



Non-contact Mapping: State of the art (and a live case)

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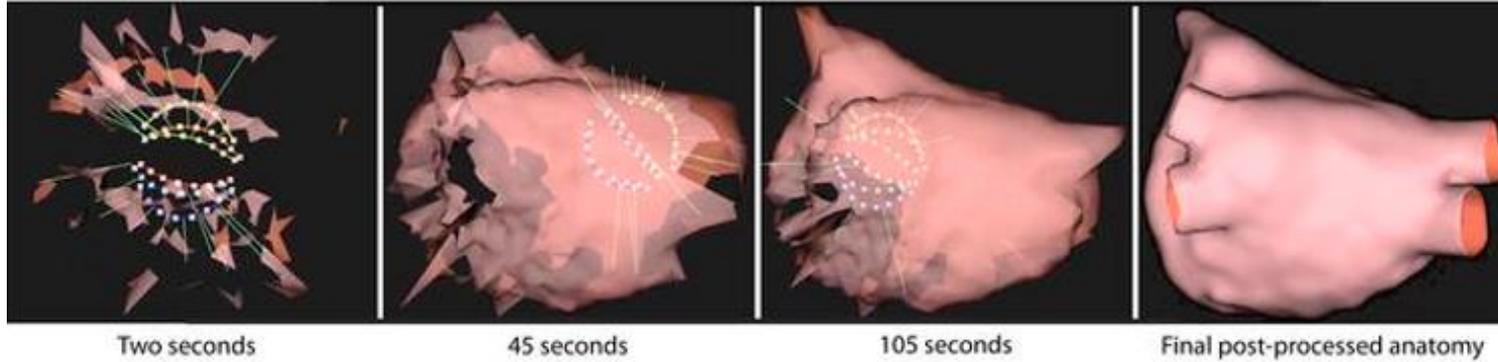
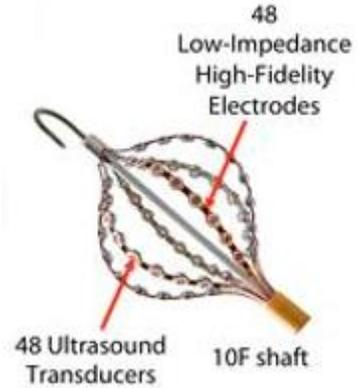
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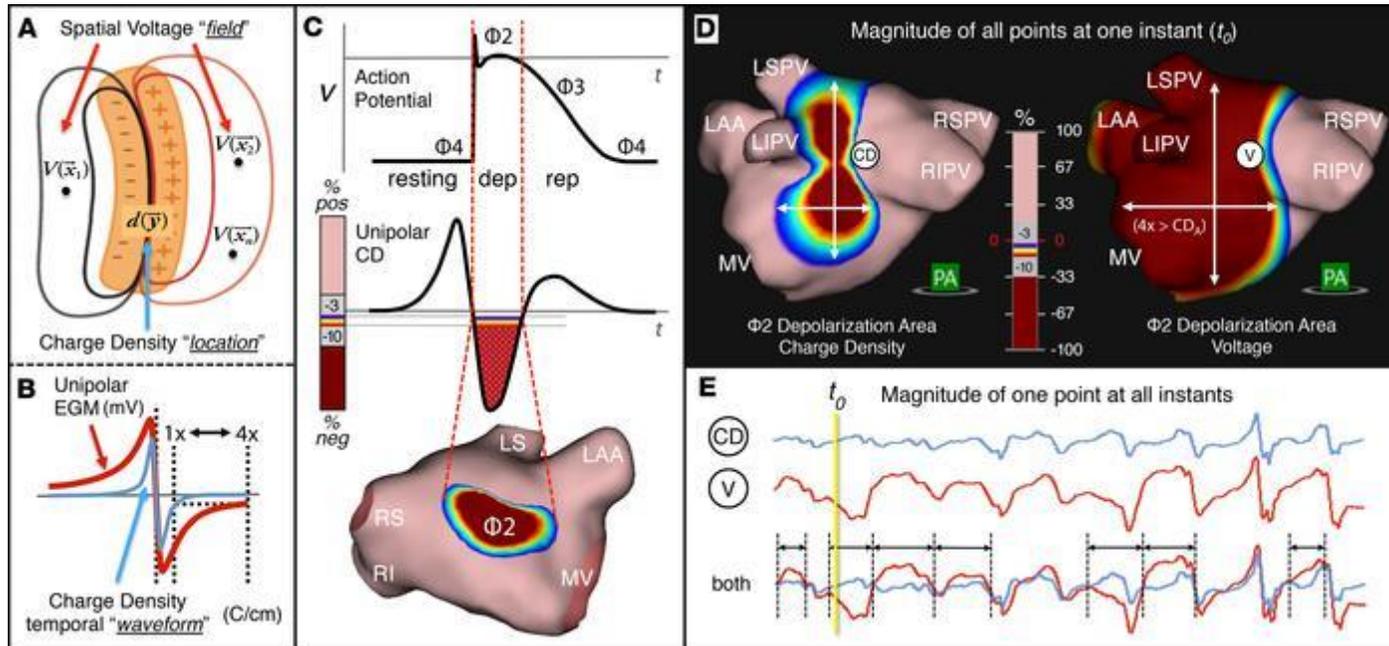
Acutus: Mapping and therapy



