PHYSIOLOGIE CORONAIRE :LA PRATIQUE AU QUOTIDIEN POUR L'ANGIOPLASTICIEN

CARTOGRAPHIE CORONAIRE: PULLBACK VIRTUAL ANGIOPLASTY

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GRCI 2021

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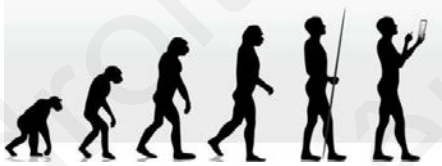
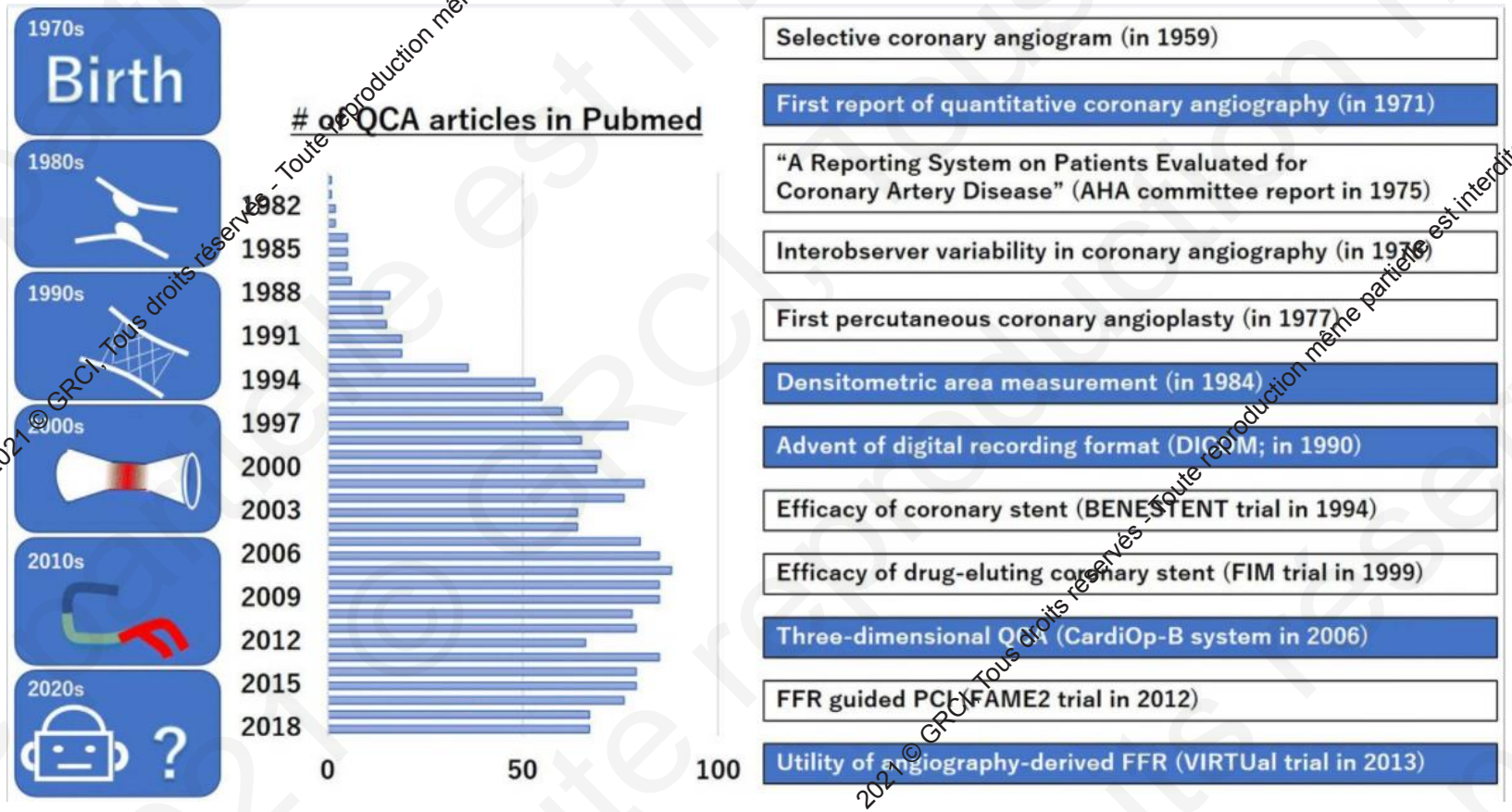
CARTOGRAPHIE / VIRTUAL ANGIOPLASTY

NOUVEAU CONCEPT?



- QCA



Suzuki CCI 2020

VIRTUAL PCI

QU'EST CE QUE C'EST?

- Outils de prédiction/simulation résultat fonctionnel post PCI
  - Post-PCI FFR/iFR
- Outils de planification de stratégie de stenting
  - Aide à la décision
    - Eléments anatomiques
    - Eléments physiologiques

