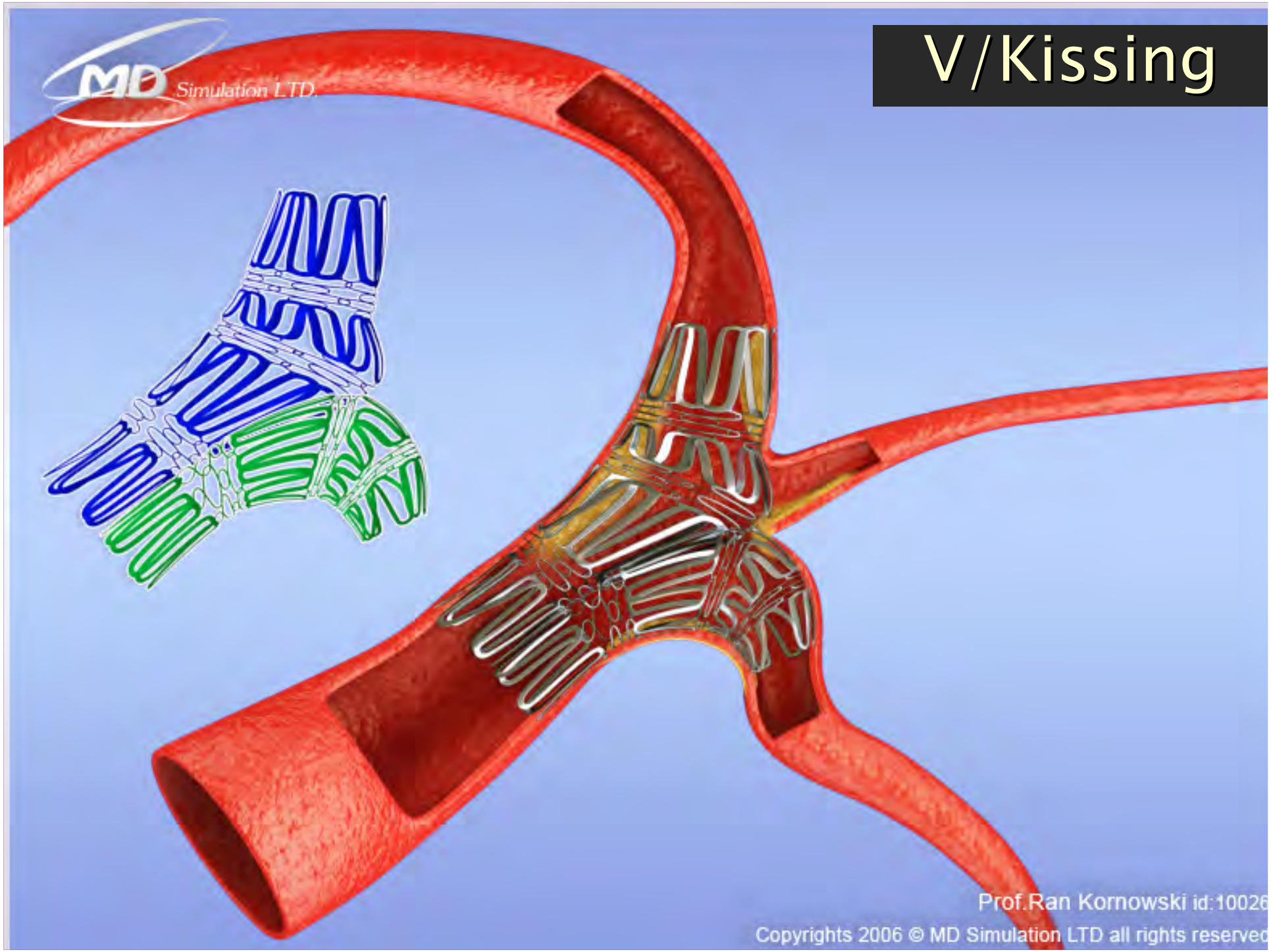
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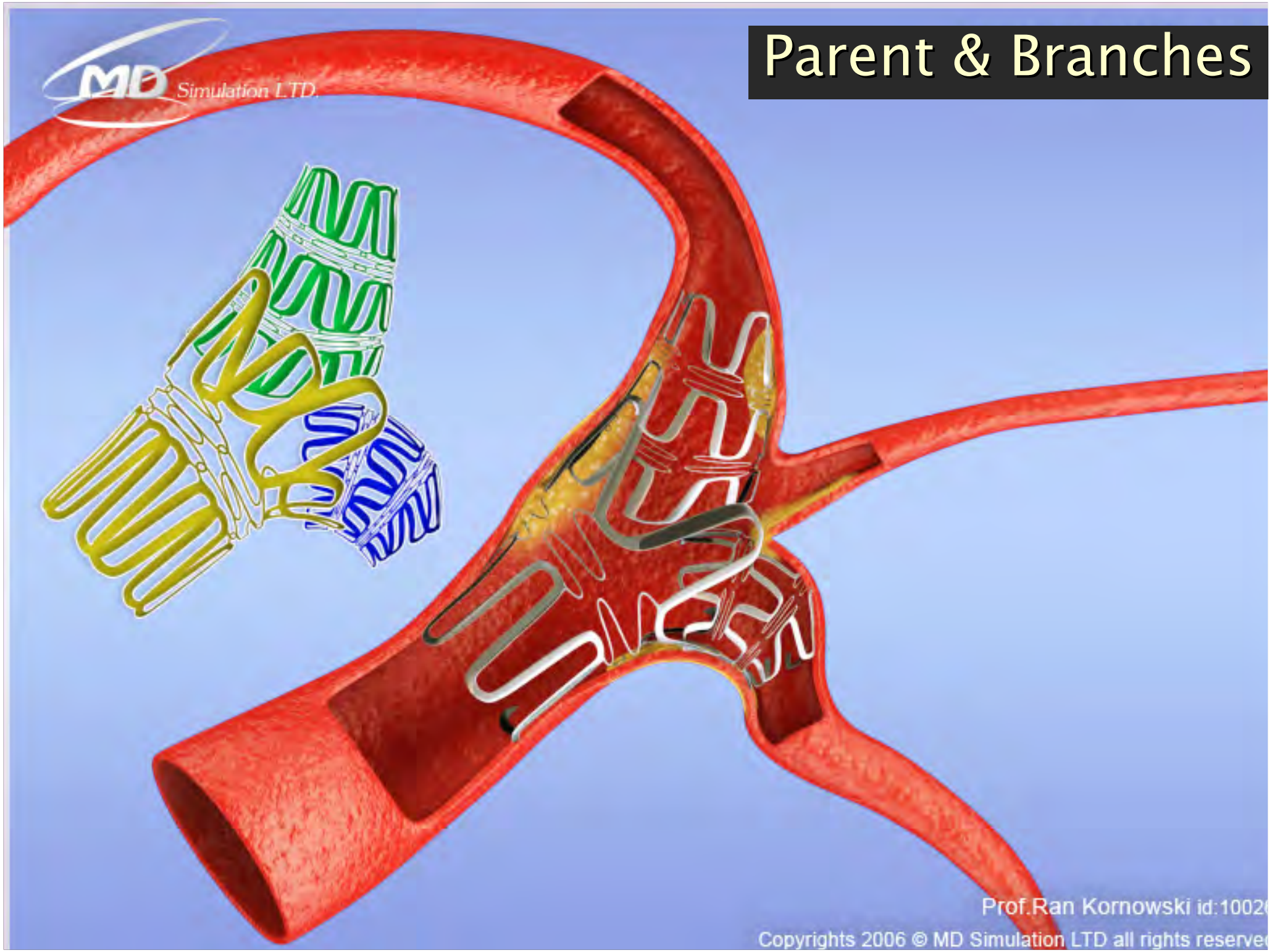
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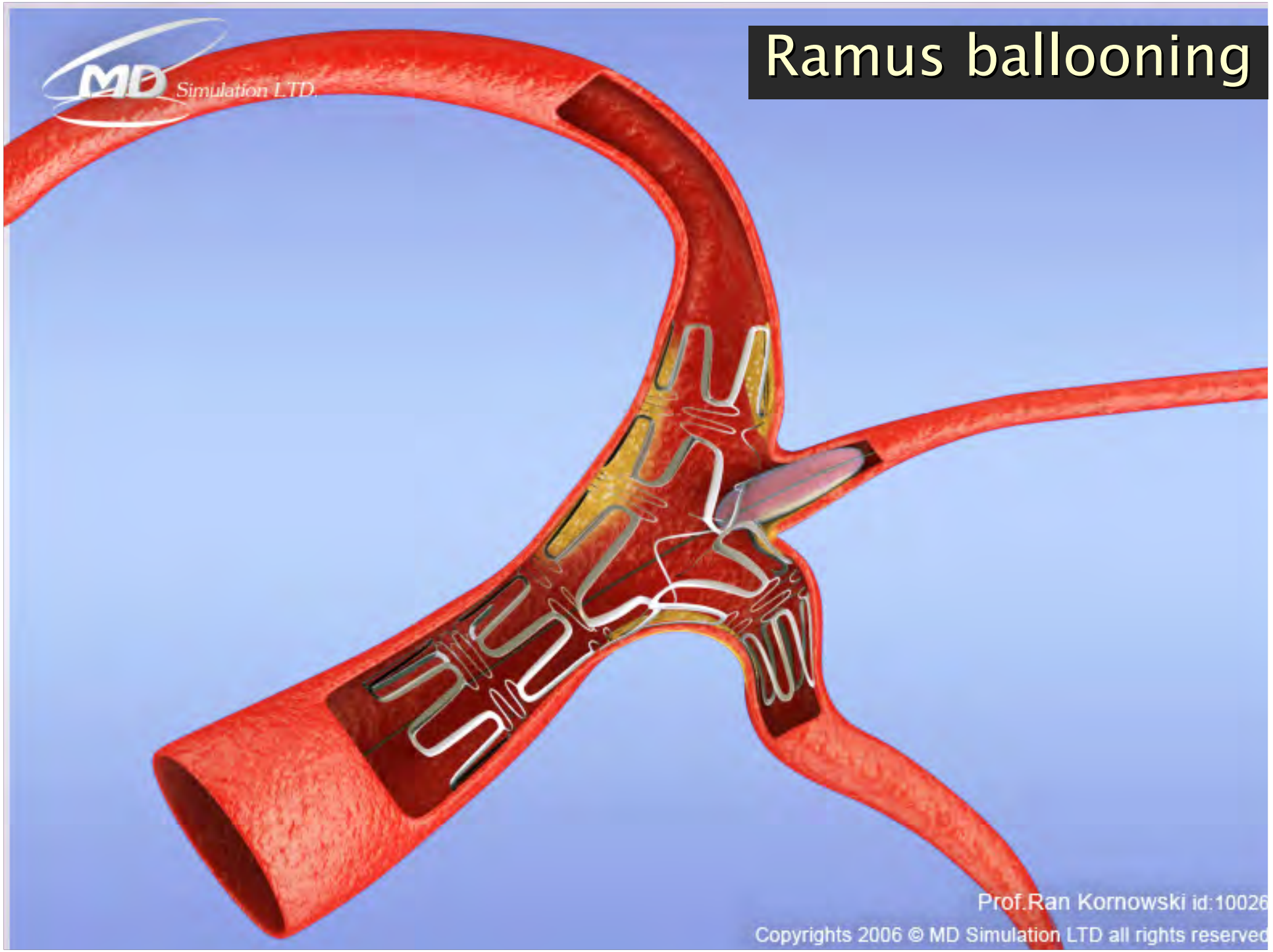