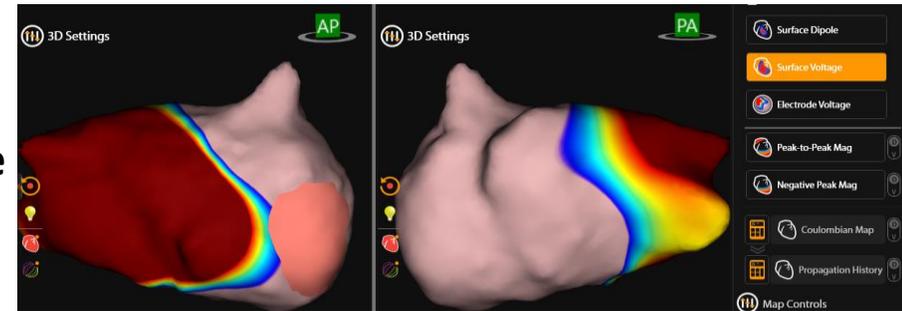
AcQMap system overview



Geometry
with
ultrasound

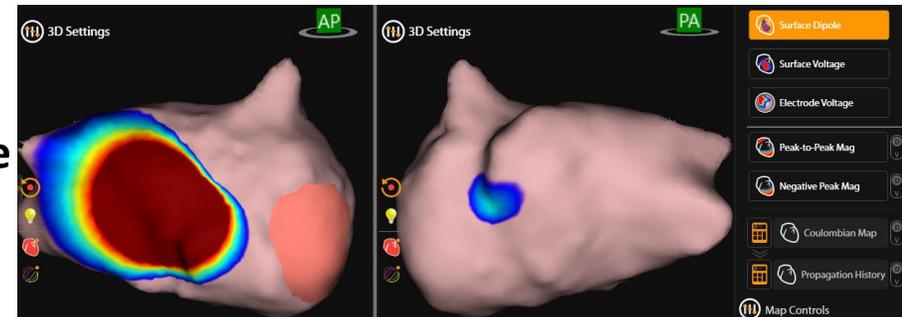


Voltage



VS.

Charge



AcQMap validation

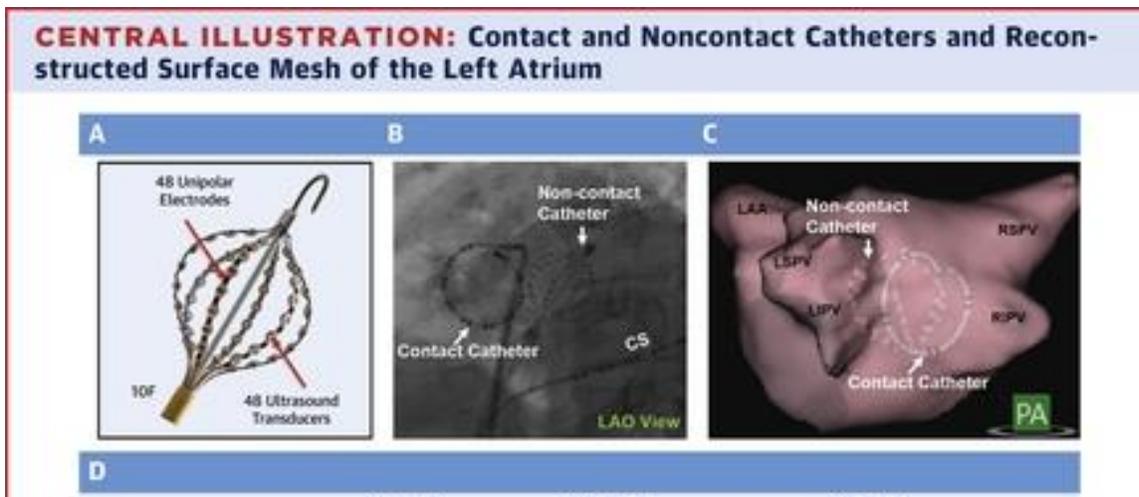
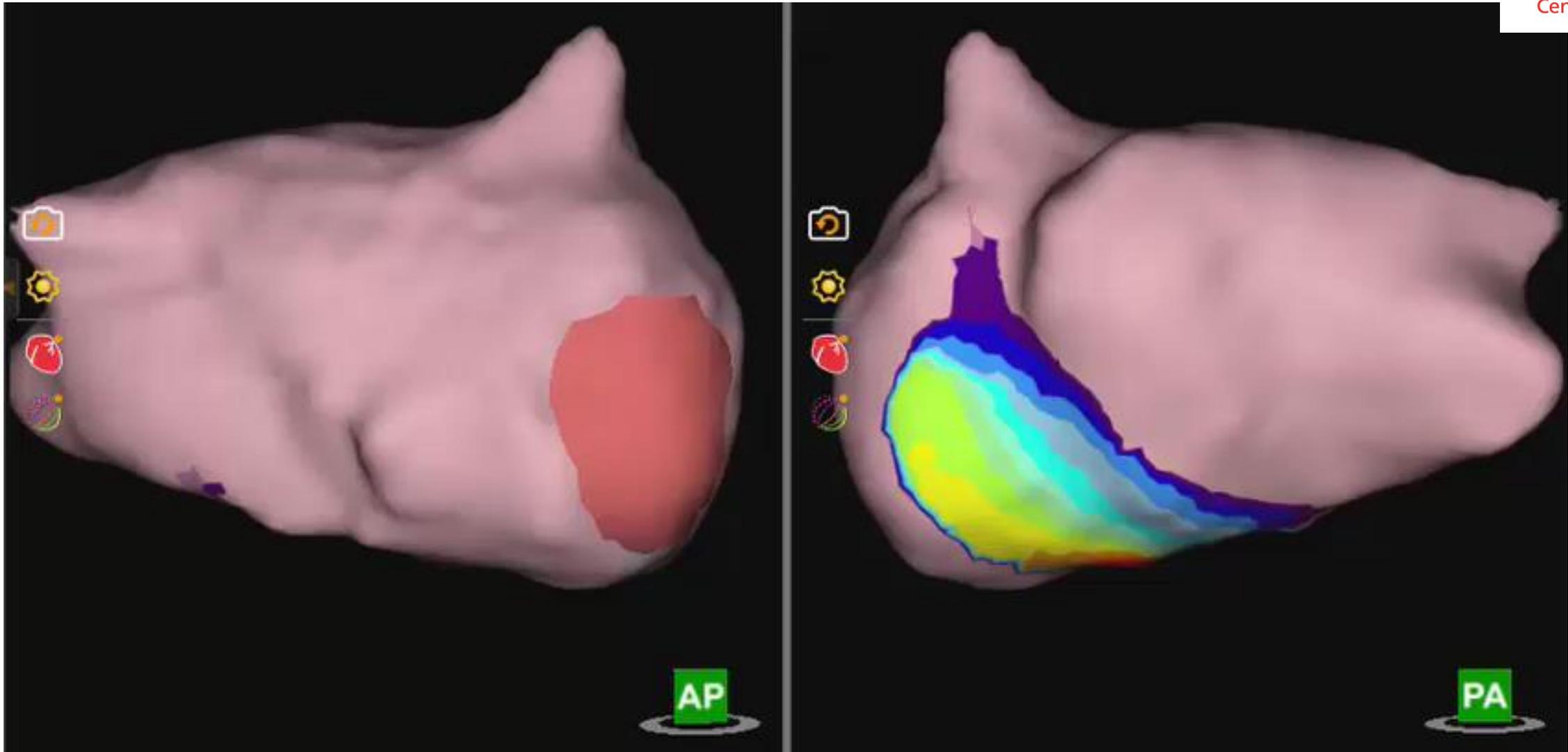


