FFR pullbacks to guide PCI

the ongoing PPG Global registry

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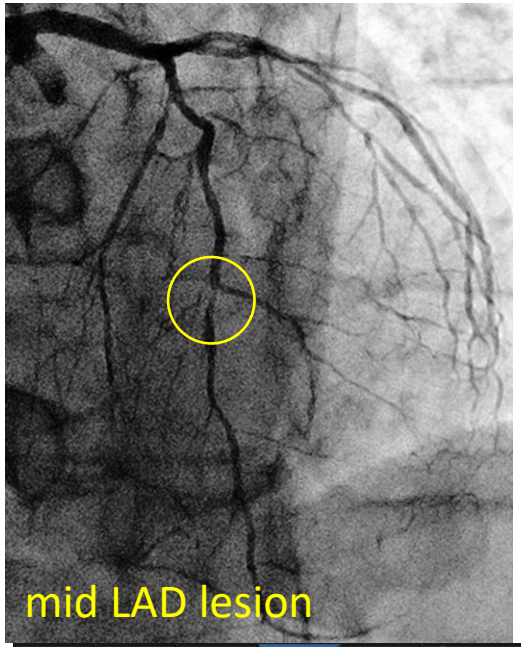
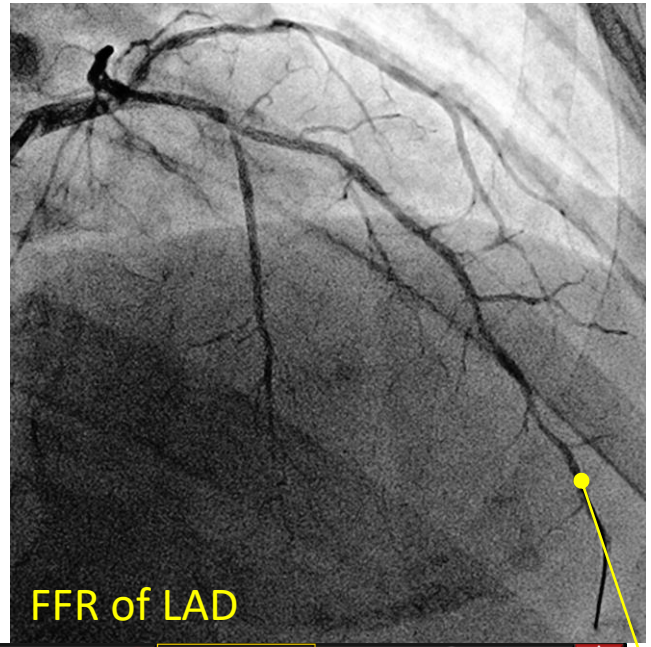
Disclosure Statement of Financial Interest

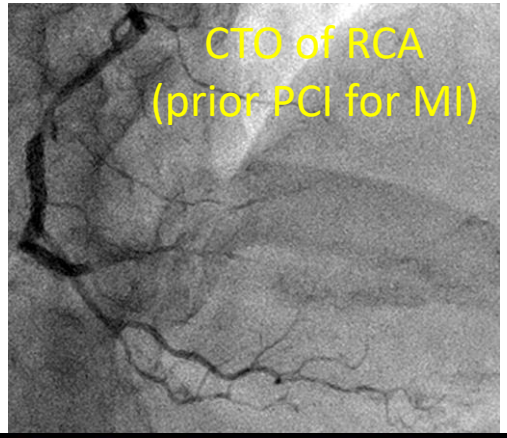
Within the past 12+ months, Nils Johnson has had a financial interest/arrangement or affiliation with the organization(s) listed below.

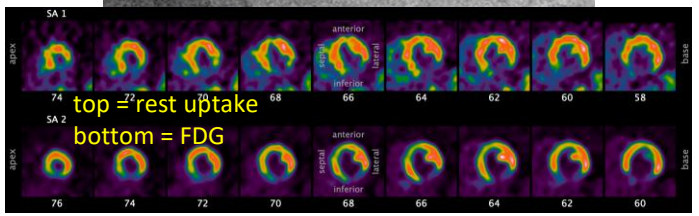
Affiliation/Financial Relationship	Organizations (chronologic)
• Grant/research support (to *institution*)	• St Jude Medical (CONTRAST, NCT02184117) • Volcano/Philips (DEFINE-FLOW, NCT02328820) • CoreAalst (PPG registry, NCT04789317) • Abiomed (local "DPTI" study)
• Licensing and associated consulting (to *institution*)	• Boston Scientific (smart-minimum FFR, 510(k) K191008)
• Support for educational meetings/training (honoraria/fees donated to *institution*)	• Various, including academic and industry
• PET software 510(k) from FDA (application by Lance Gould, to *institution*)	• K113754 (cfrQuant, 2011) • K143664 (HeartSee, 2014) • K171303 (HeartSee update, 2017) • K202679 (HeartSee update, 2020)
• Patents filed (USPTO serial numbers 62/597,134 + 62/907,174)	• SAVI and ΔP/Q methods • Correction of fluid-filled catheter signal

52 year-old woman with dyspnea

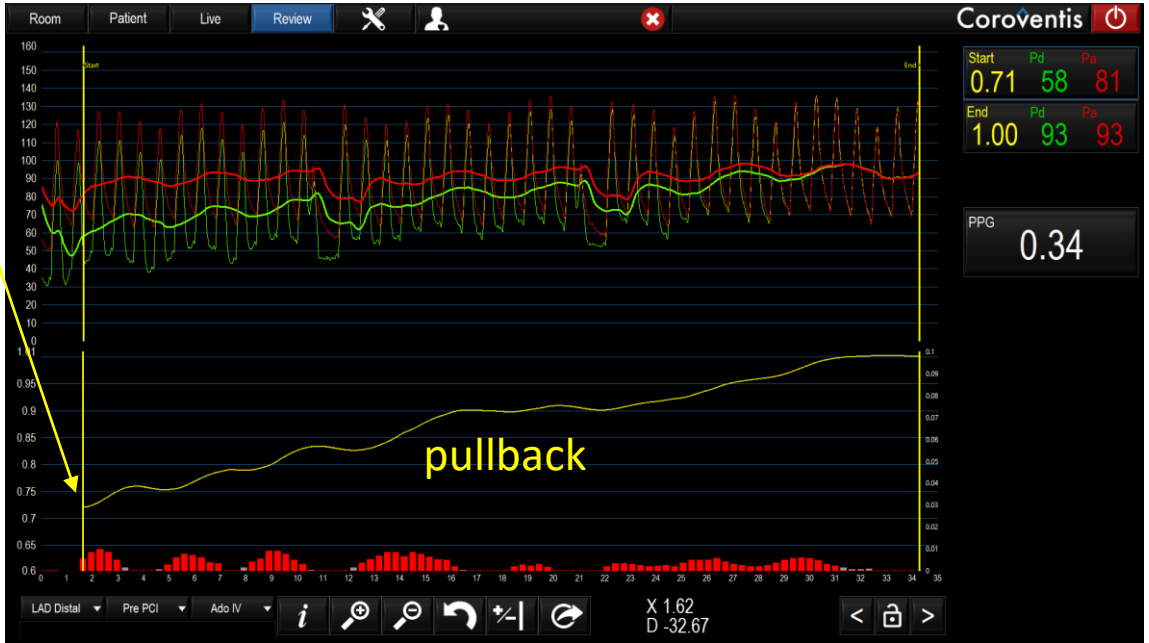




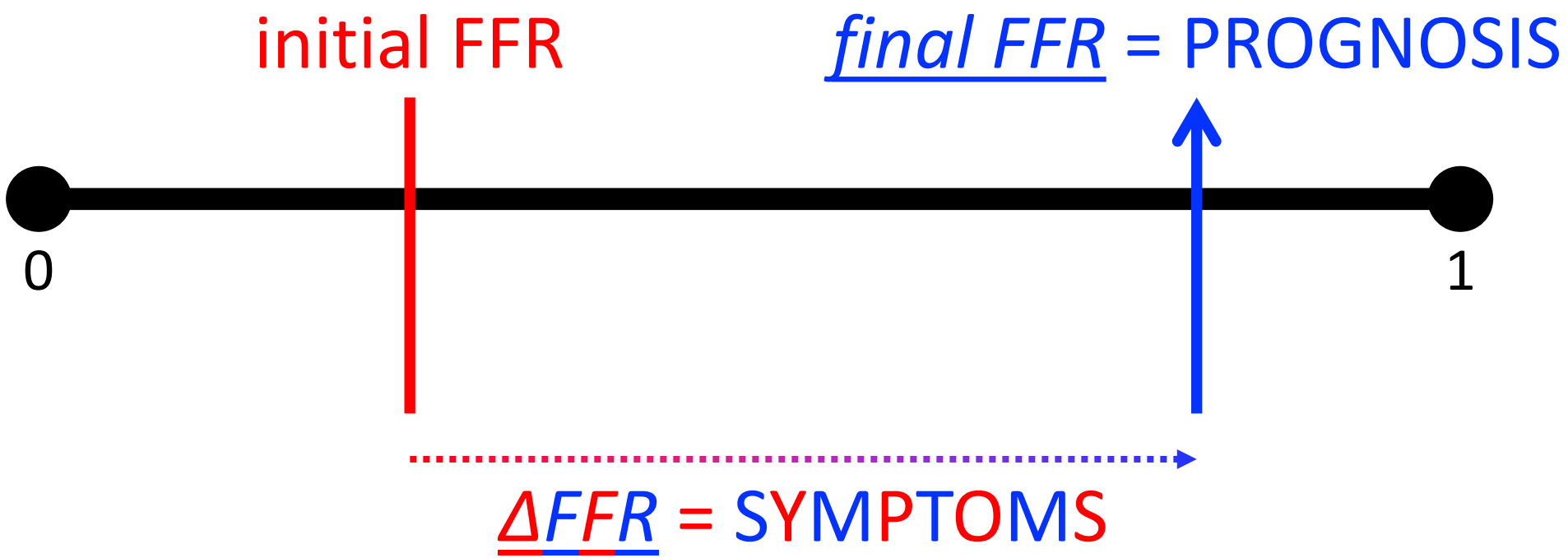




no RCA viability
(“matched”)