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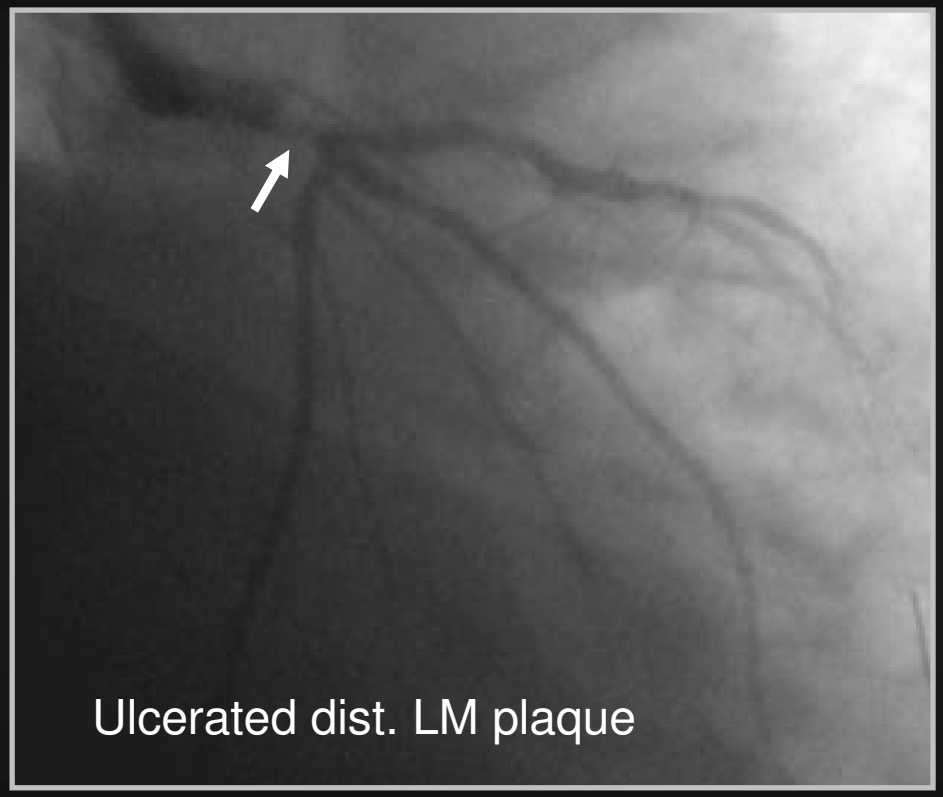
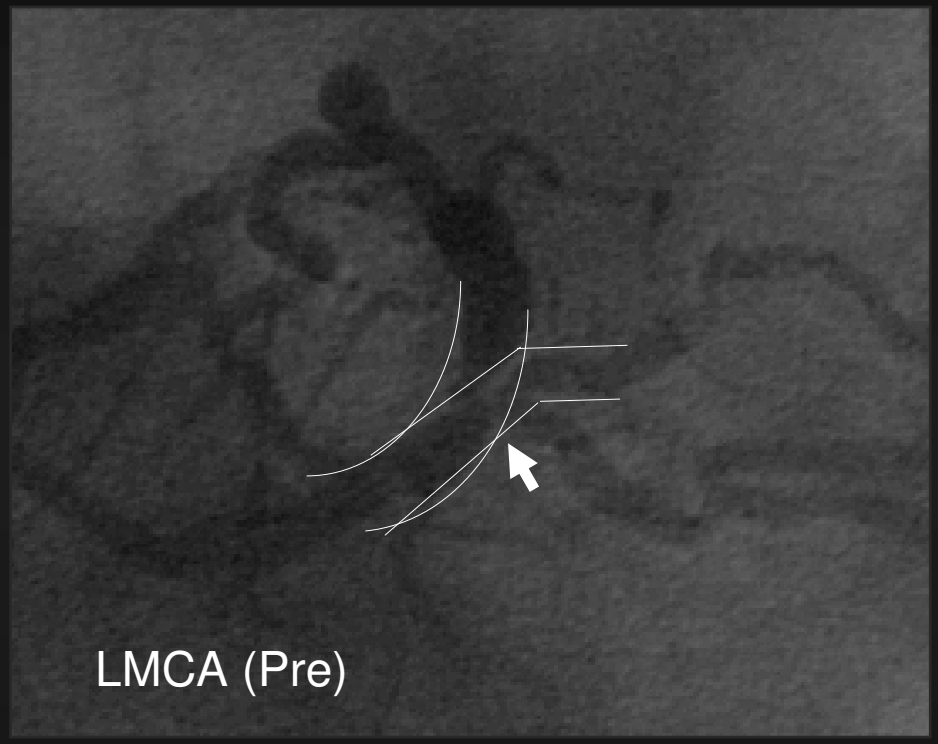
Distal LM stenting during STEMI