TABLE 1 The Median Morphology Correlation (Cross-Correlation) and Timing Difference Between Contact and Noncontact Electrograms in SR and AF

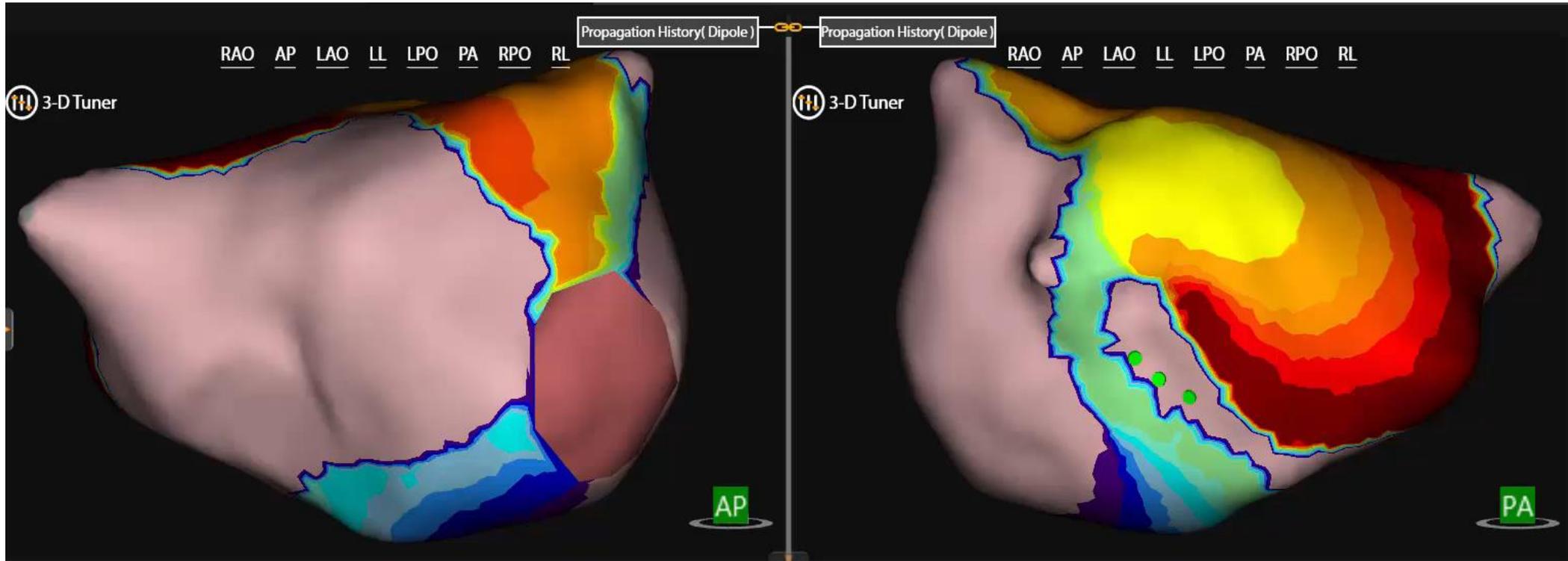
	Sinus Rhythm		Atrial Fibrillation	
	Correlation	Timing Difference	Correlation	Timing Difference
N = 20	0.85 (0.71-0.94)	6.4 (2.6-17.1)	0.79 (0.69-0.88)	14.4 (6.7-26.2)
Radial distance (r) from center of noncontact catheter				
≤40 mm	0.87 (0.72-0.94)	5.7 (2.6-15.4)	0.81 (0.69-0.89)	12.3 (5.9-21.8)
>40 mm	0.73 (0.56-0.88)	15.1 (4.1-27.7)	0.67 (0.45-0.82)	28.3 (16.2-36.0)
p Value	<0.01	<0.01	<0.01	<0.01



AcQMap phenomena: Localised Rotational Activity (LRA)