Pullback = Pierre angulaire

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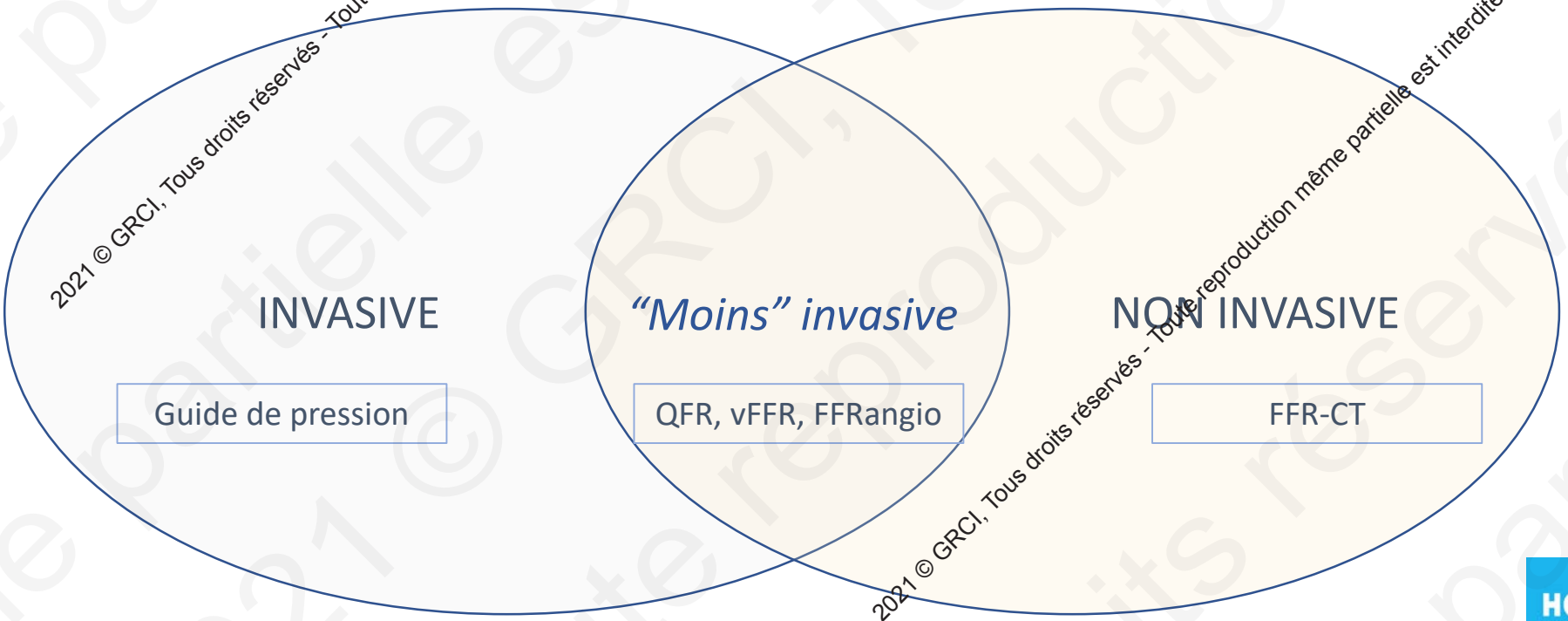
VIRTUAL PCI

CARTOGRAPHIE CORONAIRE

Pullback = Pierre Angulaire



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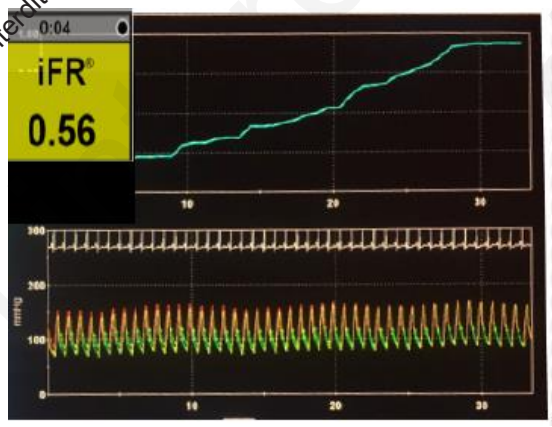
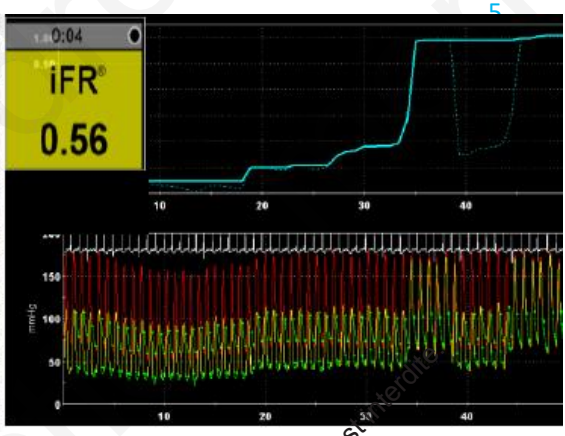
INTERET DU PULLBACK