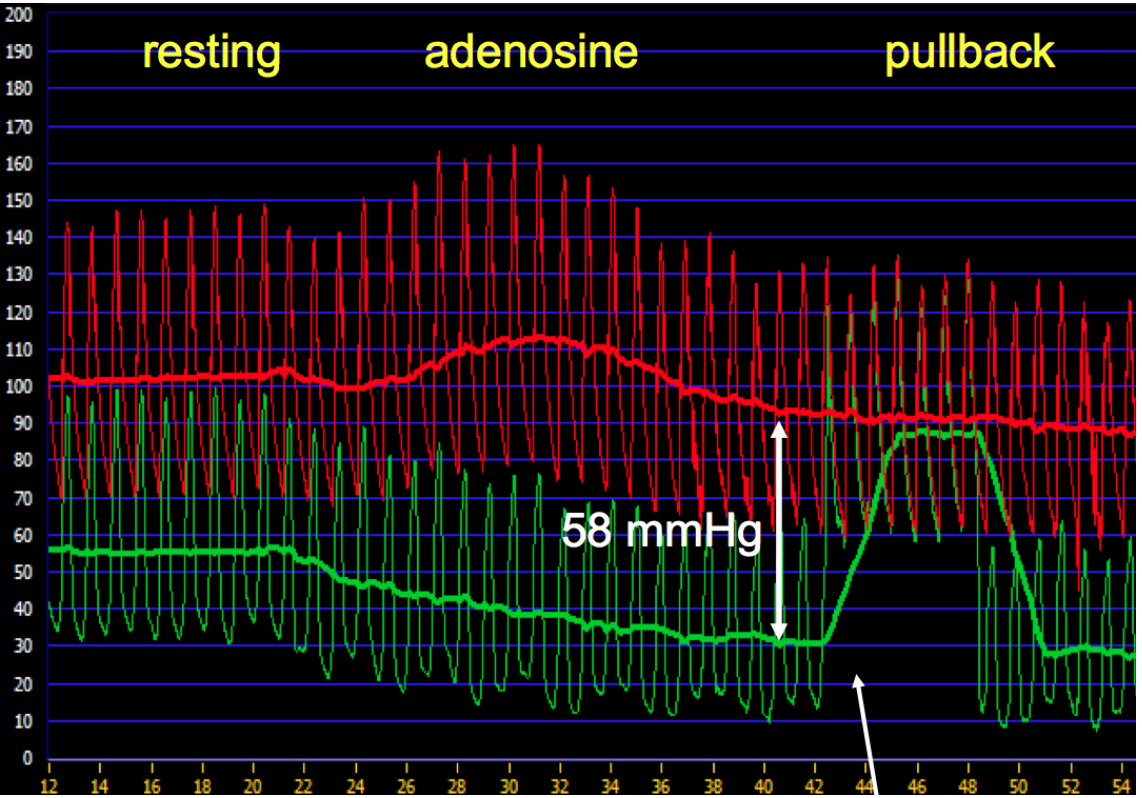
Key concept: final FFR + ΔFFR

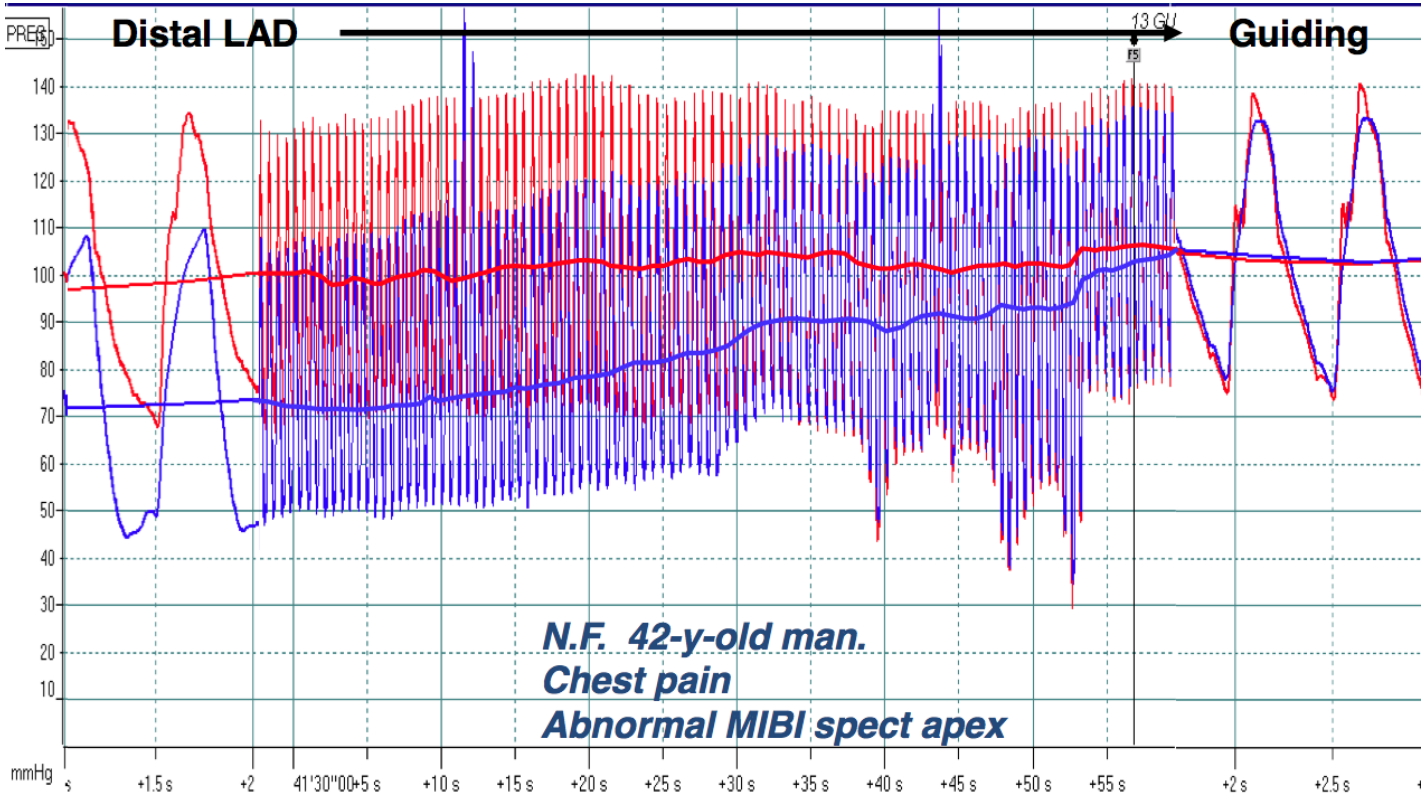


Final + Δ FFR

can we predict?

Pullback pattern: *focal* vs *diffuse*?