Ulcerated dist. LM plaque

Direct stenting of the LM

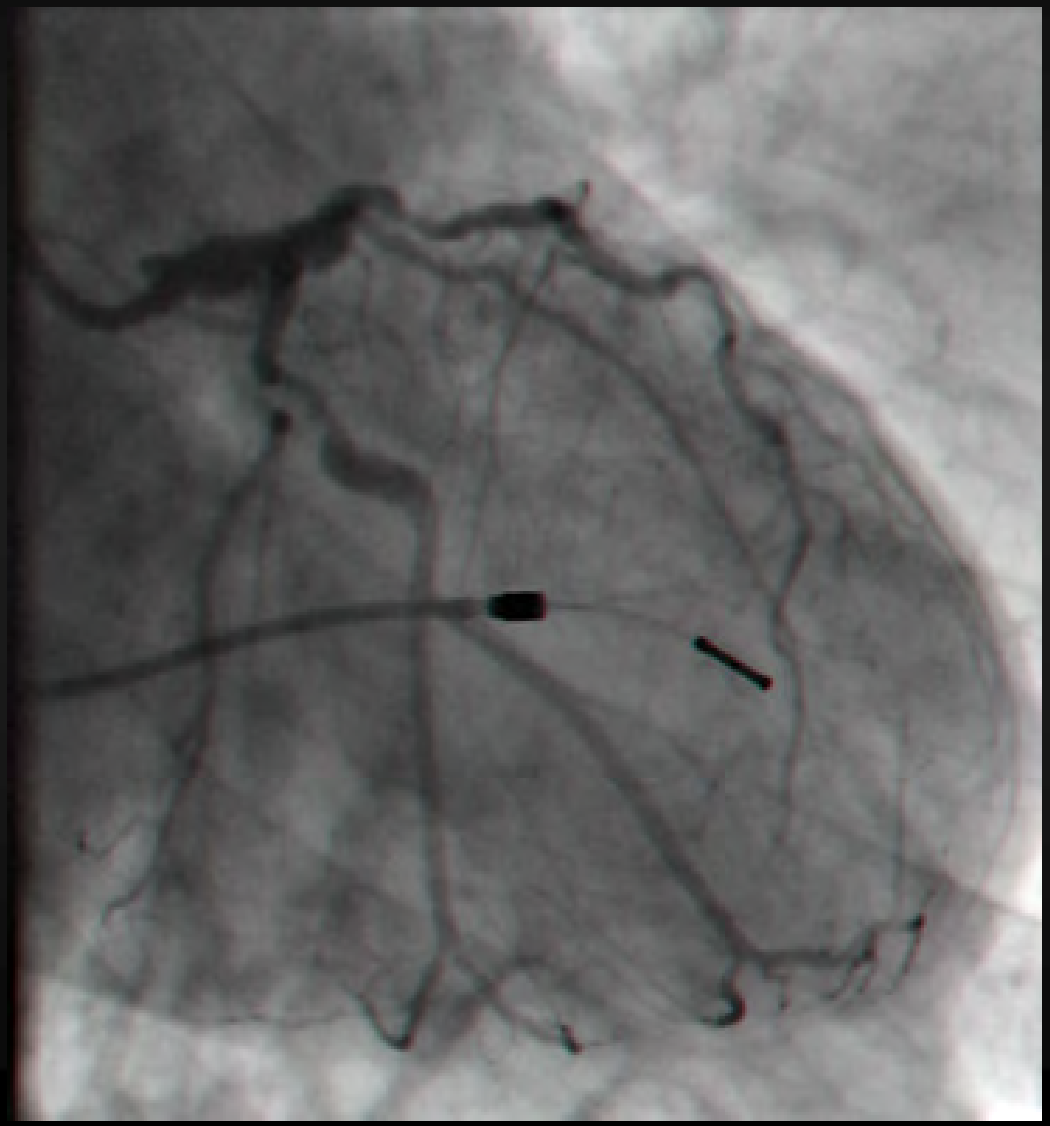
Distal LM stenting @trifurcation



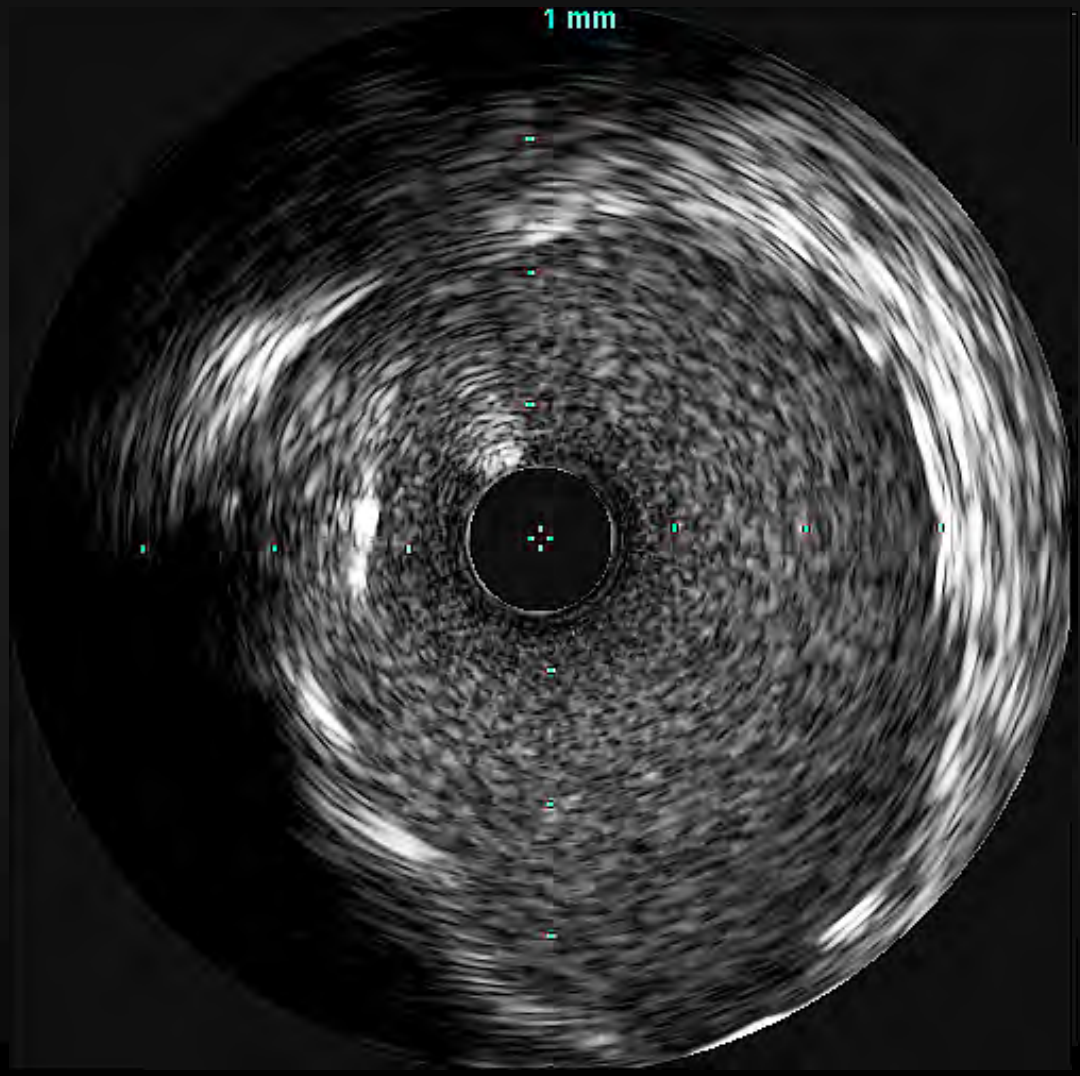
LMCA (Pre)