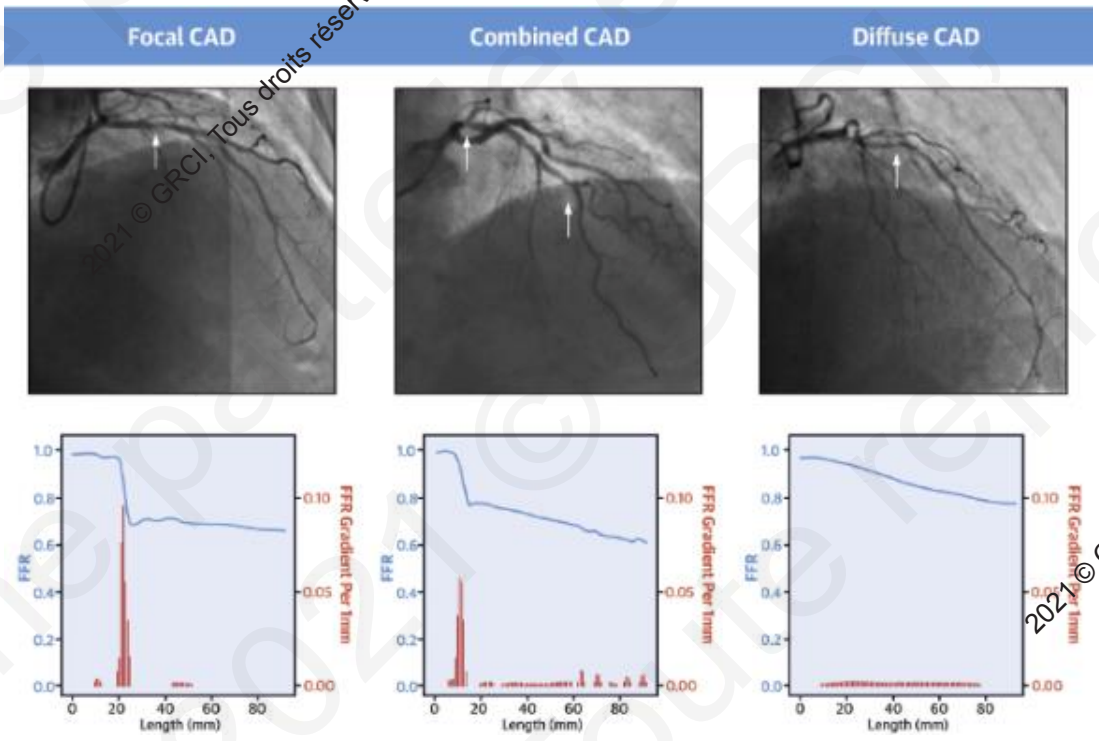
CARTOGRAPHIE/MAPPING CORONAIRE





Courtesy Eric Vanhaelle

Coronary Physiology course Lille, 2018



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POST PCI PHYSIOLOGY

POURQUOI?

- Seuils post-PCI
  - Pd/Pa ≤ 0.96
  - FFR ≤ 0.89
  - iFR/dPR ≤ 0.89
  - QFR/vFFR ≤ 0.89
- Pronostique
- Fréquent
  - 20-56% < seuil

TABLE 3 Cutoff Values for Postprocedural Fractional Flow Reserve and Correlation to Clinical Outcome

First Author (Ref. #)	Year	n	Indication	PCI	Cutoff	FUP, mo	Definition
Pijls et al (75)	2002	750	SA	BMS	NA	6	NA
Nam et al (111)	2011	80	SA	DES	≤0.90	12	AUC 0.69
Leesar et al (112)	2011	66	SA	DES	≤0.95	24	AUC 0.62 (113)
Ito et al (114)	2014	97	SA	DES	≤0.90	18	AUC 0.82
Reith et al (115)	2015	64	SA	DES	<0.905	20	AUC 0.768
Agarwal et al (10)	2016	574	SA/ACS	DES	≤0.86	31	AUC
Li et al (116)	2017	1,476	SA/UA	DES	≤0.88	36	AUC 0.83
Piroth et al (117)	2017	639	SA/ACS	DES	≤0.91	24	AUC
Azzalini et al (118)	2019	95	SA/ACS	DES	≤0.89	12	NA
Hwang et al (85)	2019	635	SA/ACS	DES	≤0.81 LAD, ≤0.87 non-LAD	24	AUC 0.70 and AUC 0.72
Diletti et al (119)	2020	959	SA/ACS	DES	≤0.089	24	NA

TABLE 4 Cutoff Values for Postprocedural Nonhyperemic Pressure Ratios and 3D QCA-Based FFR and Correlation to Clinical Outcome

First Author (Ref. #)	Index	Year	n	Indication	PCI	Cutoff	FUP, mo	Definition
Hakeem et al (76)	Pd/Pa	2019	664	SA/ACS	DES	≤0.96	30	AUC
Patel et al (79)	iFR	2019	520	SA	DES	<0.96	12	AUC 0.74
Masdjedi et al (77)	dPR	2020	885	SA/ACS	DES	≤0.89	24	AUC
Kogame et al (80)	QFR	2019	771	SA/UA	DES	≤0.90	24	AUC 0.70
Biscaglia et al (10)	QFR	2019	751	SA/ACS	DES	≤0.89	21	AUC 0.77
Masdjedi et al (24)	vFFR	2020	100	SA/UA/NSTEMI	DES	≤0.89	NA compared with FFR ≤0.89	AUC 0.98

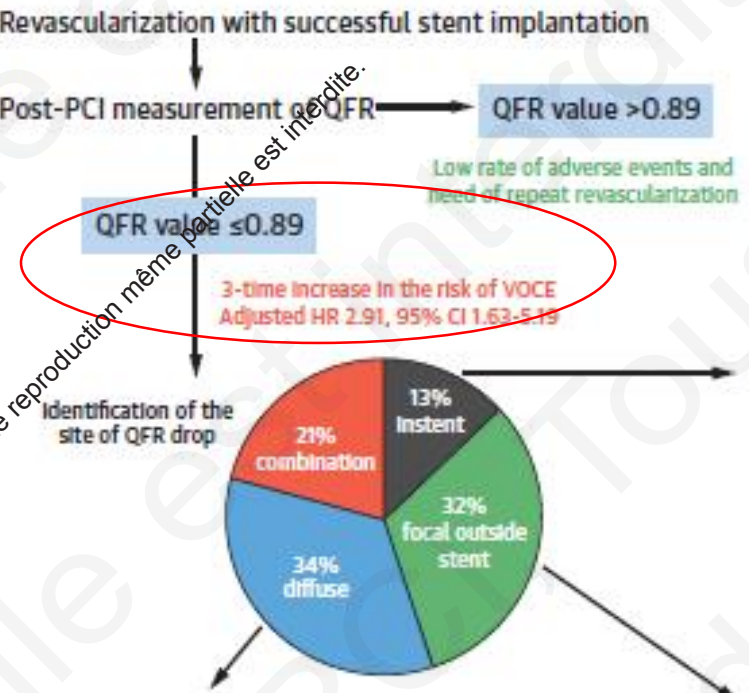
dPR = diastolic pressure ratio; iFR = instantaneous wave-free ratio; NSTEMI = non-ST-segment elevation myocardial infarction; UA = unstable angina; other abbreviations as in Tables 1 to 3.