FOCAL

BEST target for PCI/CABG

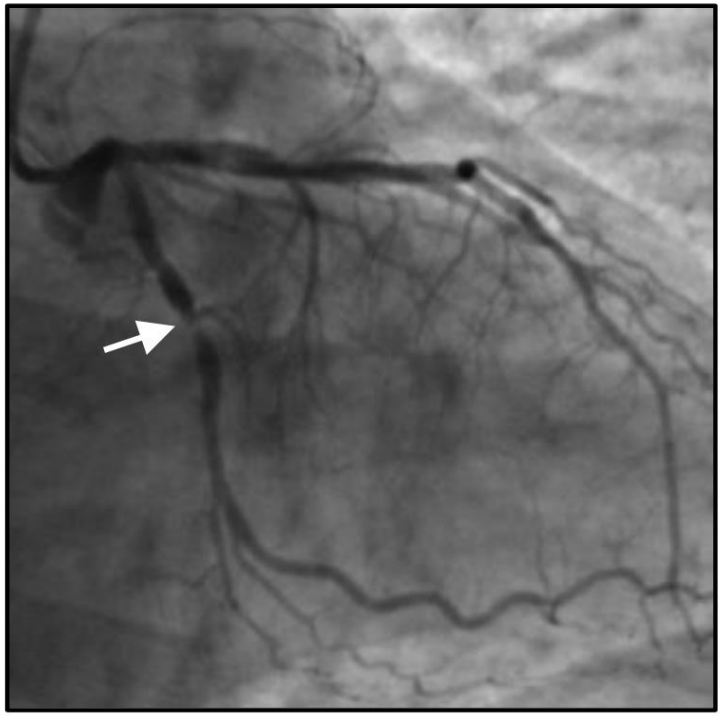
DIFFUSE

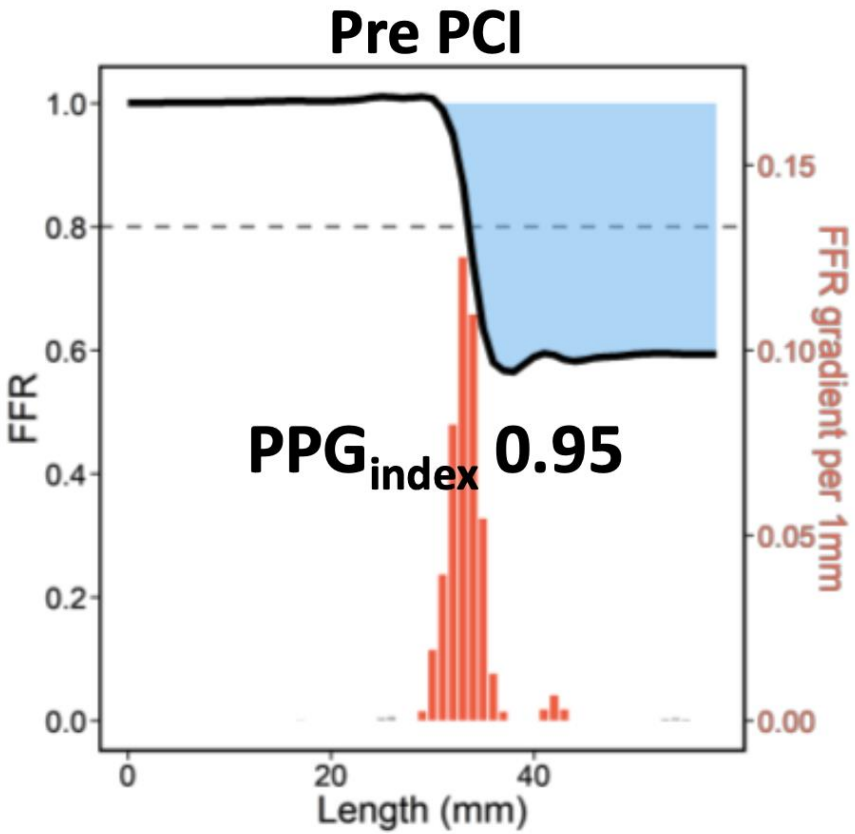
POOR target for PCI/CABG

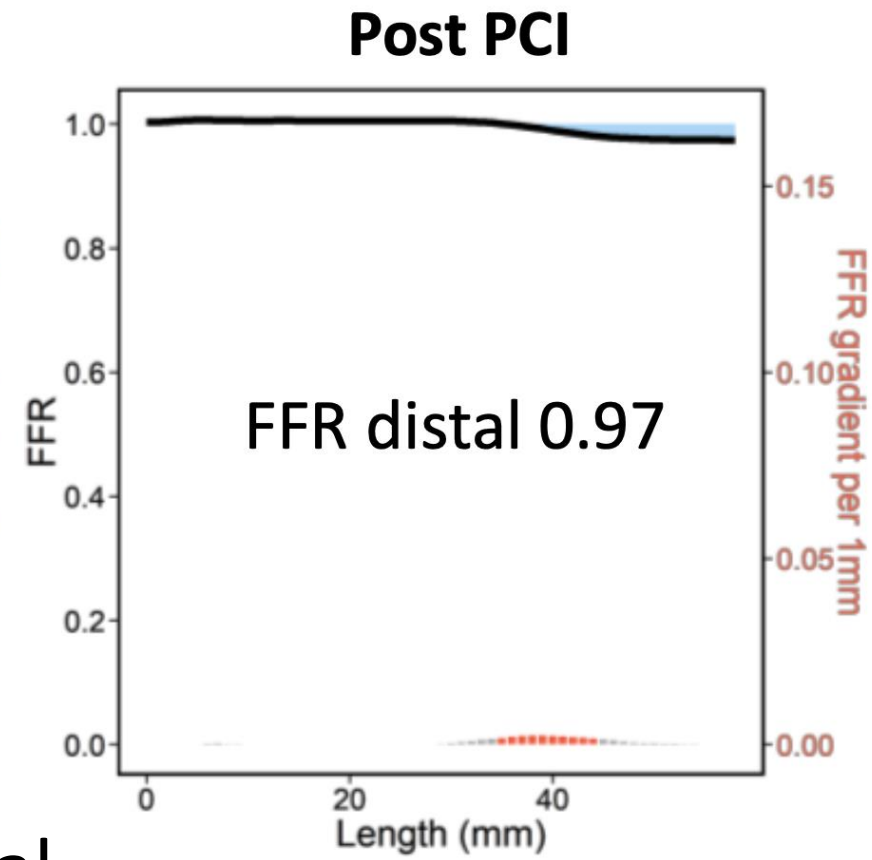
Pressure tracings from ETP and TCT presentations (Pijls, De Bruyne)