Post PCI

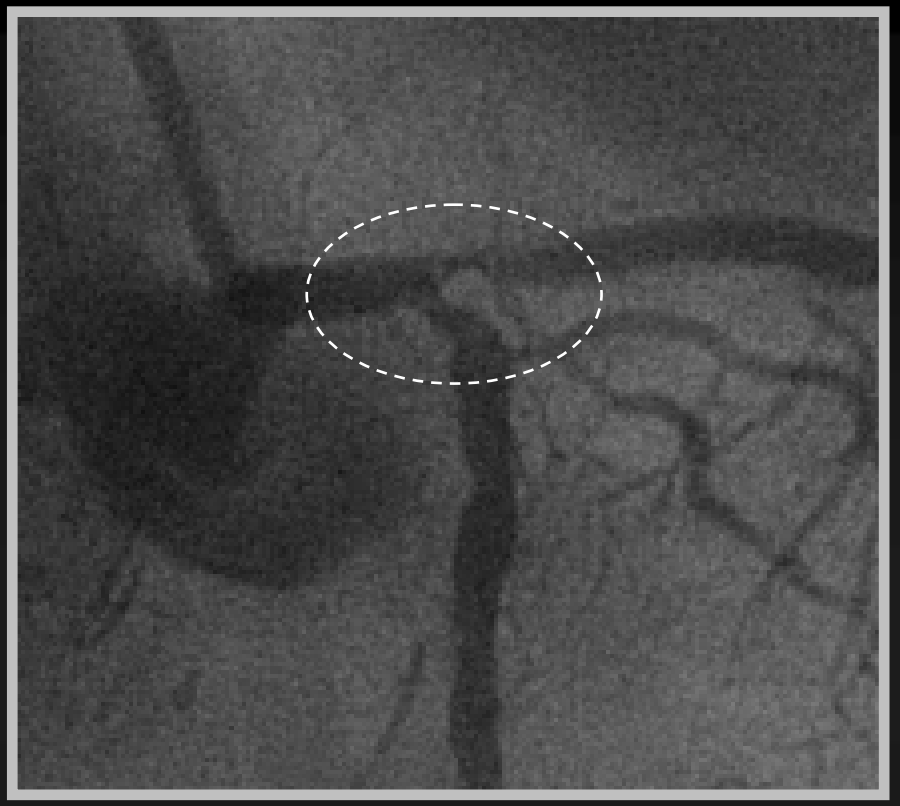
Distal LM Stenosis



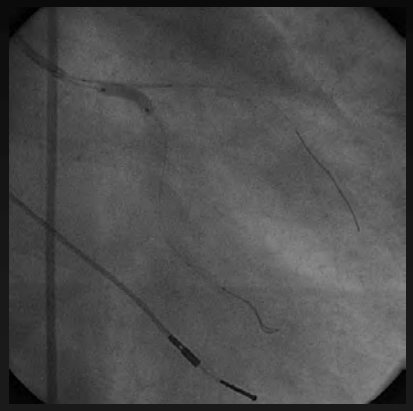
Complex Distal LM stenting

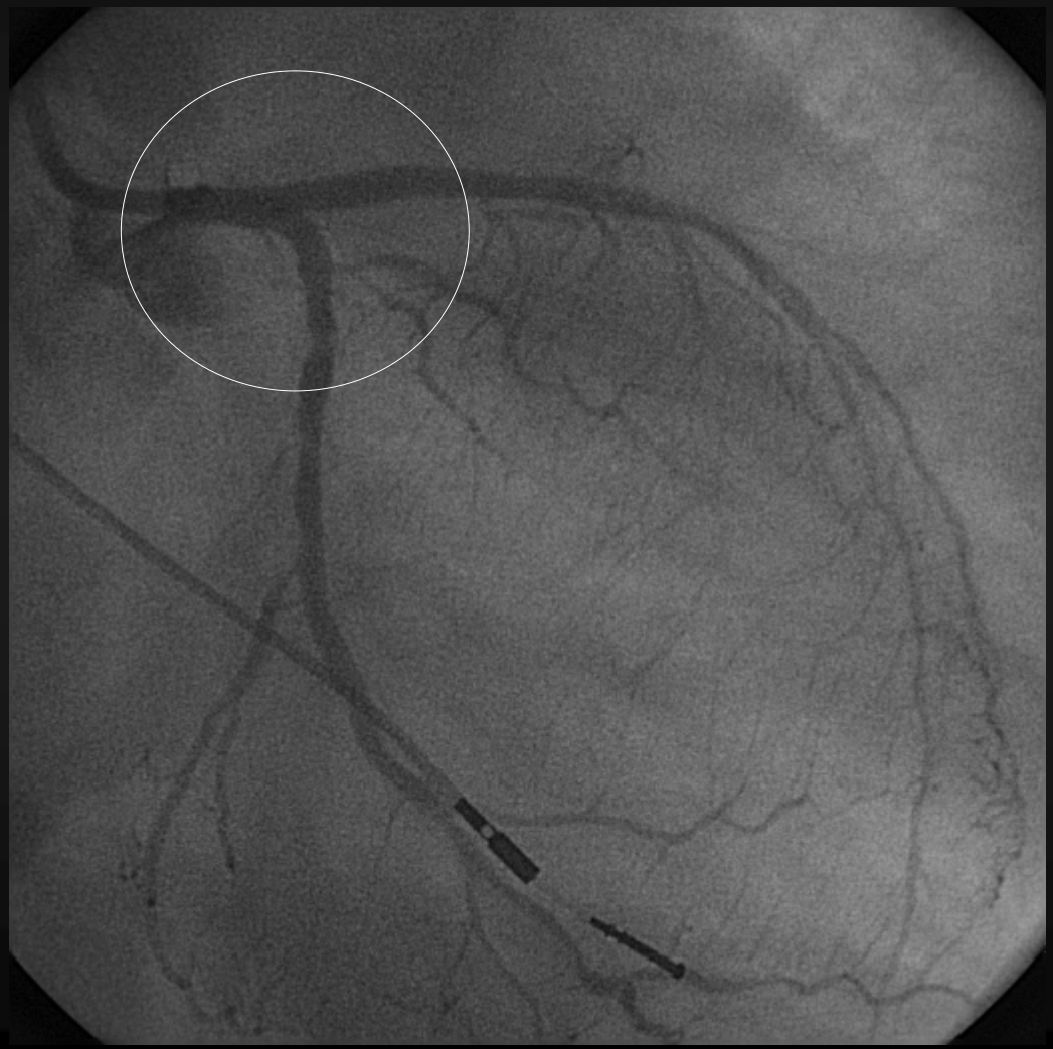


LM Equivalent disease

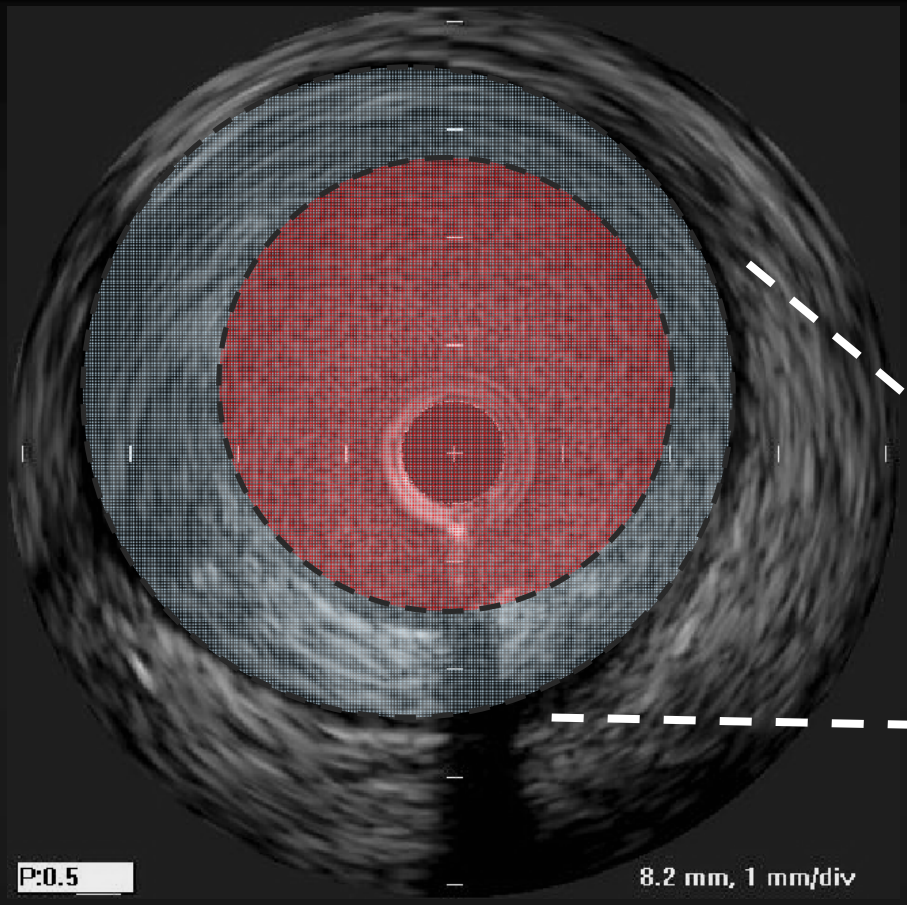


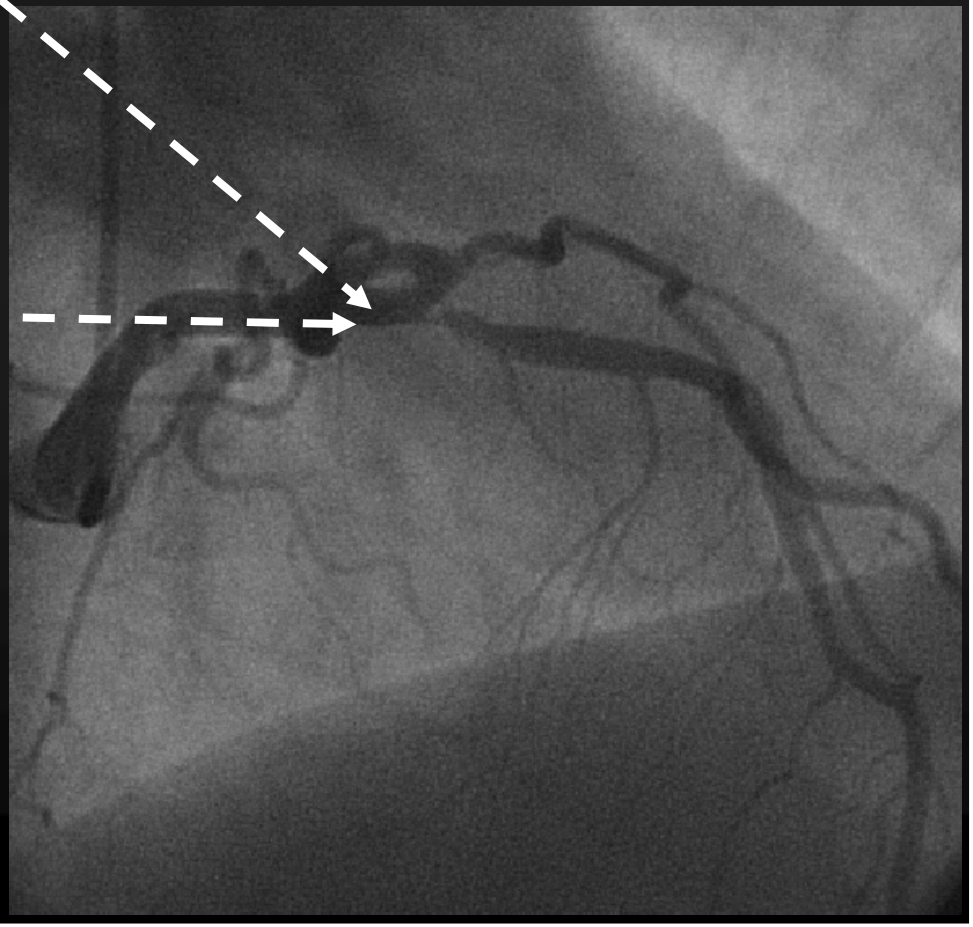
LM Equivalent disease treated using the ‘mini-crush’ technique



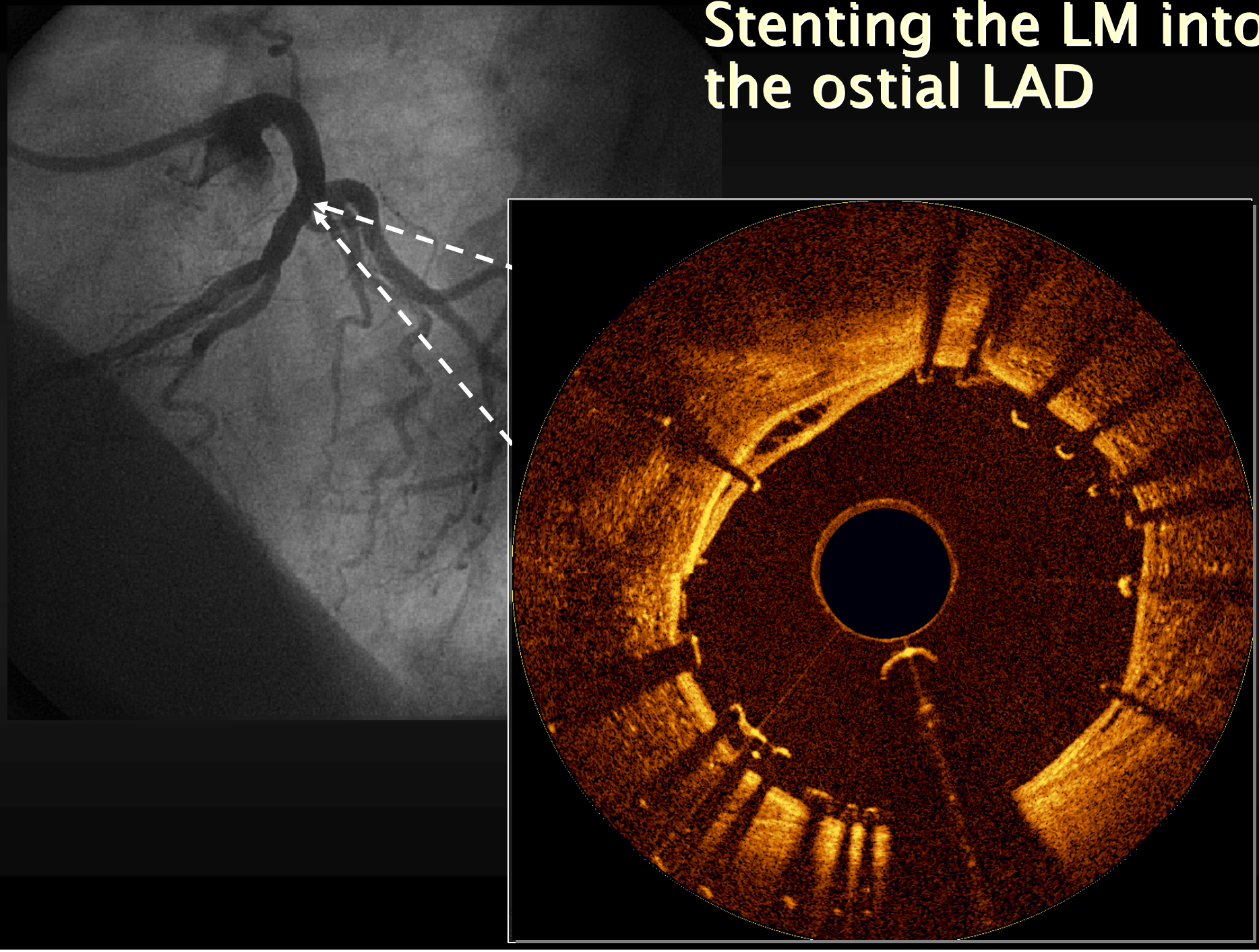


Ostial LAD involving distal LM (IVUS)