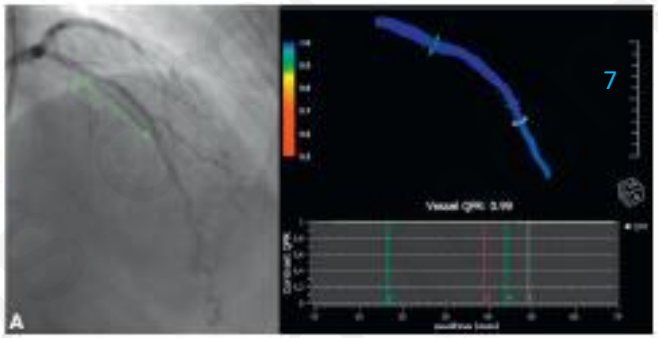
van zandvoort jacc ccv int 2021

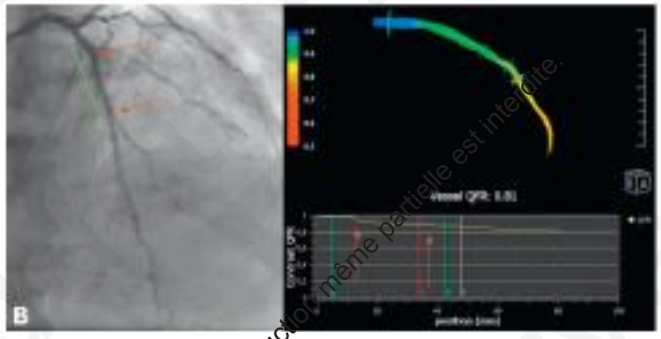
POST PCI

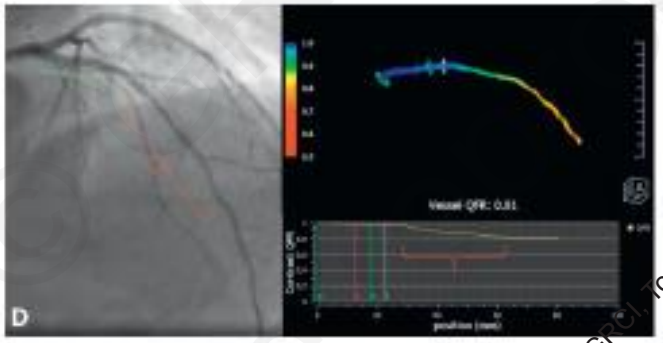
QFR

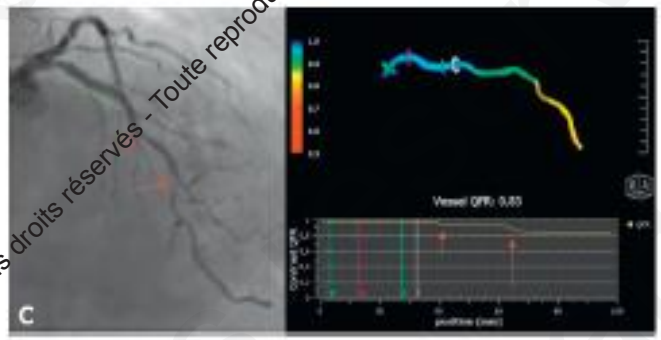
- Virtual pullback
- QFR post ≤ 0,89
  - Impact pronostique
  - Patterns
    - Focal
    - Diffus
    - Mixte