Focal disease = higher final FFR + large Δ

Functional Focal CAD







FFR distal

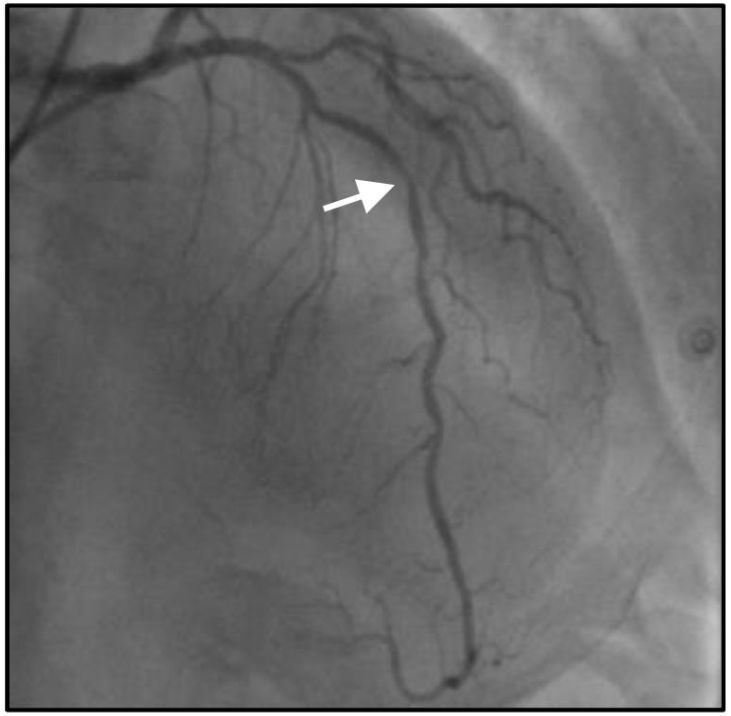
- before 0.59
- after 0.97

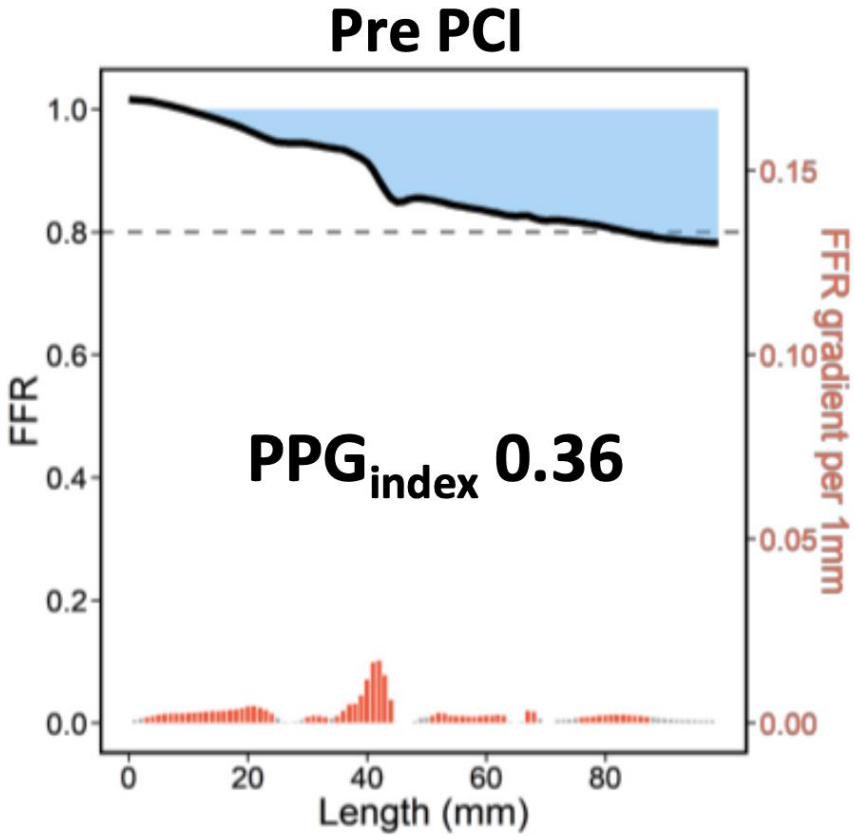
FFR Δ +0.38

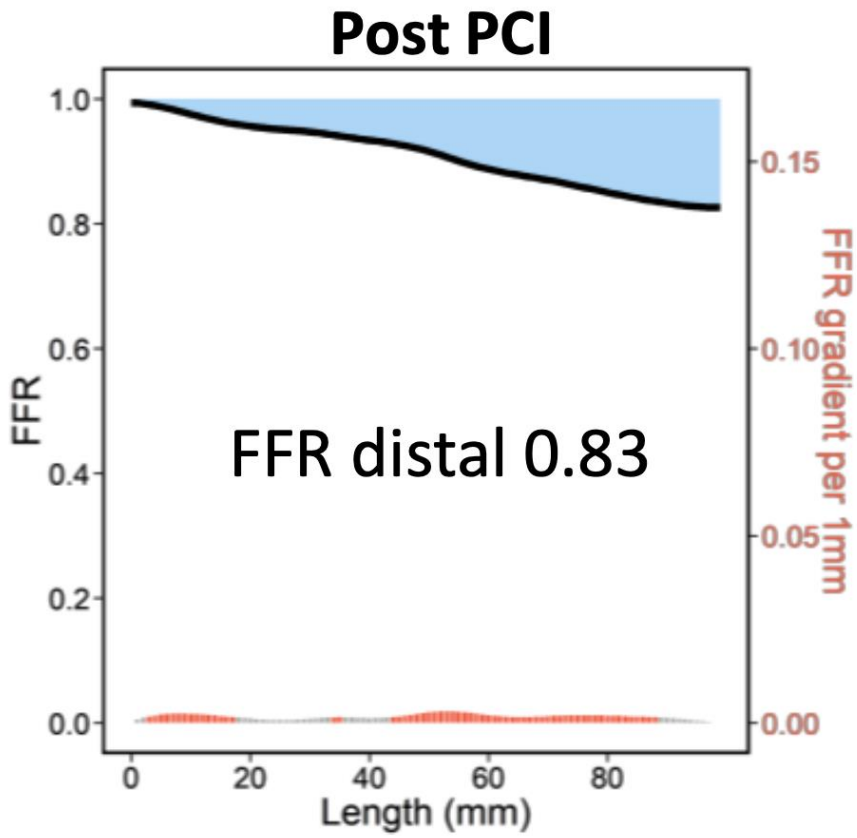
Sonck J, EuroPCR presentation on June 27, 2020. (Slide 6, focal case with minor annotation adjustment)

Diffuse disease = lower final FFR and small Δ

Functional Diffuse CAD







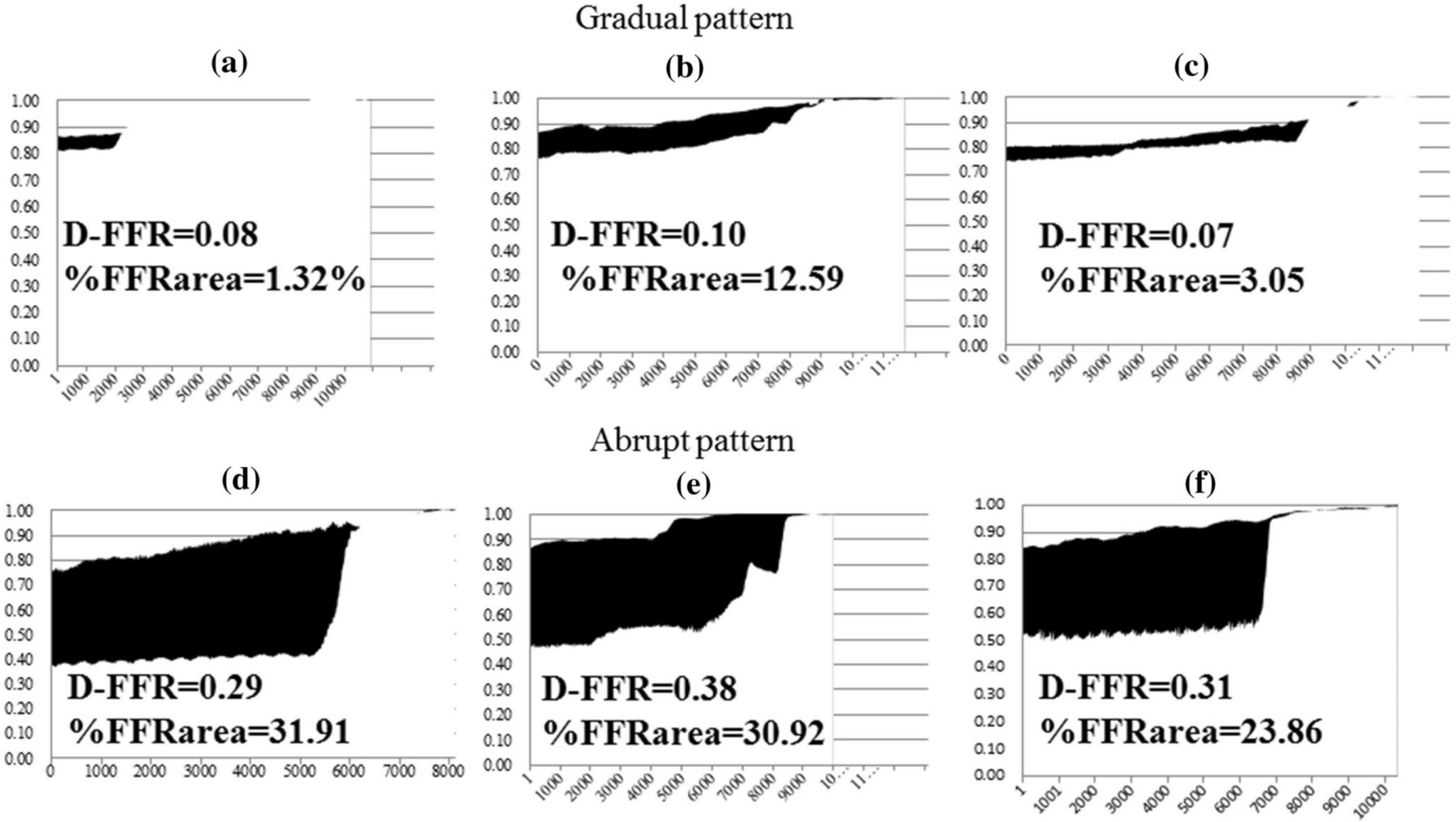
FFR distal

- before 0.78
- after 0.83

FFR Δ +0.05

Sonck J, EuroPCR presentation on June 27, 2020. (Slide 6, diffuse case with minor annotation adjustment)

Pullback curve -> anticipate

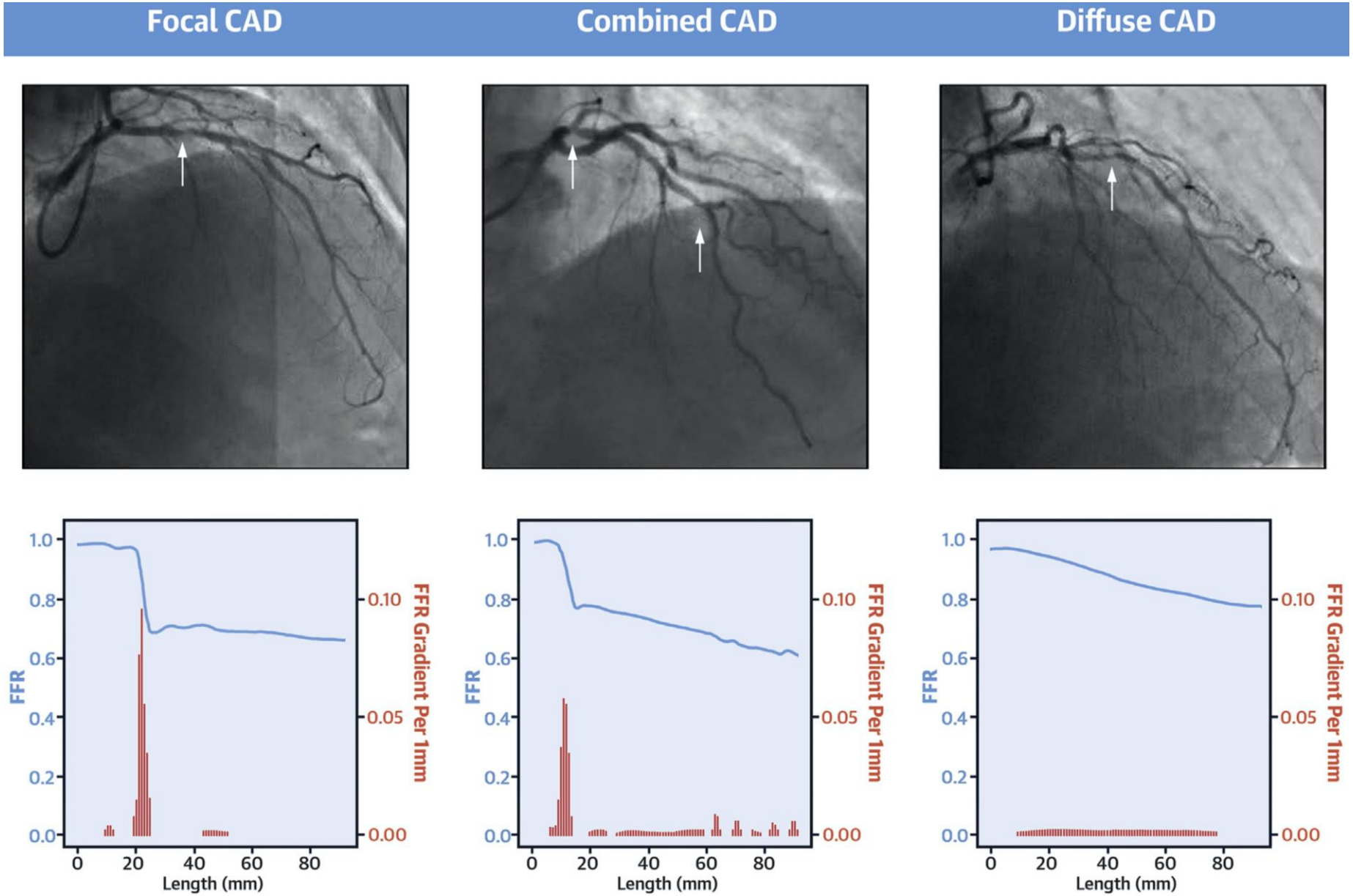


Matsuo A, *Cardiovasc Interv Ther*. 2018 Apr;33(2):99-108. (Figure 3)

How exactly?