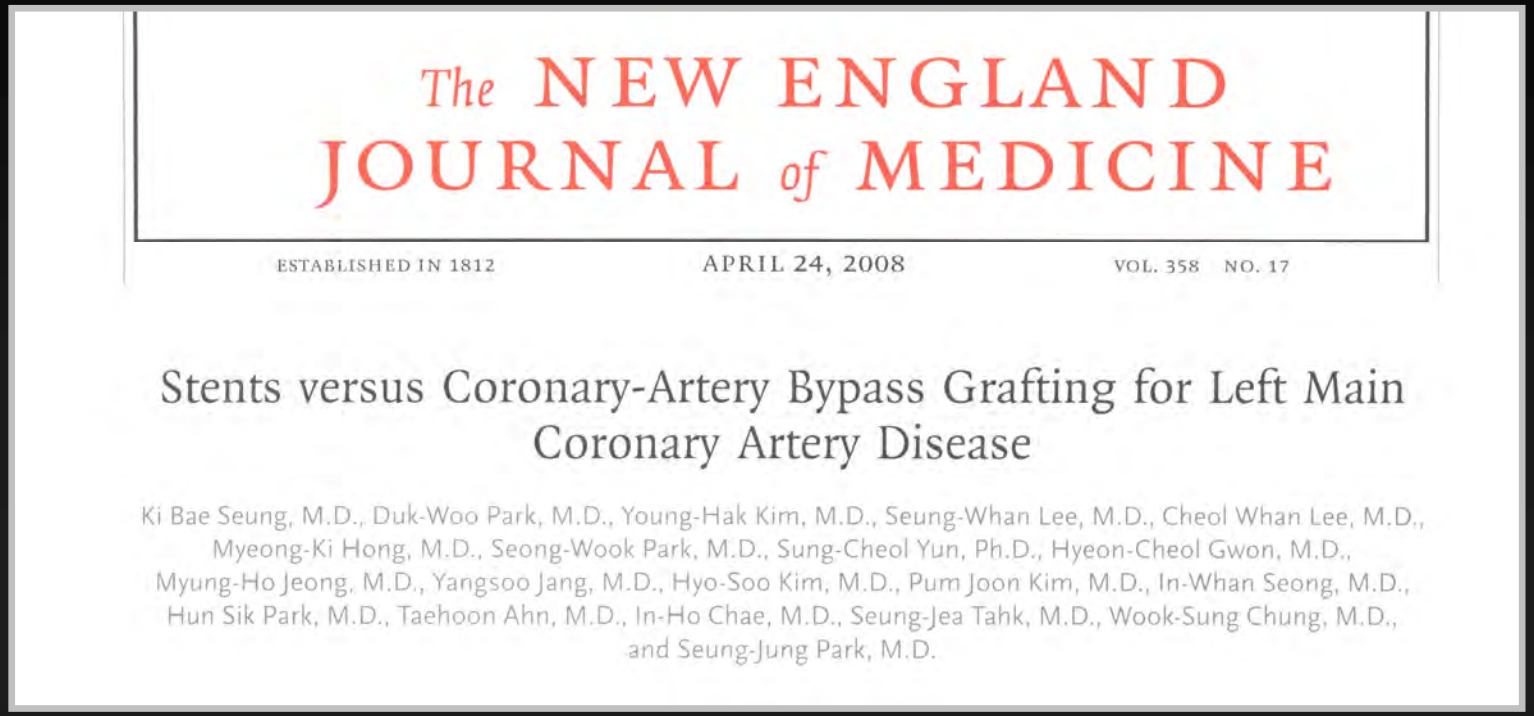


Stenting the LM into the ostial LAD



Long-term considerations

- Plavix vs. Prasugrel and for how long?
- Platelets inhibition tests?
- How to follow?
  - Symptoms driven?
  - Functional tests? SPECT? Stress echo?
  - Repeat angiography? When?
  - Cardiac CTA? When?



The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 APRIL 24, 2008 VOL. 358 NO. 17

Stents versus Coronary-Artery Bypass Grafting for Left Main Coronary Artery Disease

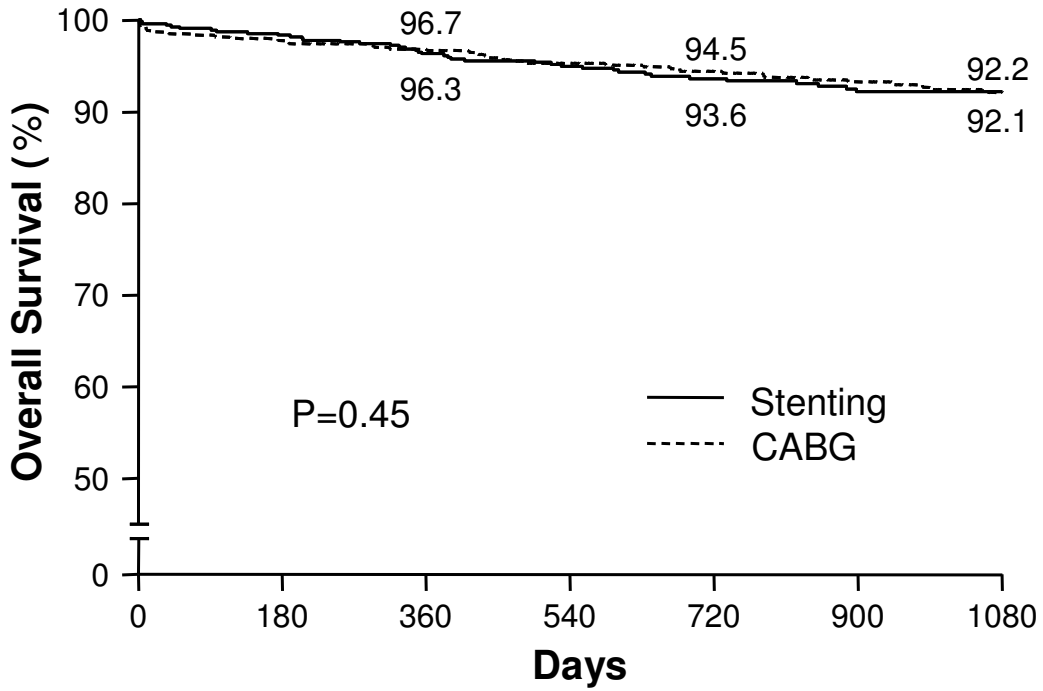
Ki Bae Seung, M.D., Duk-Woo Park, M.D., Young-Hak Kim, M.D., Seung-Whan Lee, M.D., Cheol Whan Lee, M.D., Myeong-Ki Hong, M.D., Seong-Wook Park, M.D., Sung-Cheol Yun, Ph.D., Hyeon-Cheol Gwon, M.D., Myung-Ho Jeong, M.D., Yangsoo Jang, M.D., Hyo-Soo Kim, M.D., Pum Joon Kim, M.D., In-Whan Seong, M.D., Hun Sik Park, M.D., Taehoon Ahn, M.D., In-Ho Chae, M.D., Seung-Jea Tahk, M.D., Wook-Sung Chung, M.D., and Seung-Jung Park, M.D.

"In a cohort of patients with unprotected LMCA disease, we found no significant differences in rates of death or of the composite endpoint of death, Q-wave MI or stroke between patients receiving stents and those undergoing CABG. However, stenting even with DES was associated with higher rates of TVR that was CABG."