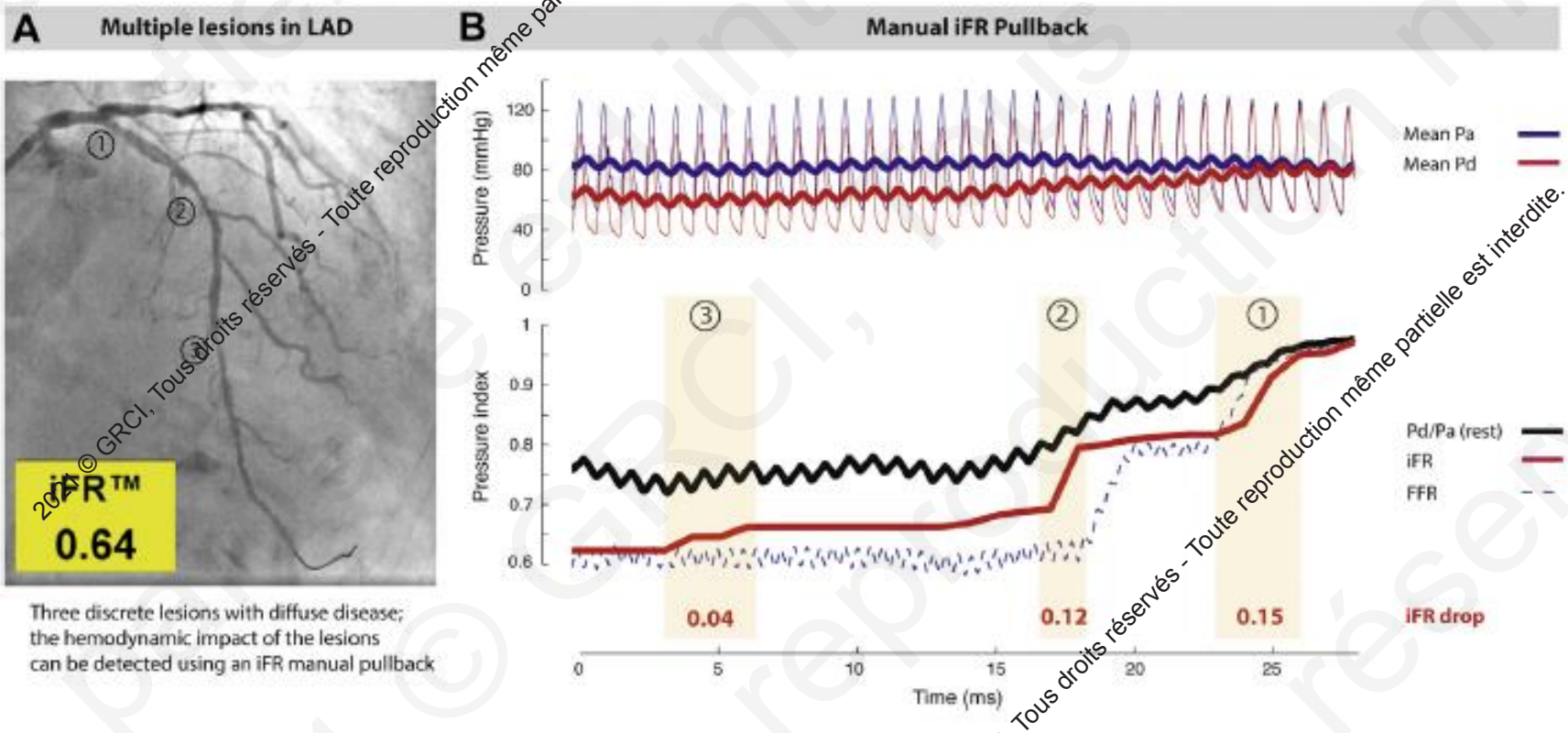




Biscaglia jacc cv int 2019

MAPPING CORONAIRE ET VIRTUAL PCI

FFR, IFR INVASIVES



Three discrete lesions with diffuse disease; the hemodynamic impact of the lesions can be detected using an iFR manual pullback

FIGURE 6 iFR Pullback Can Be Performed Manually and Can Predict the Effect of PCI