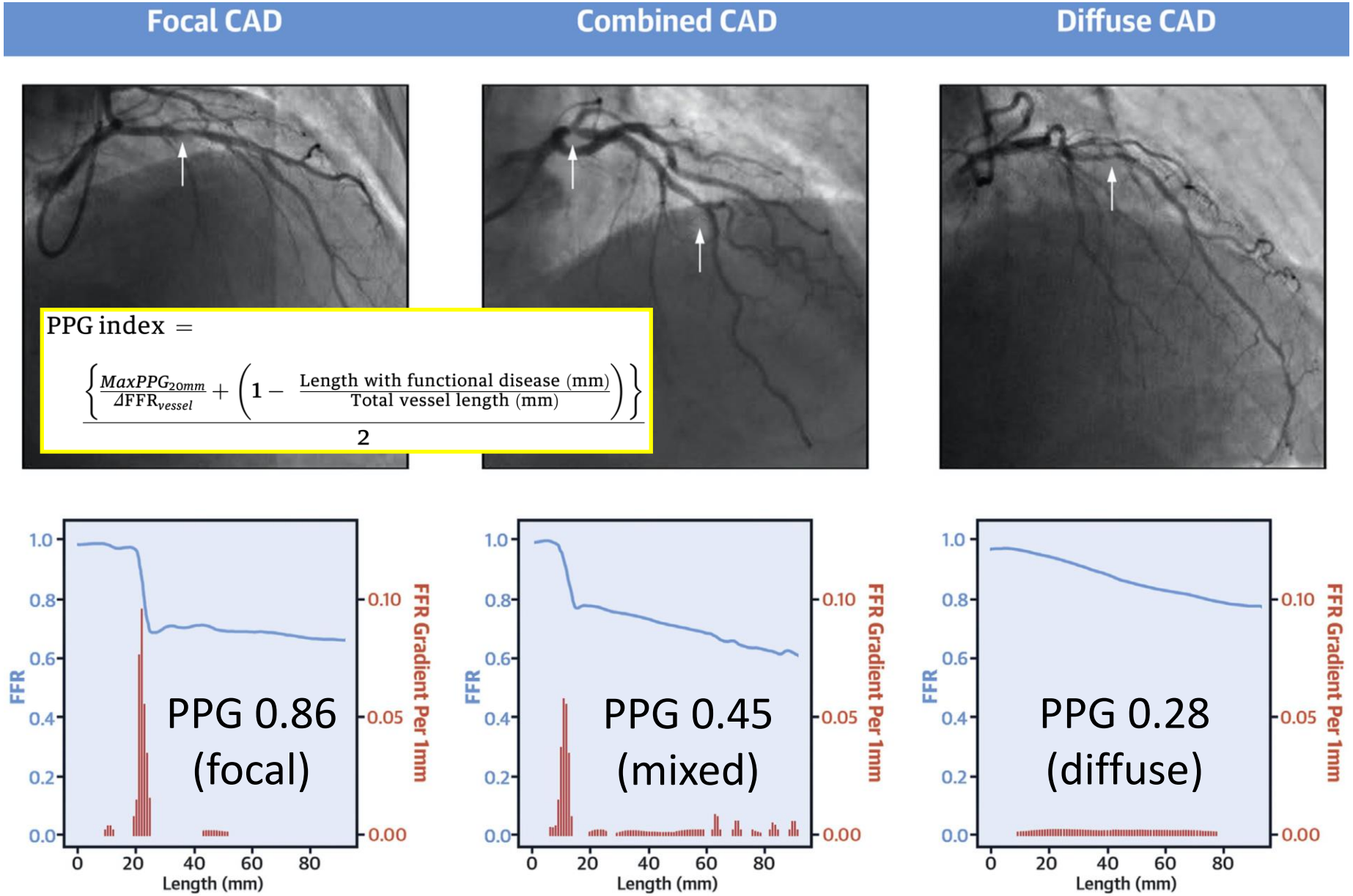
PPG

Continuum of plaque distribution



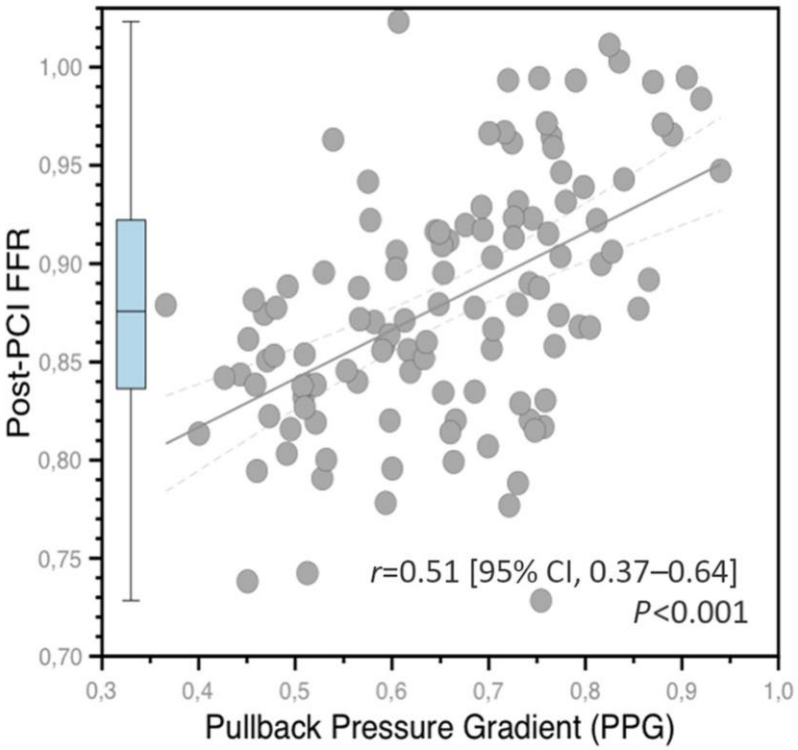
Collet C, *JACC*. 2019 Oct 8;74(14):1772-1784. (Central Illustration, top portion)

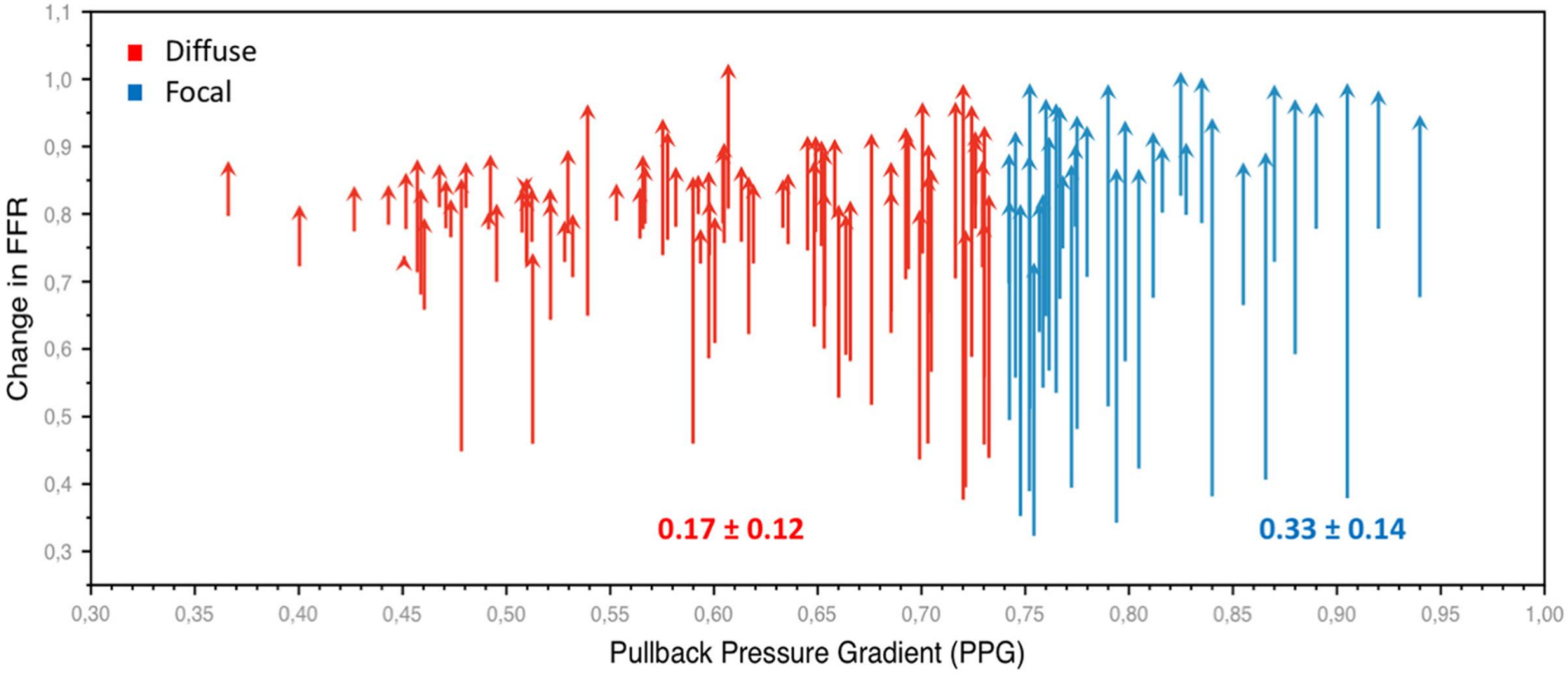
1 = focal, 0 = diffuse



Collet C, *JACC*. 2019 Oct 8;74(14):1772-1784. (Central Illustration, top portion with PPG values and equation inset)