Seung et al, NEJM 2008

Mortality

(Overall PCI and CABG matched cohort: 542 pairs)



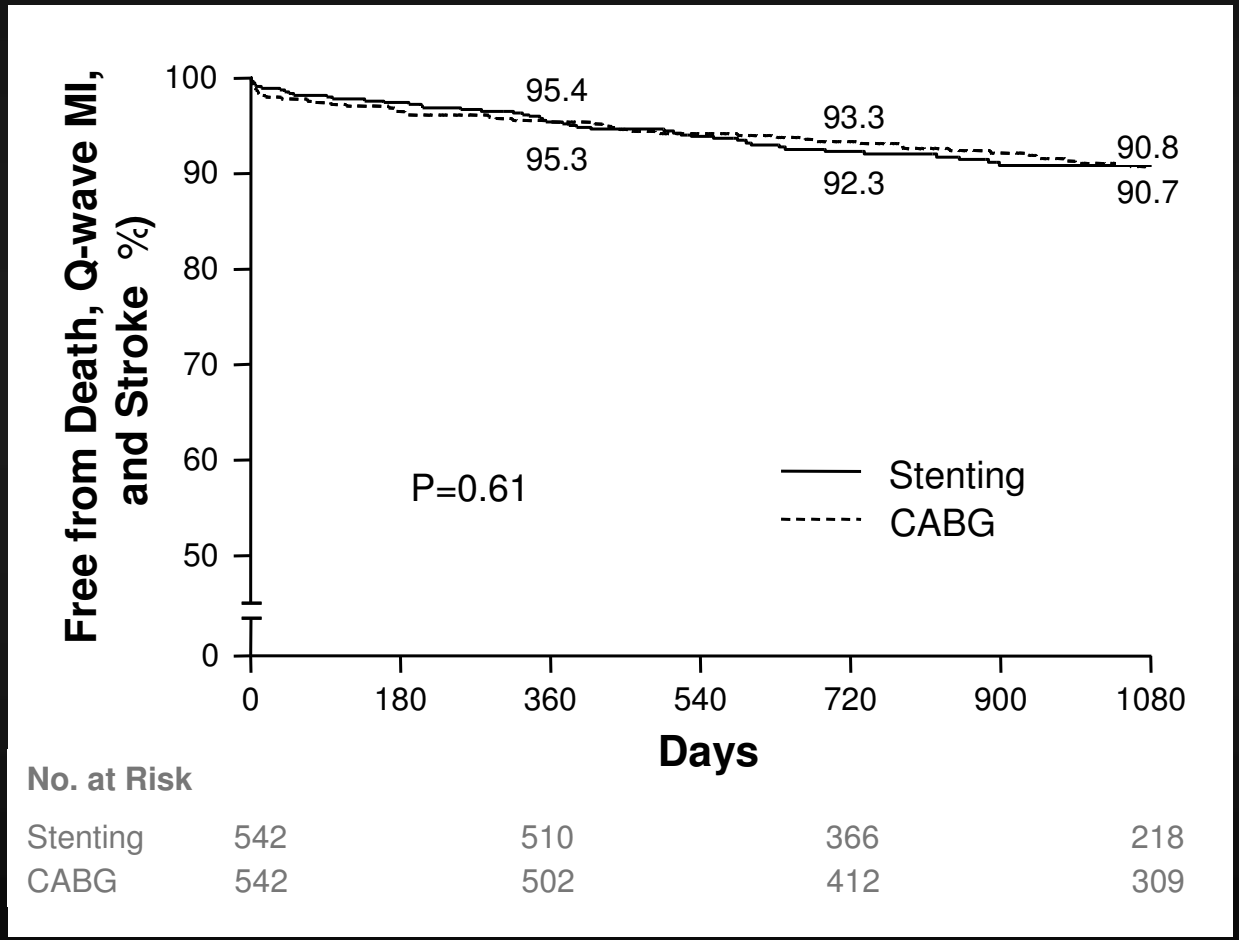
No. at Risk

Stenting	542	516	372	220
CABG	542	512	420	317

Seung et al, NEJM 2008

Death, Q-MI, or Stroke

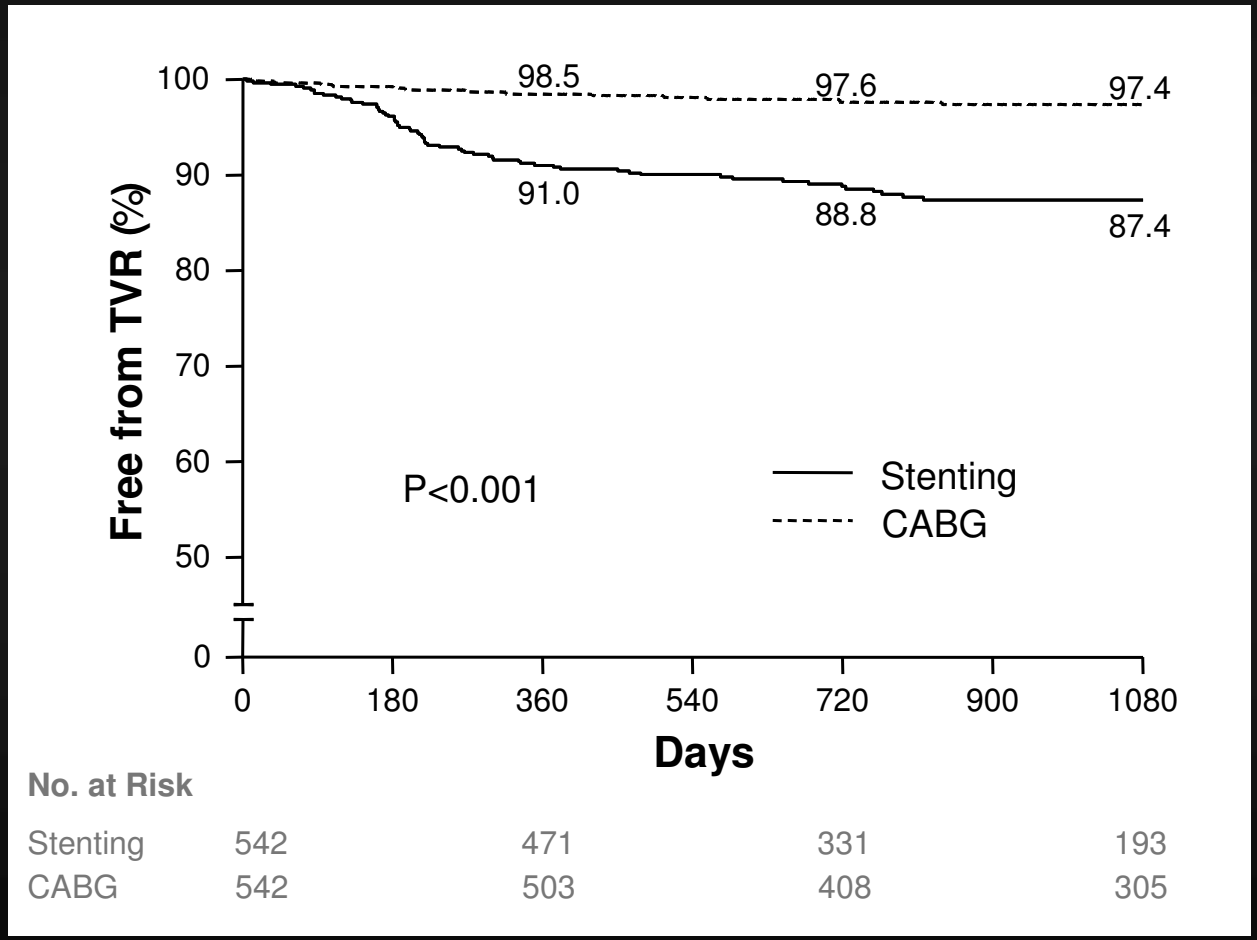
(Overall PCI and CABG matched cohort: 542 pairs)



Seung et al, NEJM 2008

Target-vessel revascularization

(Overall PCI and CABG matched cohort: 542 pairs)