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VIRTUAL PCI

STENTING ET IMPACT PHYSIO POST PCI

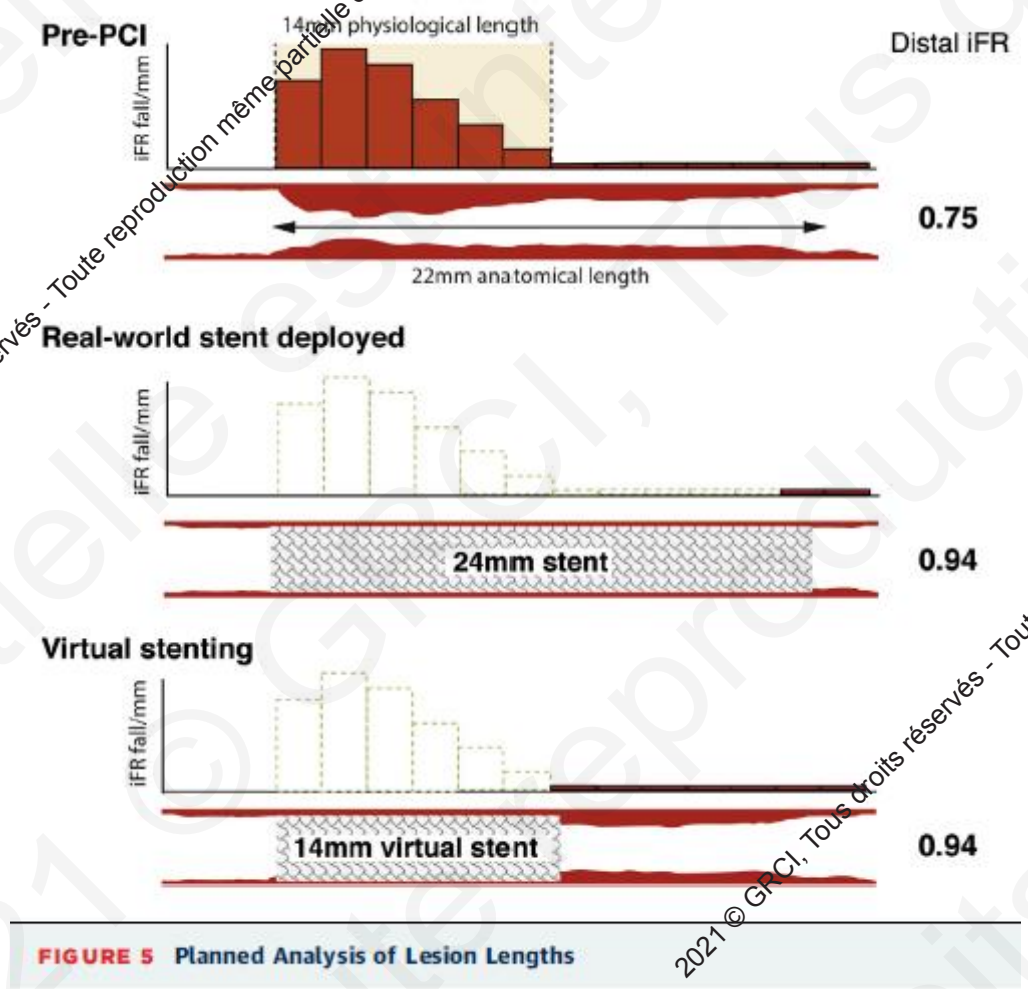

FIGURE 5 Planned Analysis of Lesion Lengths

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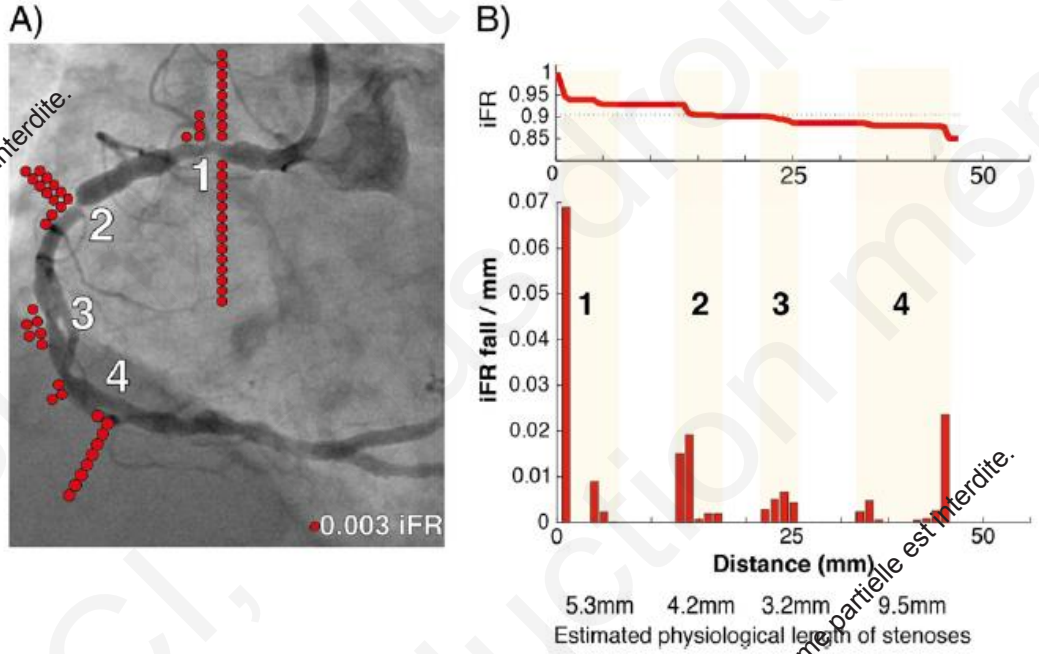
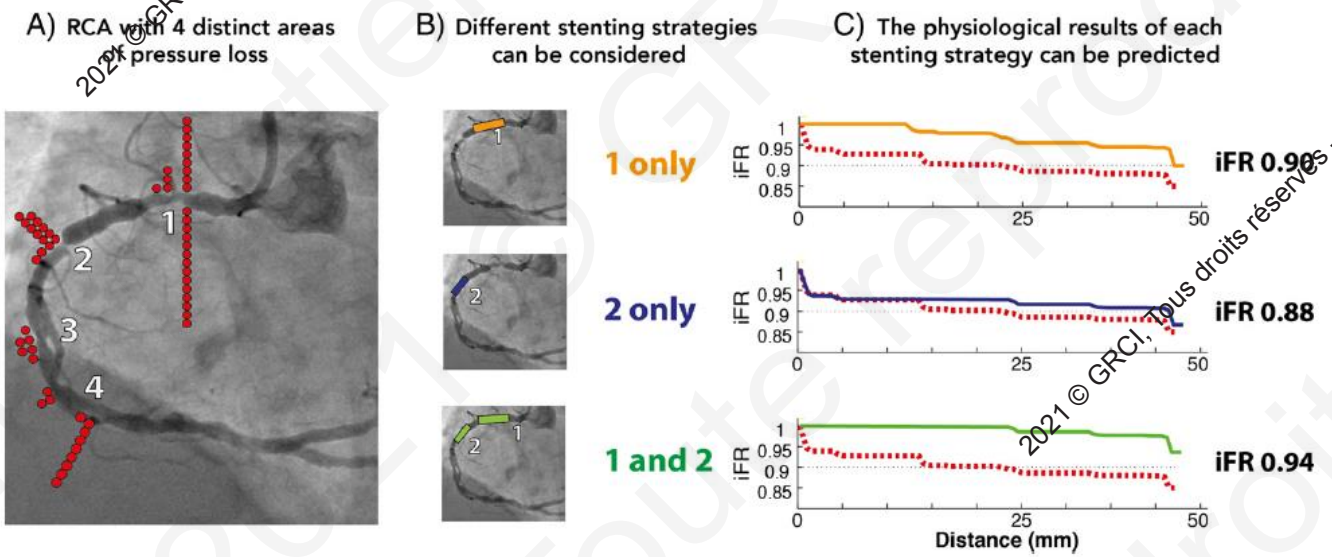
VIRTUAL PCI