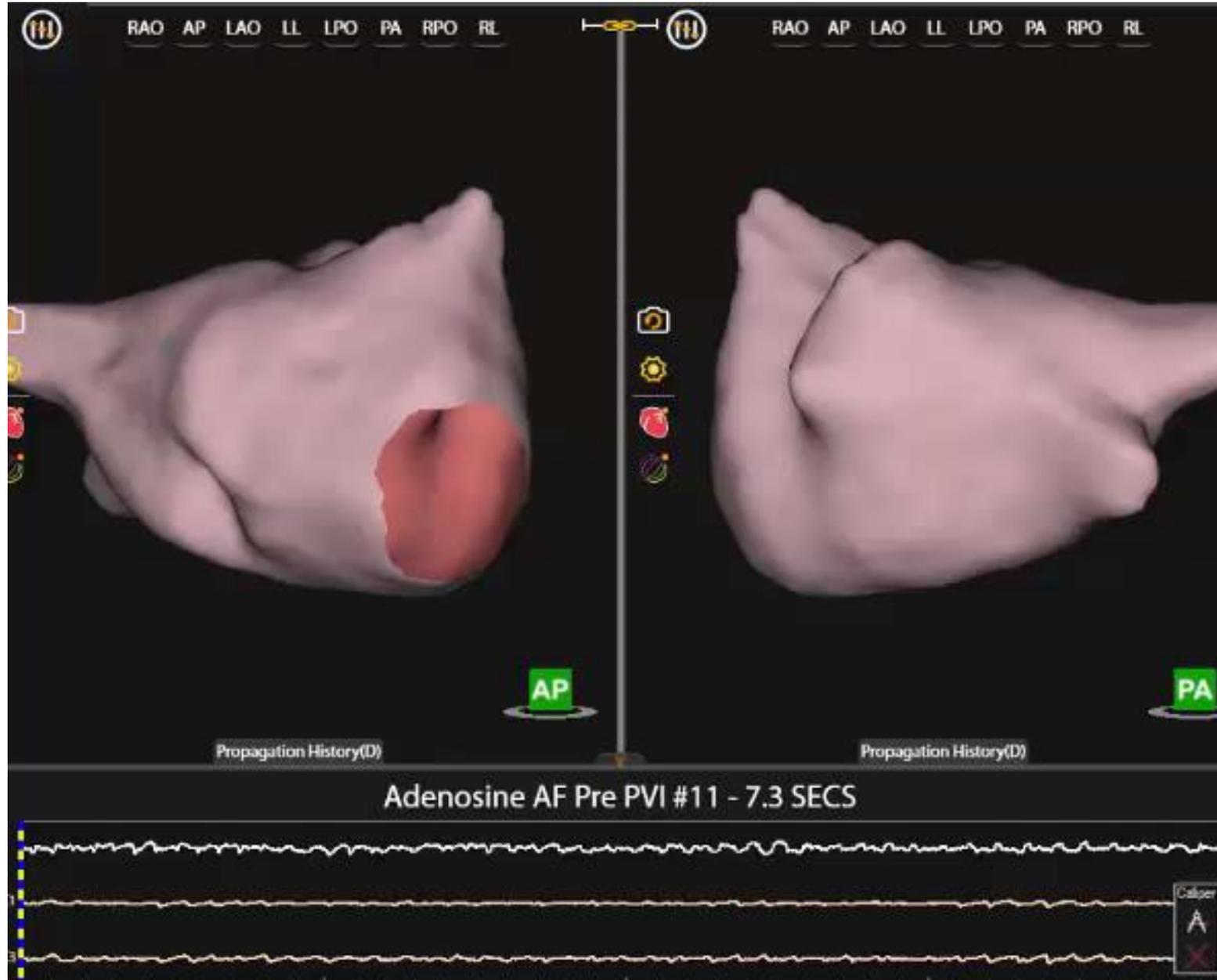
AcQMap phenomena: LRA



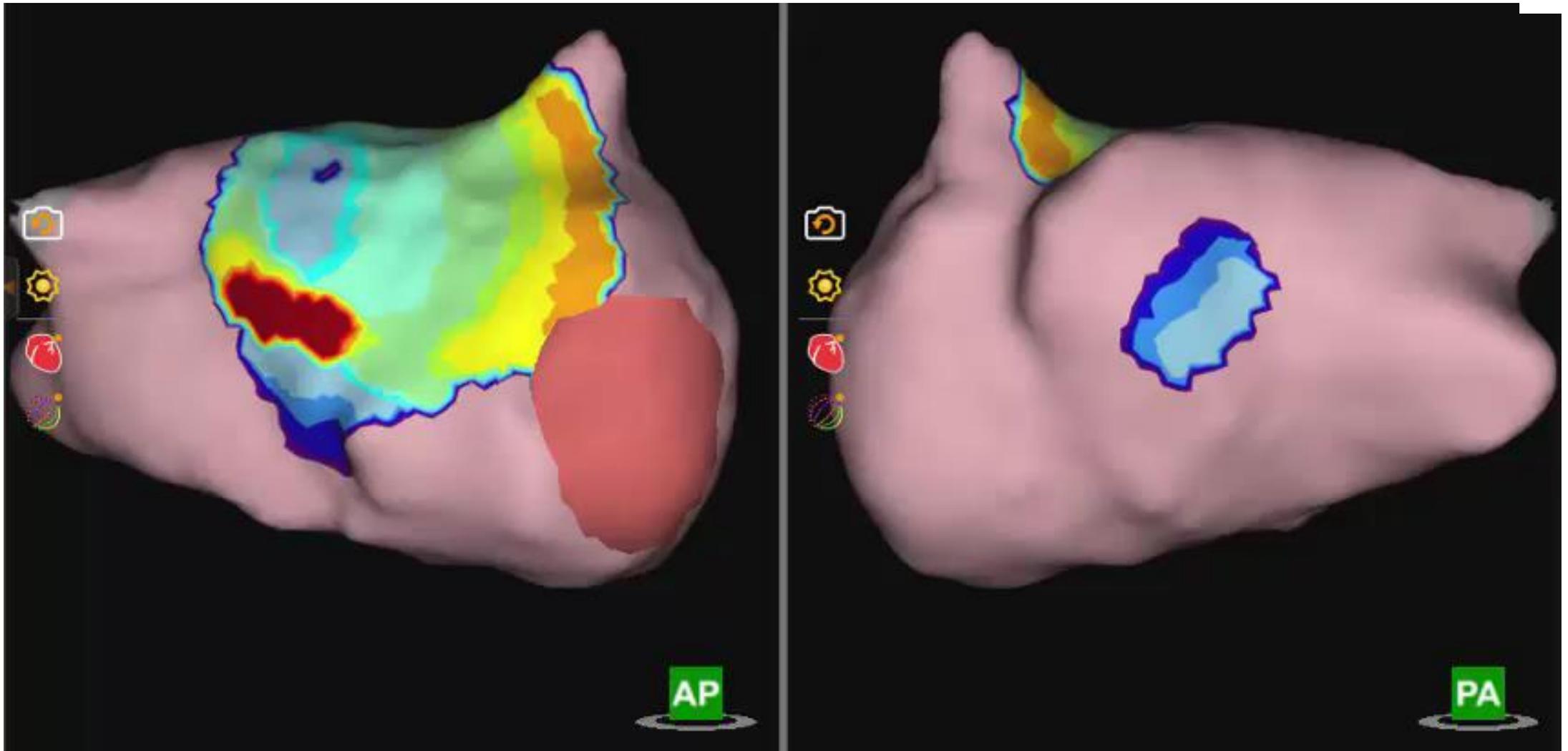