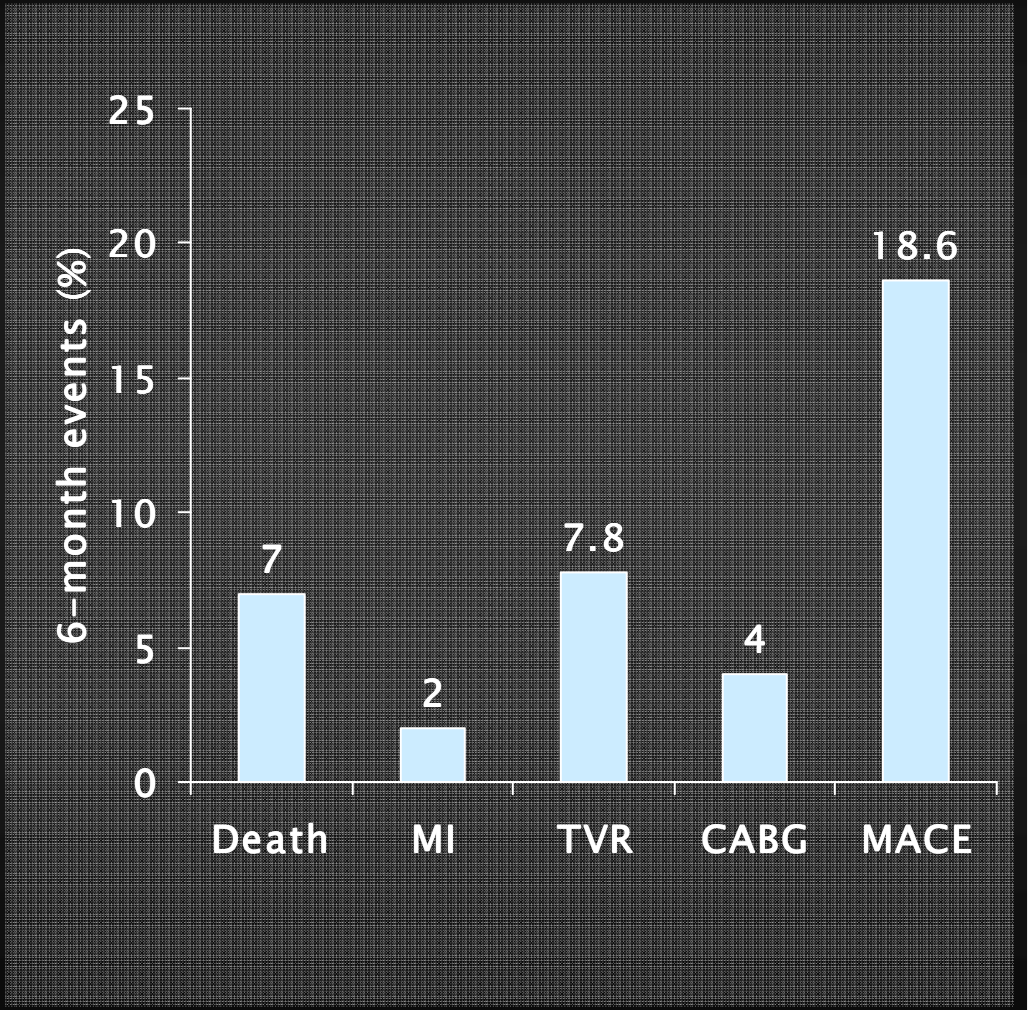
No. at Risk

Stenting	542	471	331	193
CABG	542	503	408	305

Seung et al, NEJM 2008

Unprotected LM PCI results @RMC

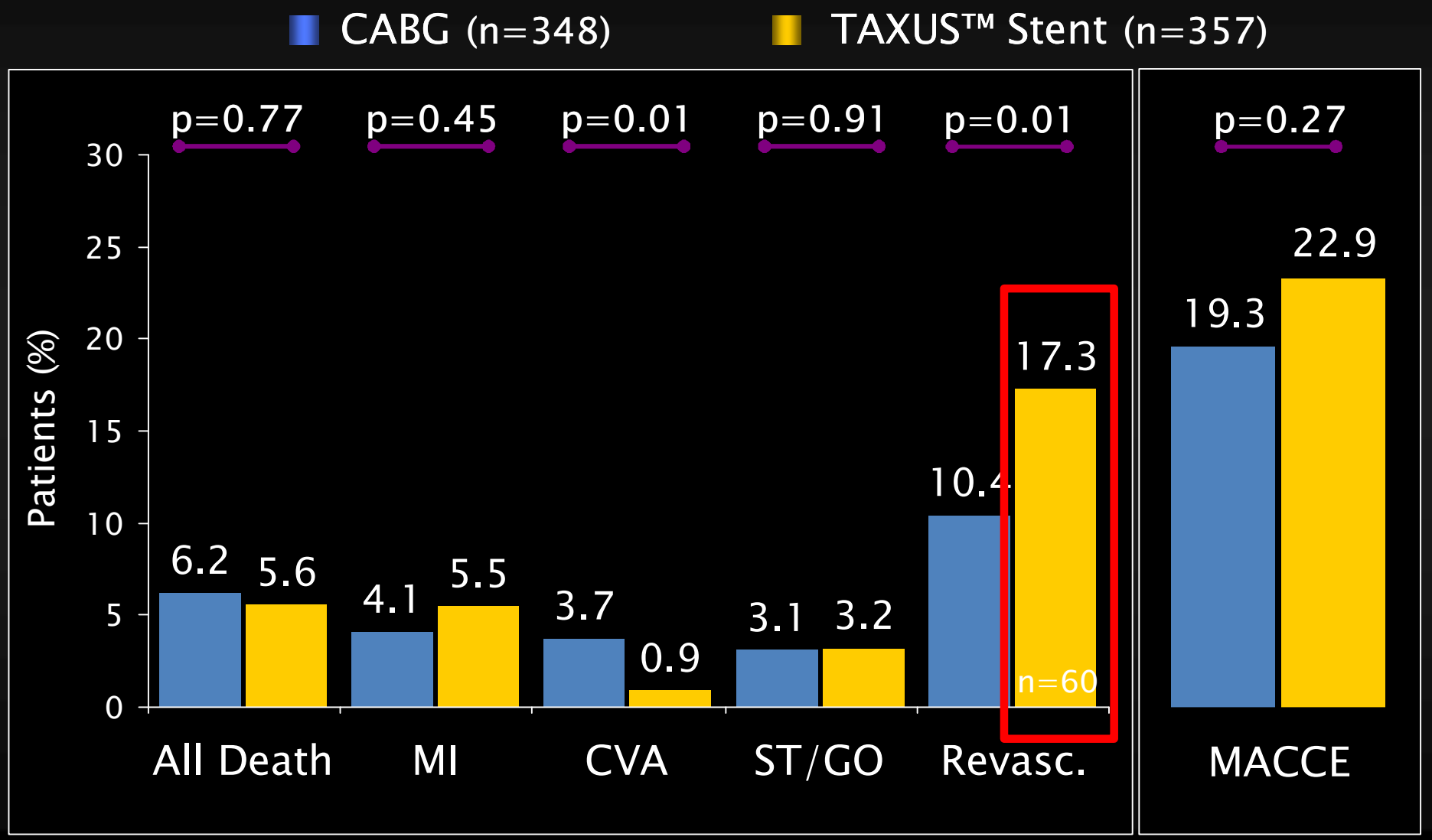
- 102 pts with UPLM stenting @RMC between 2006-2009
  - age 74±12 yrs
  - 64% male
  - 34% diabetics
  - 72% ACS
  - 45% distal LM disease
  - EuroScore=7.2%
  - 65% rate of DES use
  - 100% angio success



Assali A, Kornowski R et al. Israeli Heart Meeting 4.2010

SYNTAX Trial – MACCE to 2 Years

LM Cohort – Revasc in 60 patients from PCI Arm



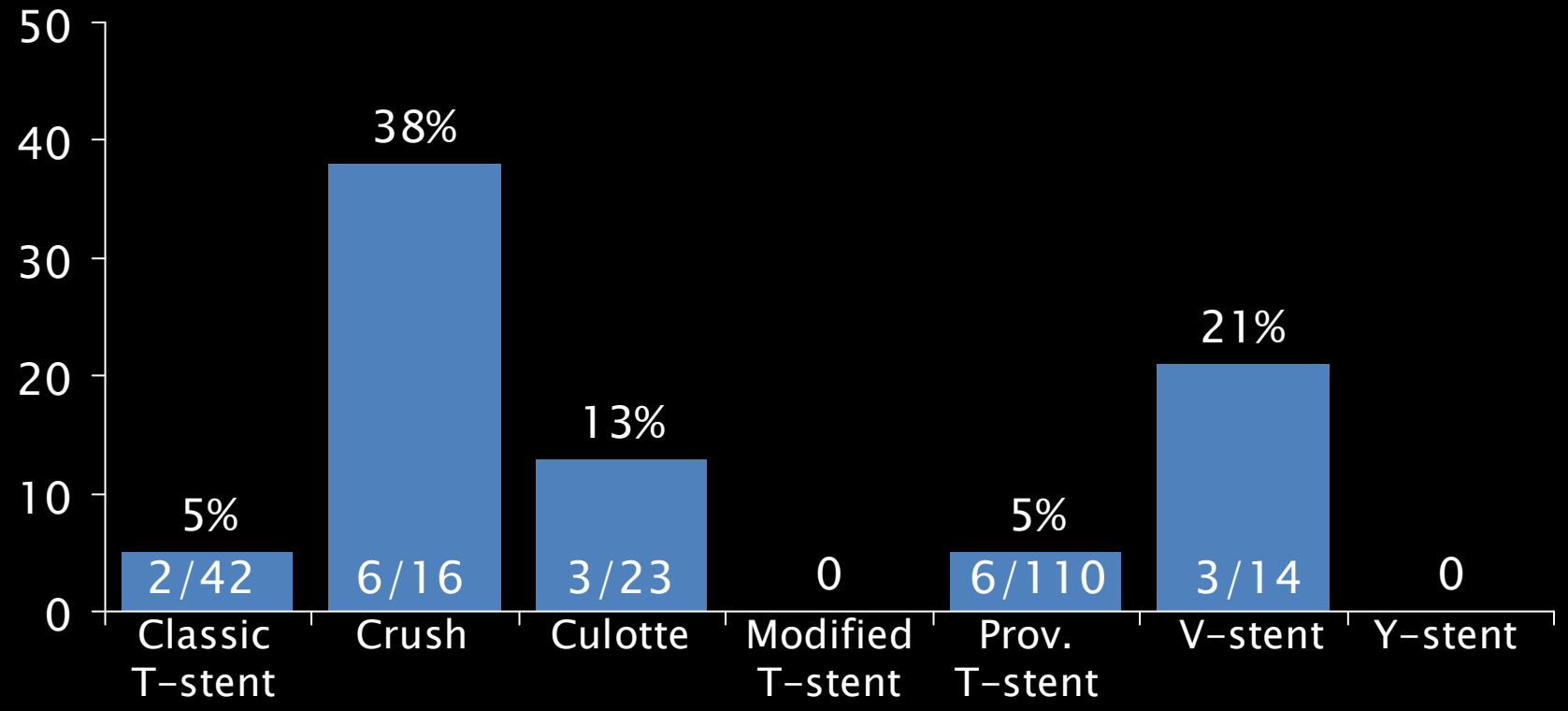
Time to event analysis; log-rank *P* value

ST=stent thrombosis; GO=graft occlusion

The TAXUS™ Express²™ Stent System is contraindicated for use in patients with unprotected left main coronary artery disease.