QUANTIFICATION DU PULLBACK, IFR

- Coregistration





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Nijjer CV revasc med 2015

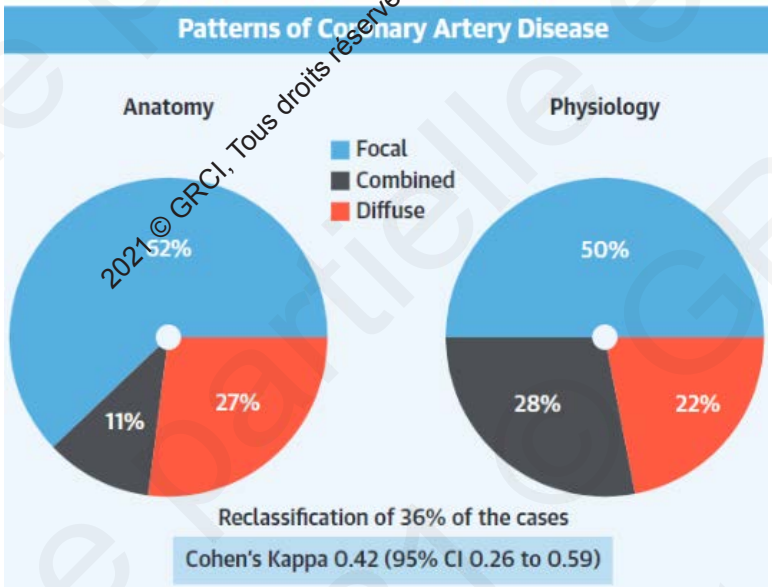
VIRTUAL PCI

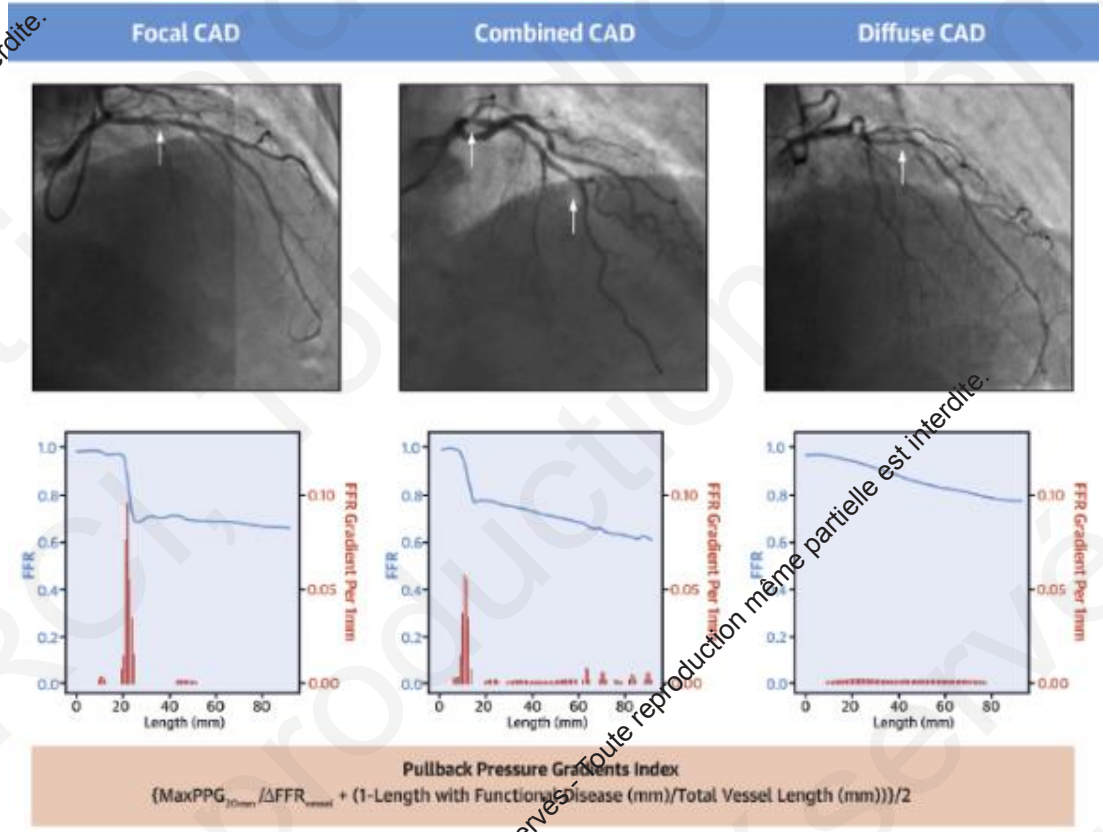
QUANTIFICATION DU PULLBACK, FFR

- PPG_{index}

$$\frac{\left\{\frac{MaxPPG_{20mm}}{\Delta FFR_{vessel}} + \left(1 - \frac{\text{Length with functional disease (mm)}}{\text{Total vessel length (mm)}}\right)\right\}}{2}$$

- Hyperemie IVSE





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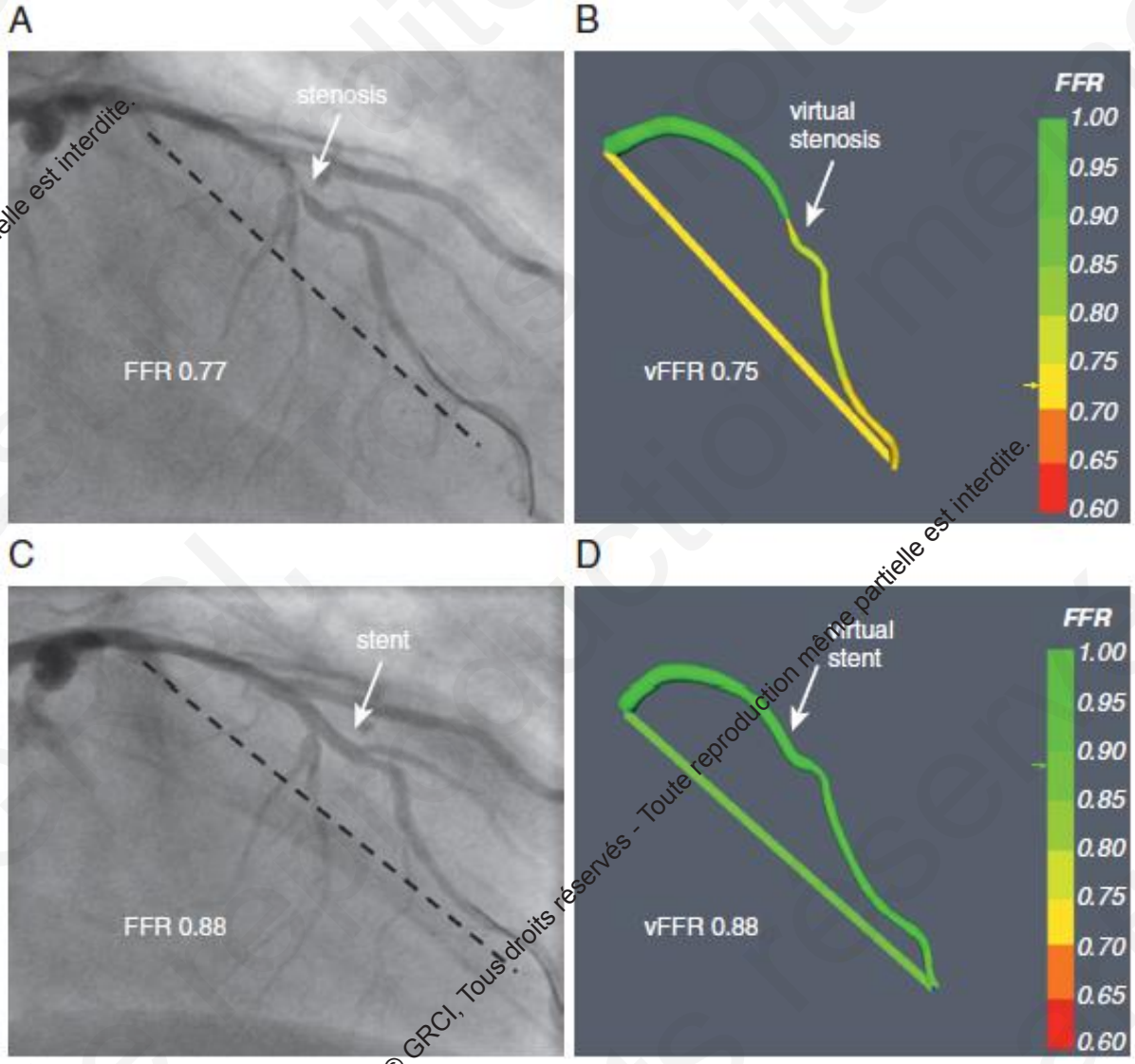
VIRTUAL PCI