Pre PVI AF - Mapping Name 1



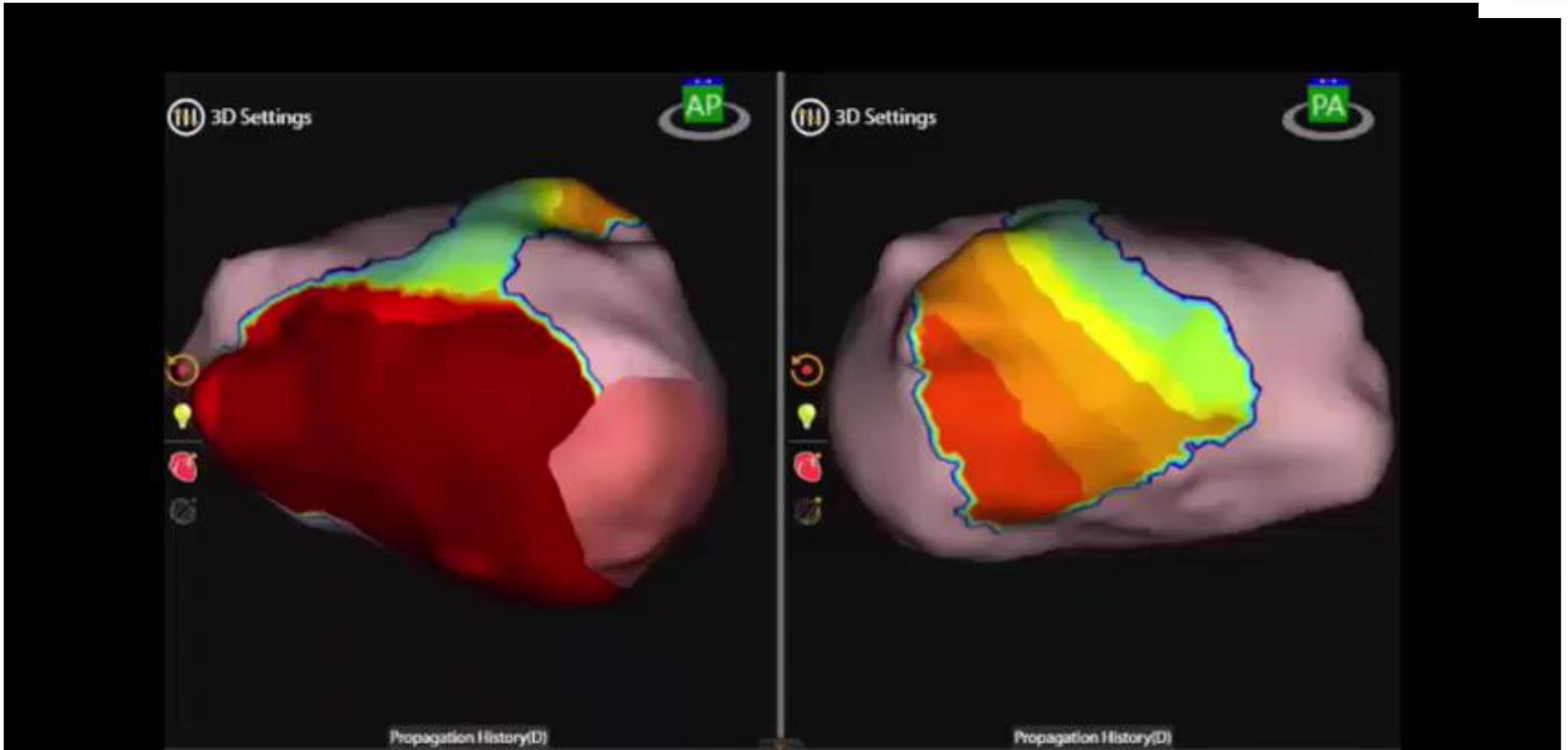
AcQMap phenomena: LRA



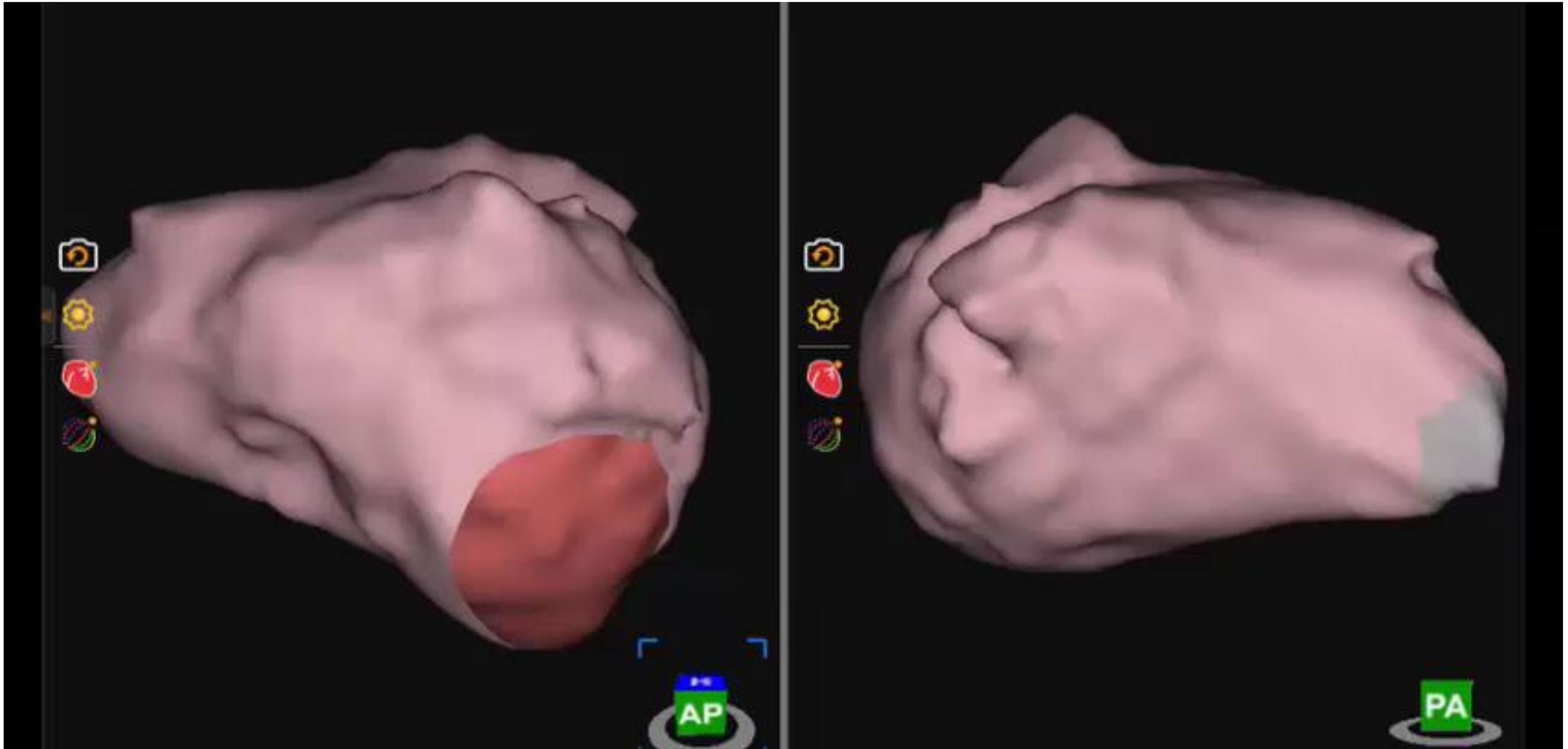
AcQMap phenomena: Focal firing



AcQMap phenomena: Localised Irregular Activation (LIA)