Focal PPG indicates larger final FFR and Δ

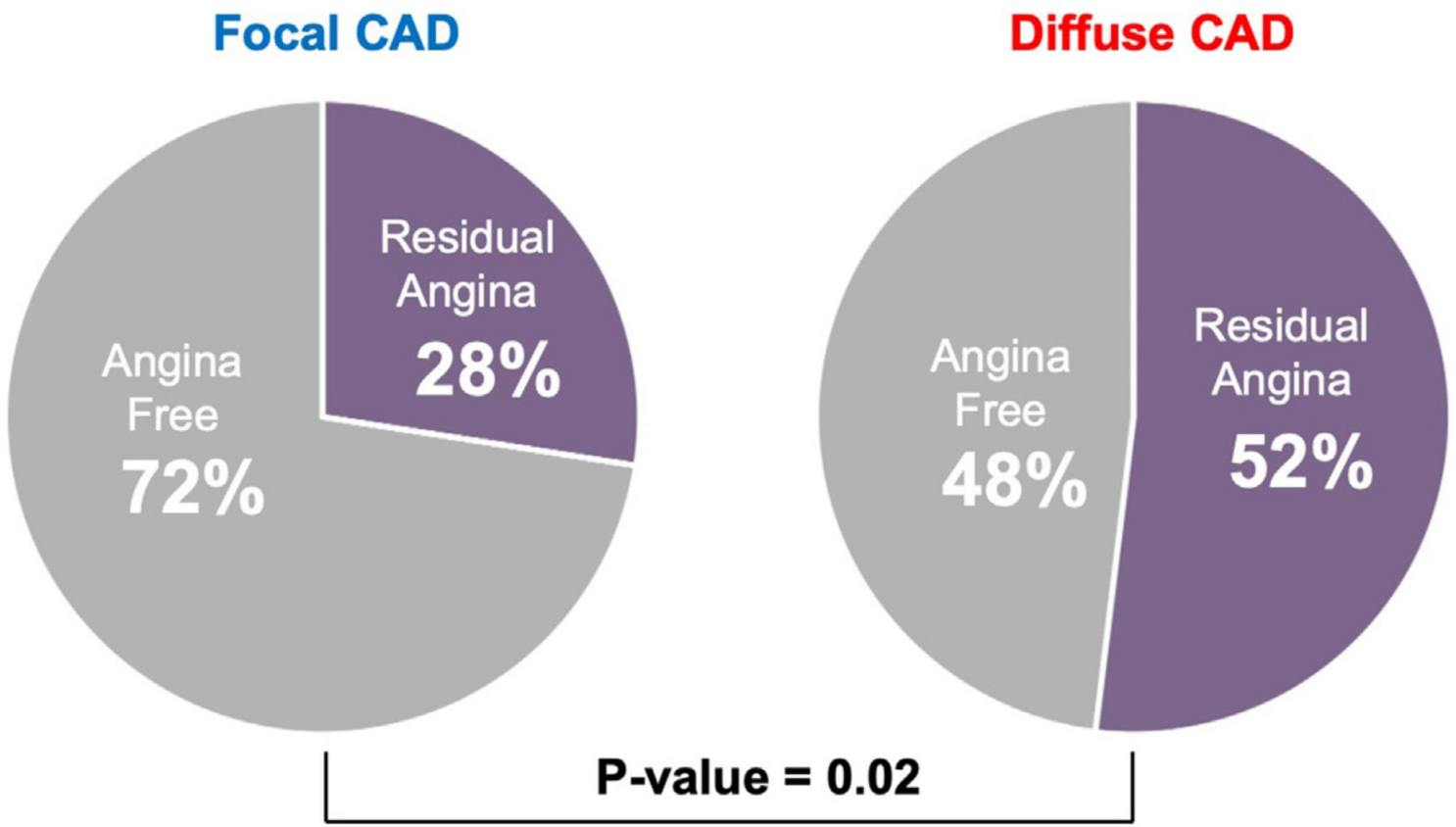


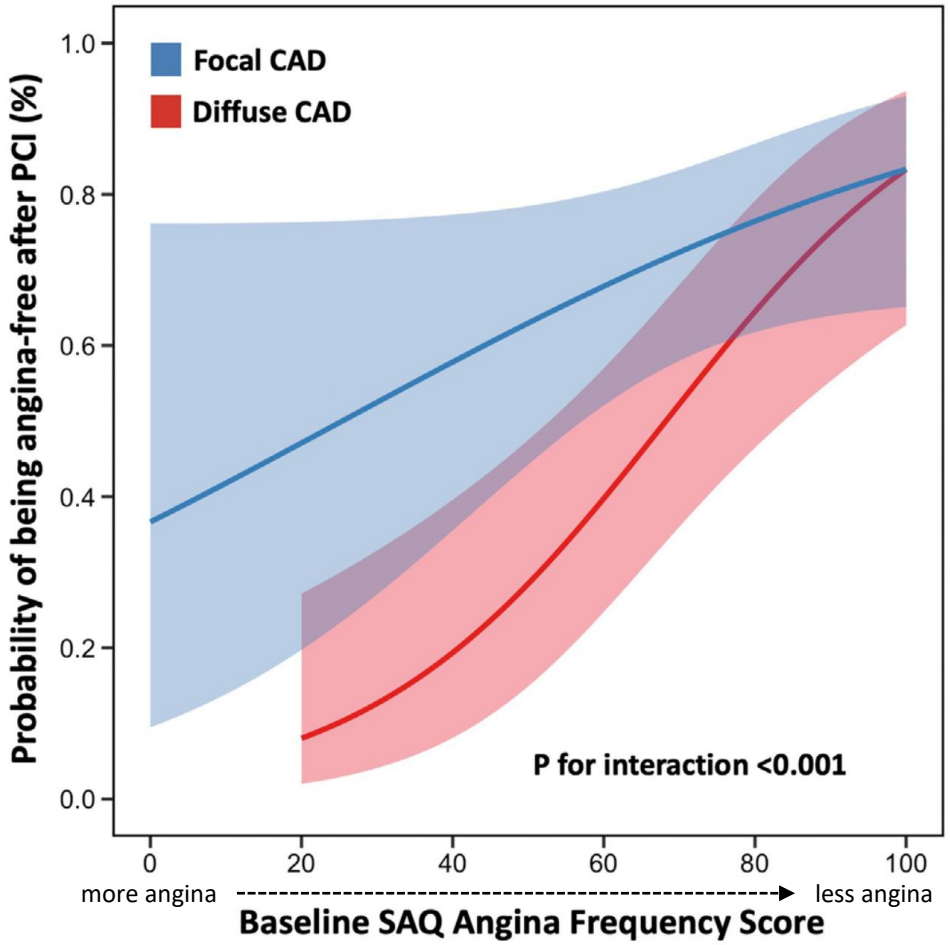


Mizukami T, *J Am Heart Assoc*. 2022 Dec 6;11(23):e026960. (Figure 3 portions)

Less residual angina after PCI for focal PPG

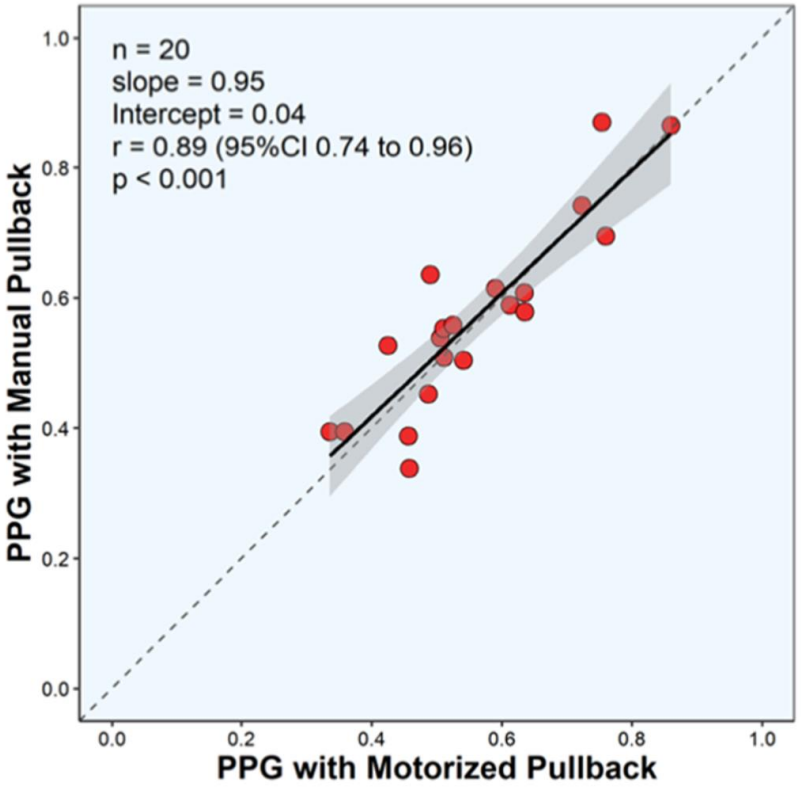
Rate of Freedom From Angina After Percutaneous Coronary Intervention Stratified by CAD Patterns