VFFR

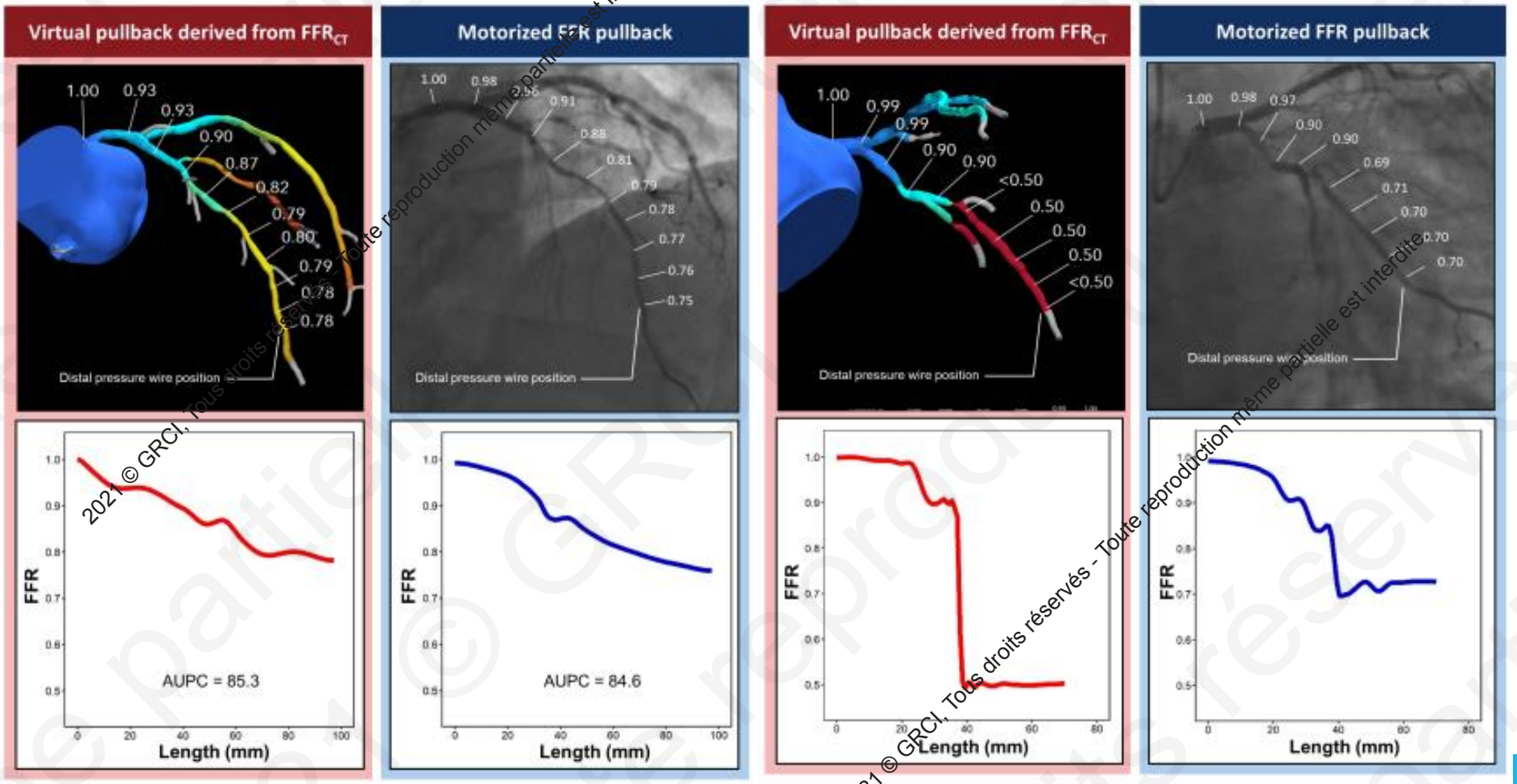
- Virtual Pullback
- Simple et rapide
- 2 incidences
- Pression aortique



Gosling R JACC cv imaging 2019

VIRTUAL PCI

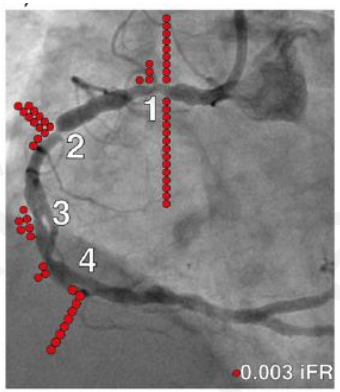
FFR CT, VIRTUAL PULLBACK

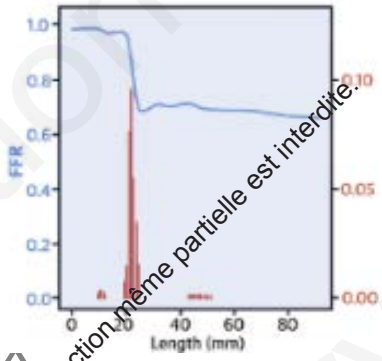


Kim Jacc cv int 2014

CARTOGRAPHIE / VIRTUAL PCI

CONCLUSIONS





- Outil séduisant de physiologie moderne
  - Pullback invasif et virtuel+++
    - Focal, diffus, mixte
  - Simulation stenting
  - Prédiction Physio post-PCI
- Le but n'est pas de stenter moins ou plus mais mieux
  - Semble avoir un impact pronostique
- Evaluation clinique prospective