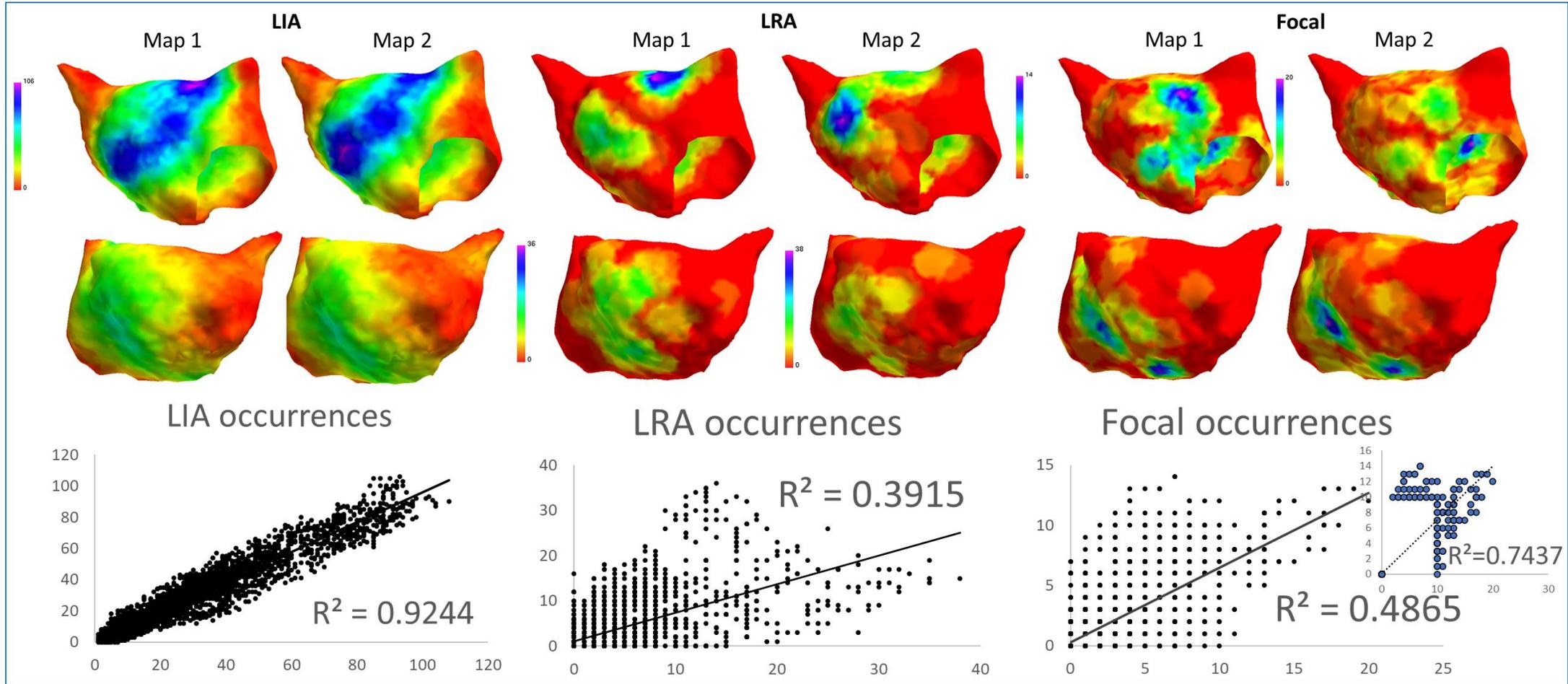
AcQMap phenomena: LIA



Supermap: mapping organised rhythms

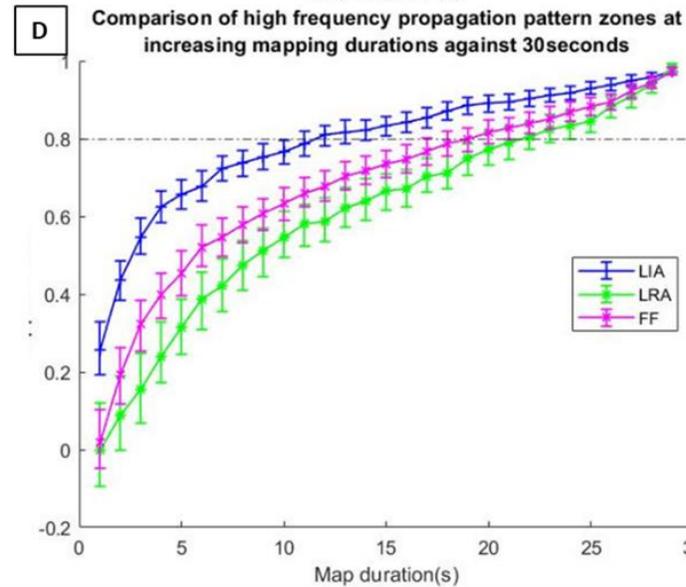
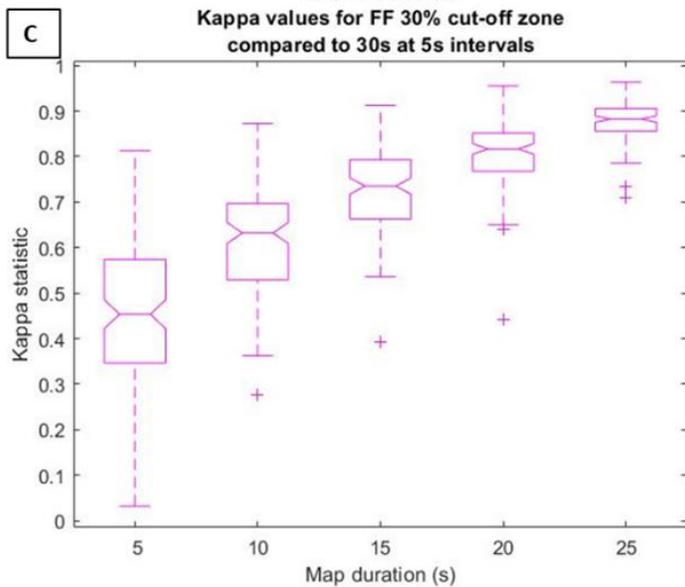
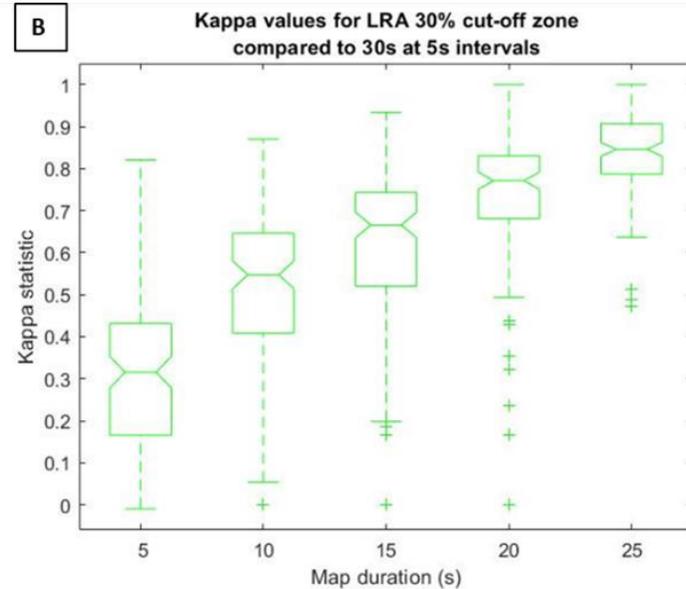
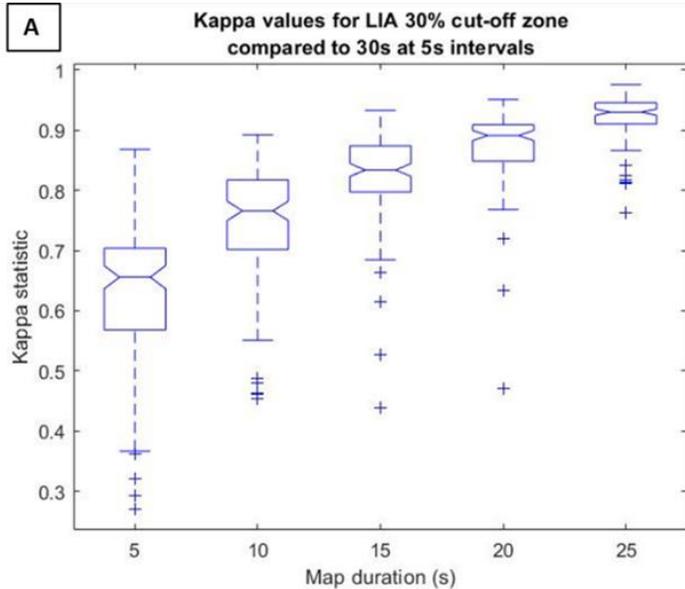


Stability of activation patterns



- LIA is anatomically stable – in both LA and RA
- LRA least so – perhaps more reflective of dynamic functional properties