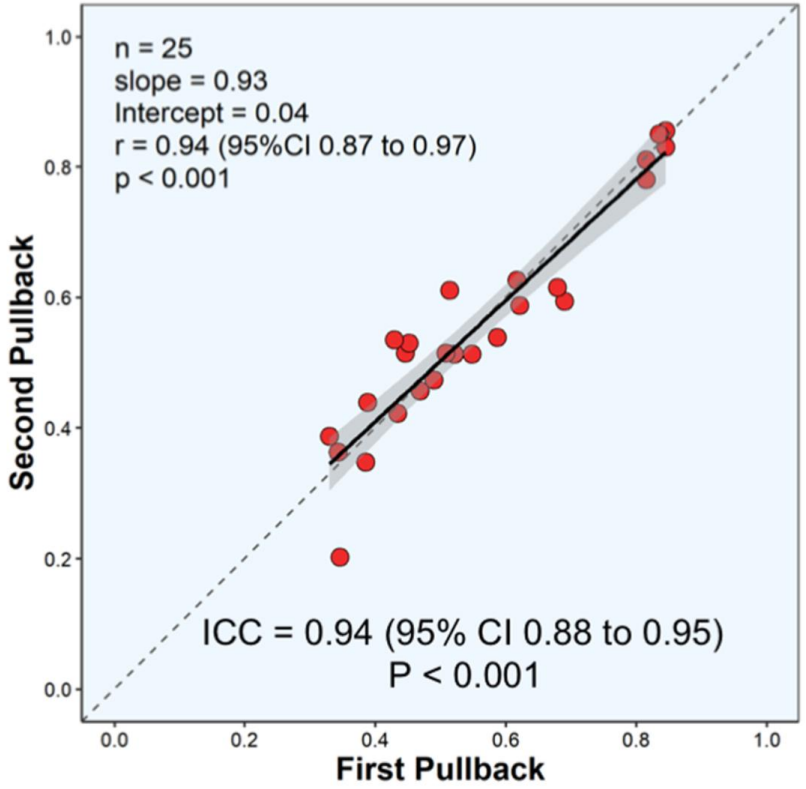


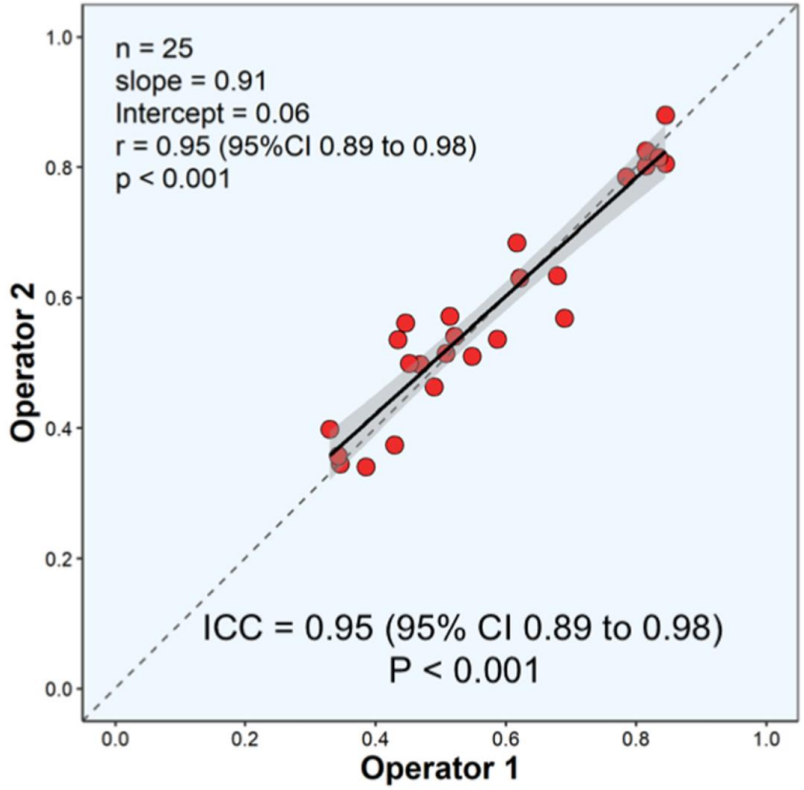


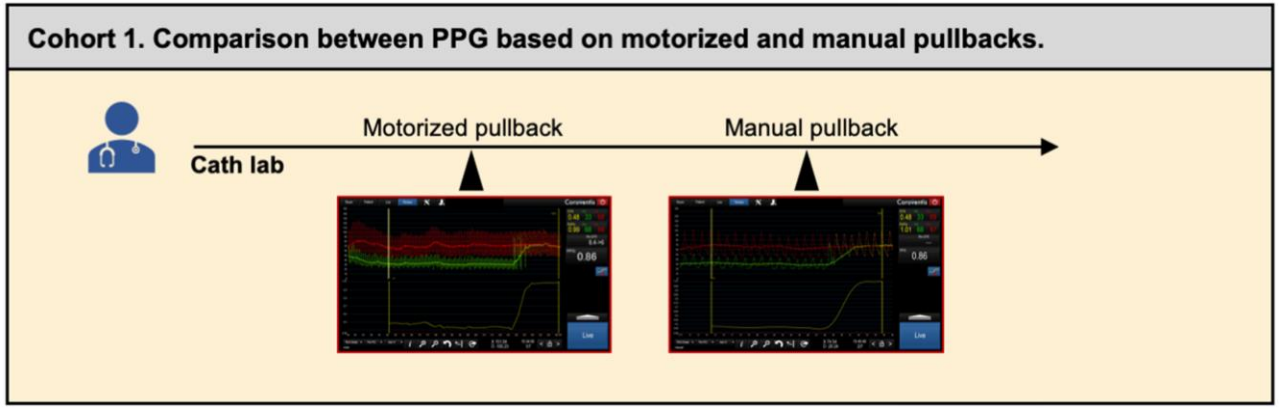
Collet C, *JACC Cardiovasc Interv*. 2022 Dec 26;15(24):2506-2518. (Figure 4 part and Figure 5 with angina annotation)

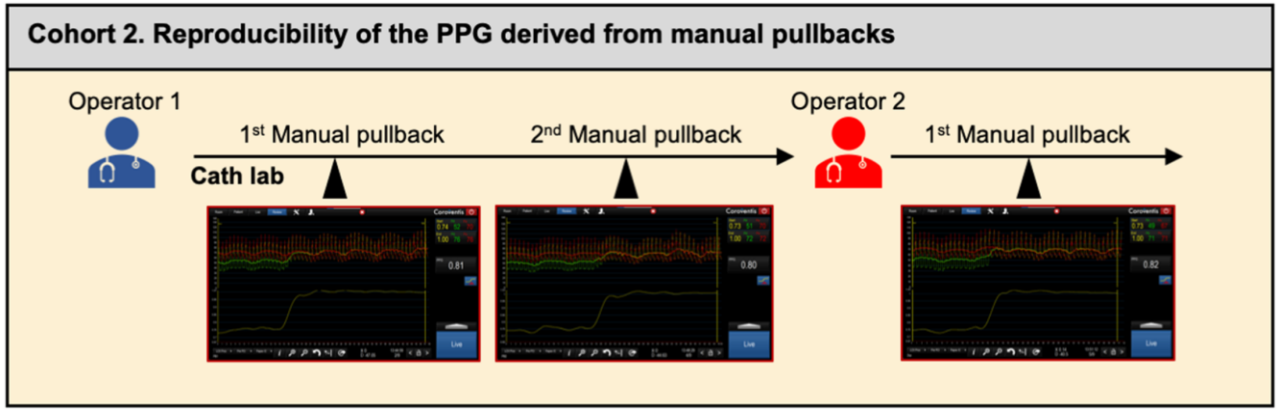
PPG is practical (reproducible by hand)