Baseline LM Bifurcation Stenting Techniques Requiring Re-treatment

LM Distal PCI (n=20 lesions)



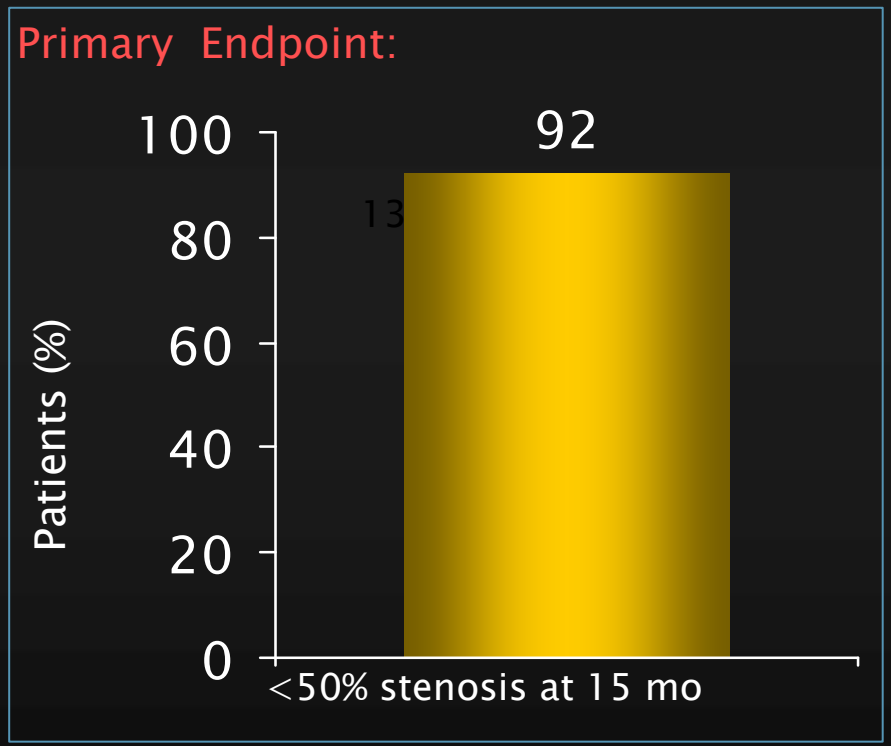
5/20 (25%) lesions originally treated with 1 stent
15/20 (75%) originally treated with 2 or 3 stents

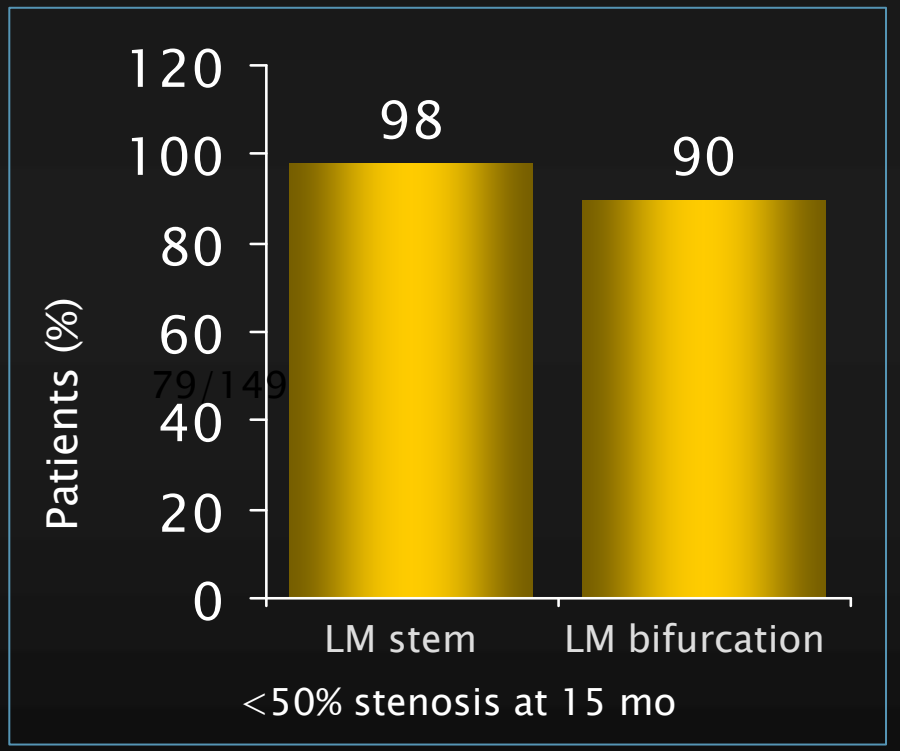
Bar graphs represent percent of baseline treated lesions

The TAXUS™ Express²™ Stent System is contraindicated for use in patients with unprotected left main coronary artery disease and in vessels involving bifurcation.

SYNTAX Le Mans: **TAXUS results**

- Angiography for 271 SYNTAX LE MANS pts at 15±1 mos
- Primary Endpoints: Rate of long-term patency of treated LMD by QCA





Morice MC et al, PCR 2009

DES Type

Cypher select

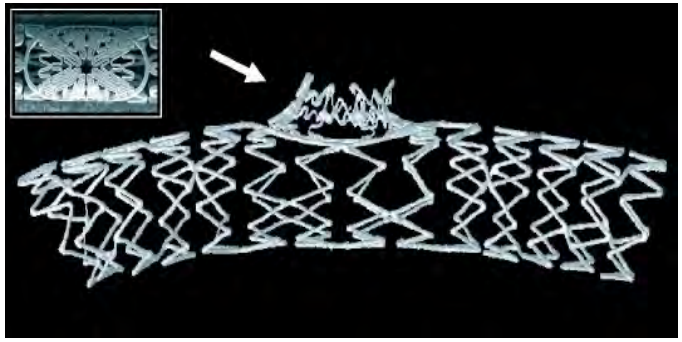
Taxus Liberte’

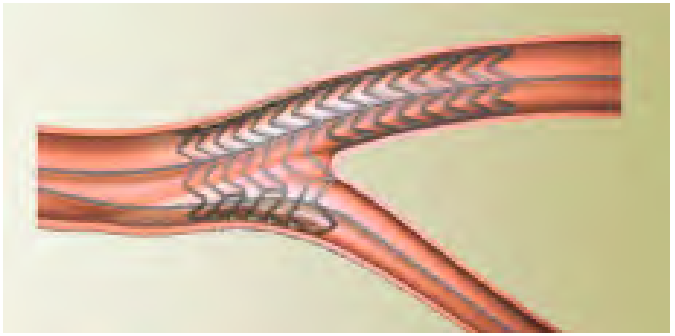
Biomatrix / Nobori

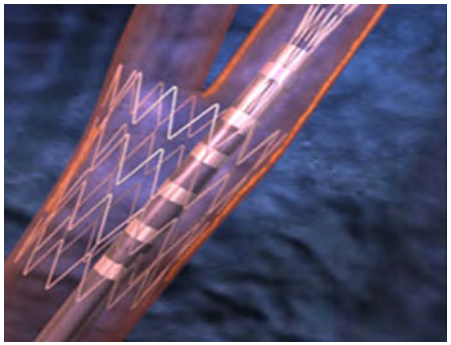
Endeavor (Sprint / Resolute)

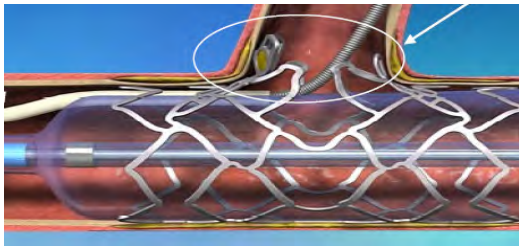
Xience V / Promus

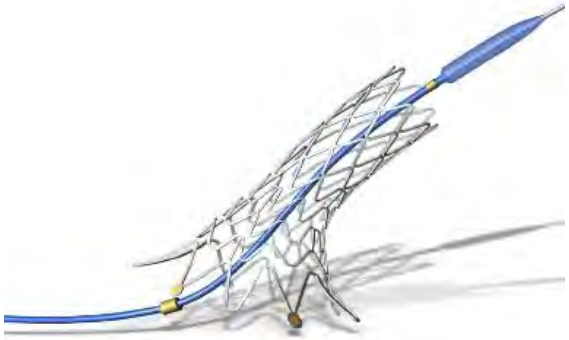
Dedicated LM bifurcation techniques?

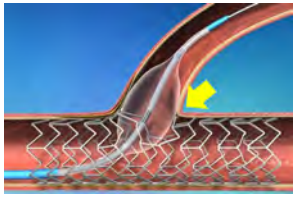


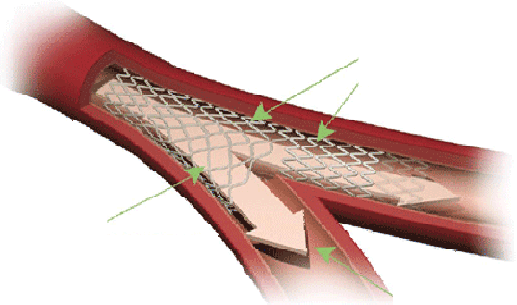


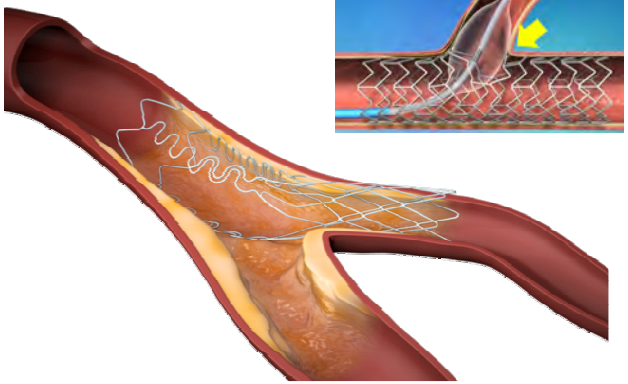


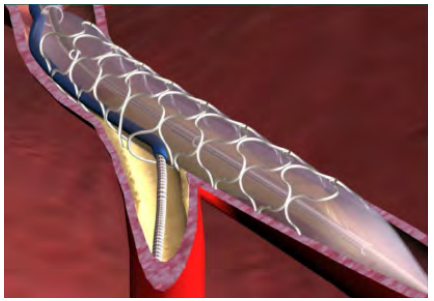












Left Main PCI

Techniques, devices and operators!

- Left main is a PCI territory in suitable cases and by very experiences operators.
- Careful attention should be given to case selection, comprehensive clinical judgment and excellent PCI technique.
- Always do it for the patient!

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