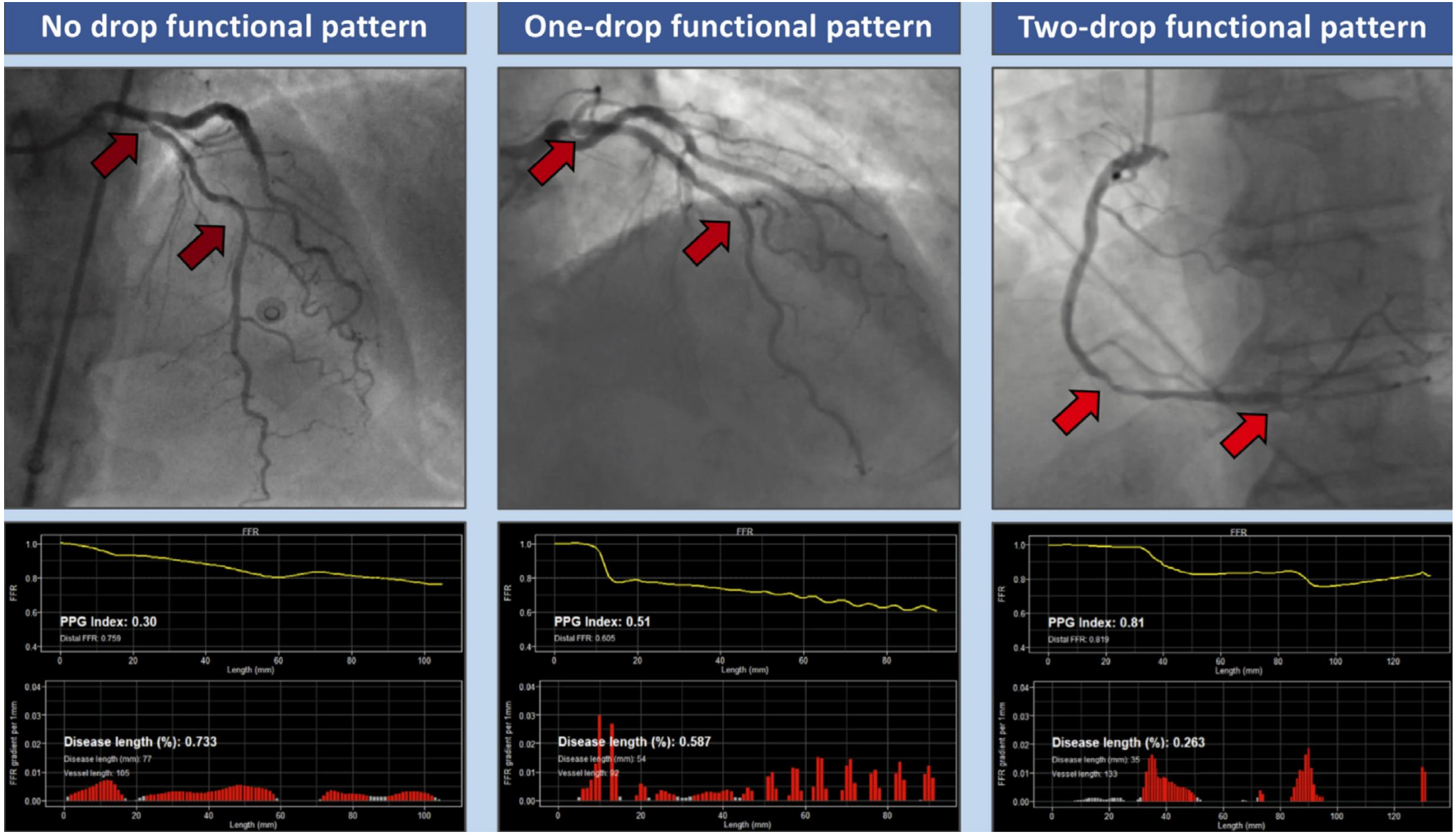






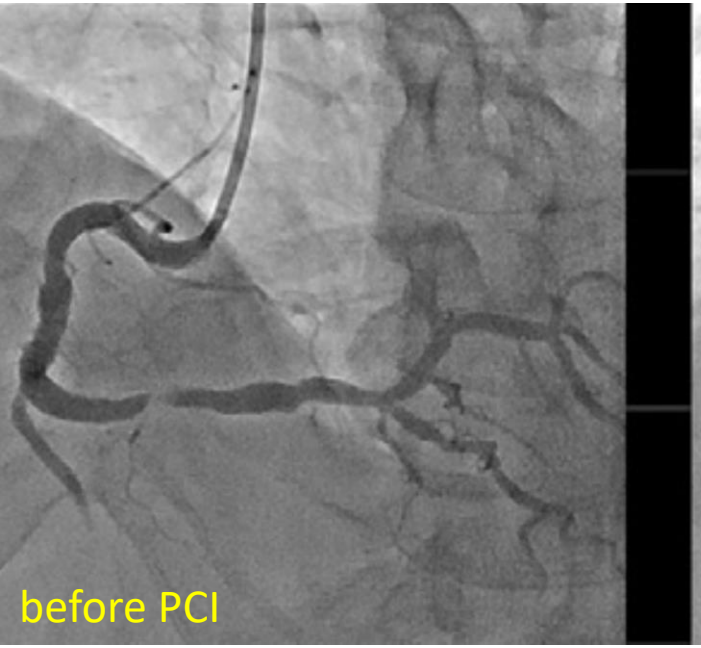
Sonck J, *Catheter Cardiovasc Interv.* 2022 Apr;99(5):1518-1525. (Figures 2A, 3A, 3C, and 1 split)

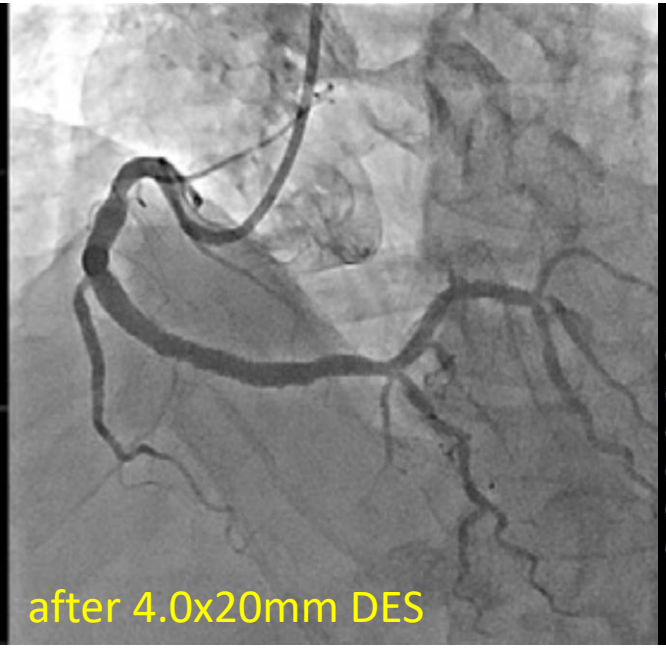
What about serial lesions?



Candreva A, *Catheter Cardiovasc Interv*. 2021 Nov 1;98(5):E647-E654. (Figure 1)

High PPG can lead to RFR vs FFR discordance





before

RFR = 0.91

FFR = 0.66

PPG = 0.91

after

RFR = 0.92

FFR = 0.96

Δ +0.30

70 year-old man
prior PCI, several risk factors
refractory CCS class I angina

Nakayama M, *JACC Cardiovasc Interv*. 2022 May 23;15(10):e113-e116. (Figures 2 and 3 portion with annotations)

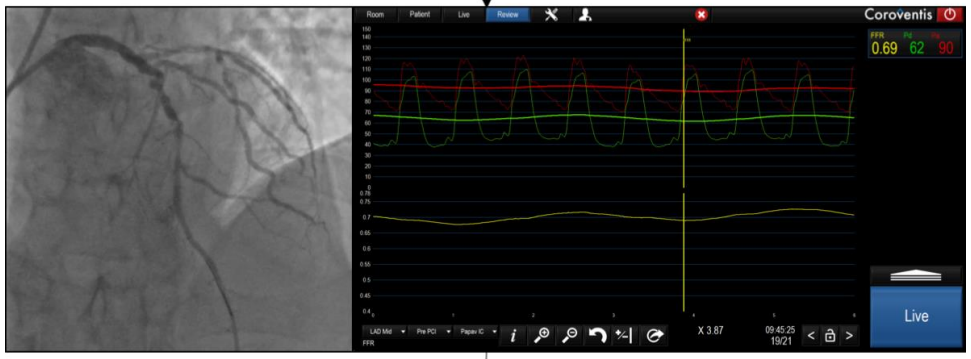
PPG registry

and what did I do?

PPG Global Registry of 982 subjects

Stable patients with significant coronary artery disease (FFR ≤ 0.80) and intention to perform PCI

Initial strategy based on angiography and distal point physiology



FFR Pullback with Pullback Pressure Gradient (PPG)

Adapted Treatment Decision

OMT | PCI | CABG

Primary objective

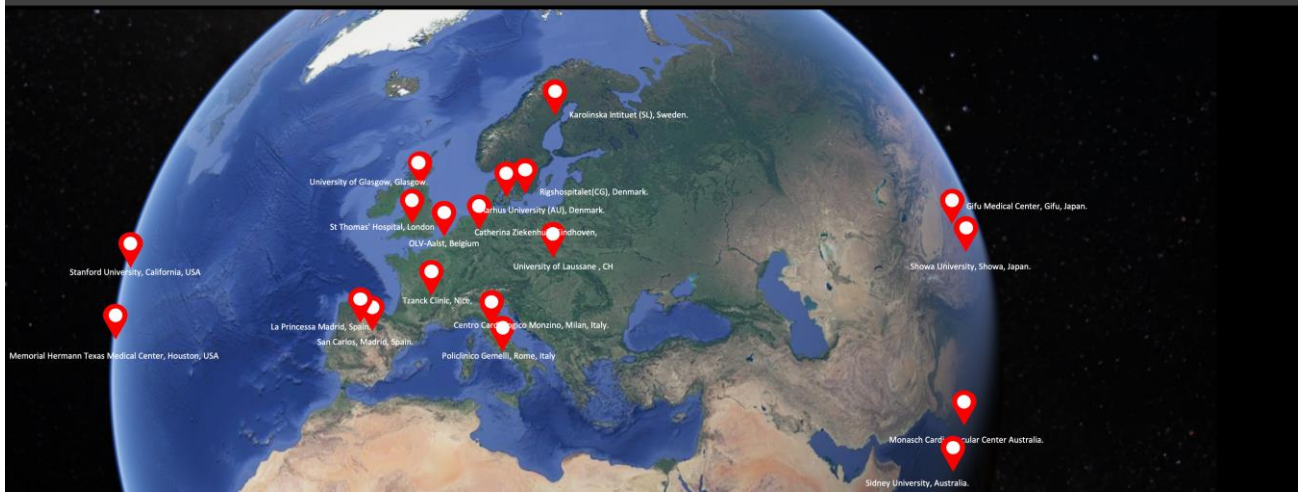
Predictive capacity of PPG for Post-PCI FFR

Secondary objectives

Patient reported and clinical outcomes stratified by focal and diffuse disease at 1, 2, and 3 years

23 Clinical Sites

PPG GLOBAL



https://clinicaltrials.gov/ct2/show/NCT04789317, accessed May 8, 2023.

Opted for medical treatment!