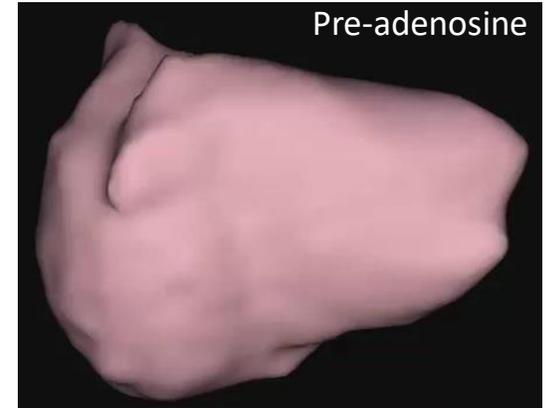
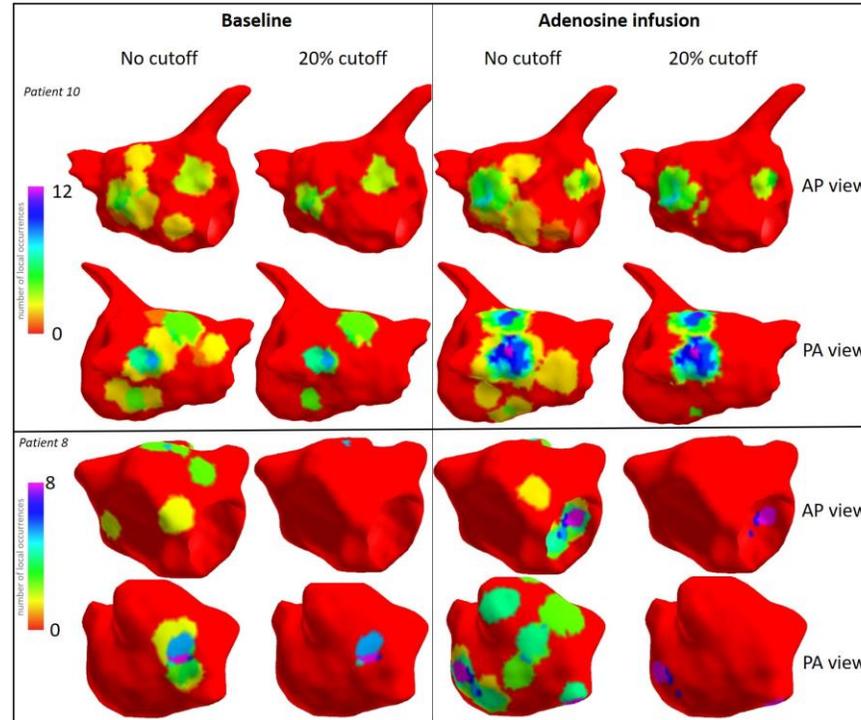
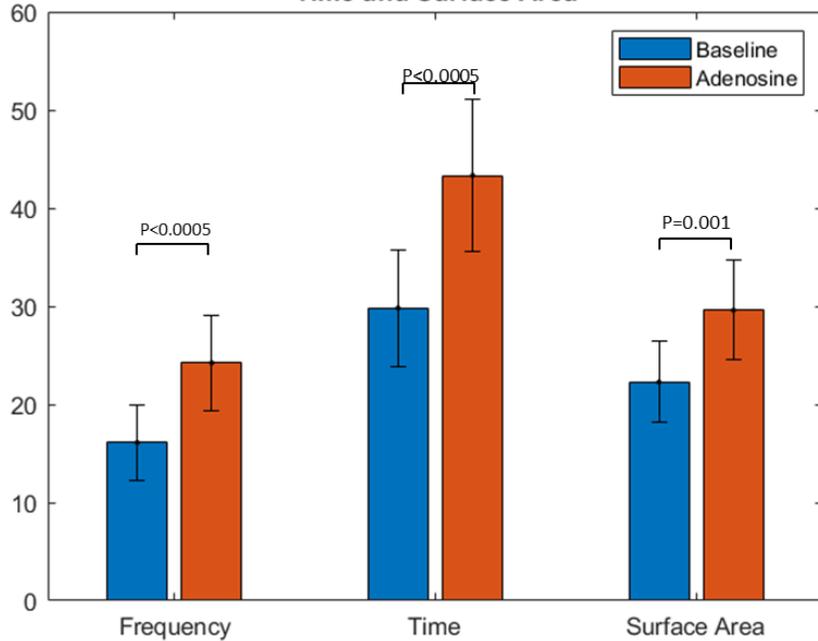
Stability of activation patterns



- LIA is most temporally stable – high frequency zones revealed after 12s closely resemble findings after 30s
- FF and LRA stabilise after 18 and 22s respectively

Impact of adenosine

Impact of Adenosine on LRA Frequency, Time and Surface Area

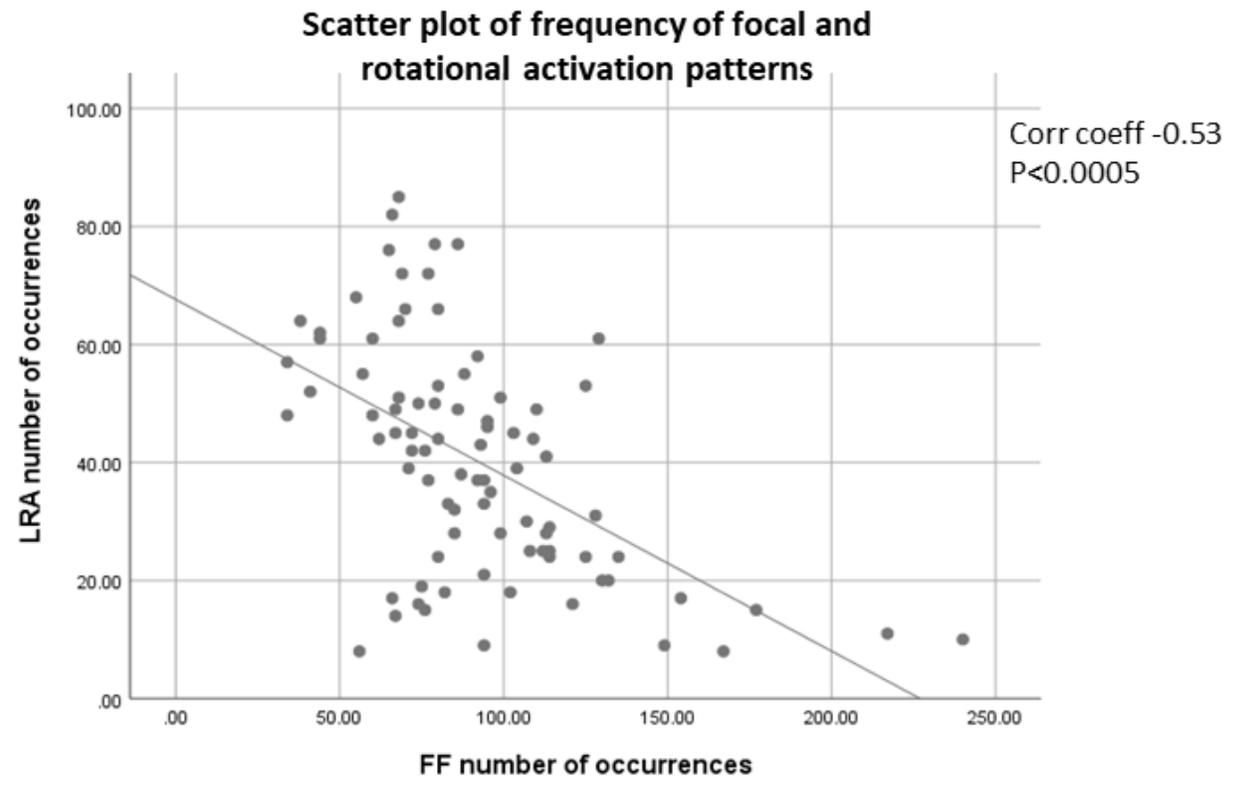
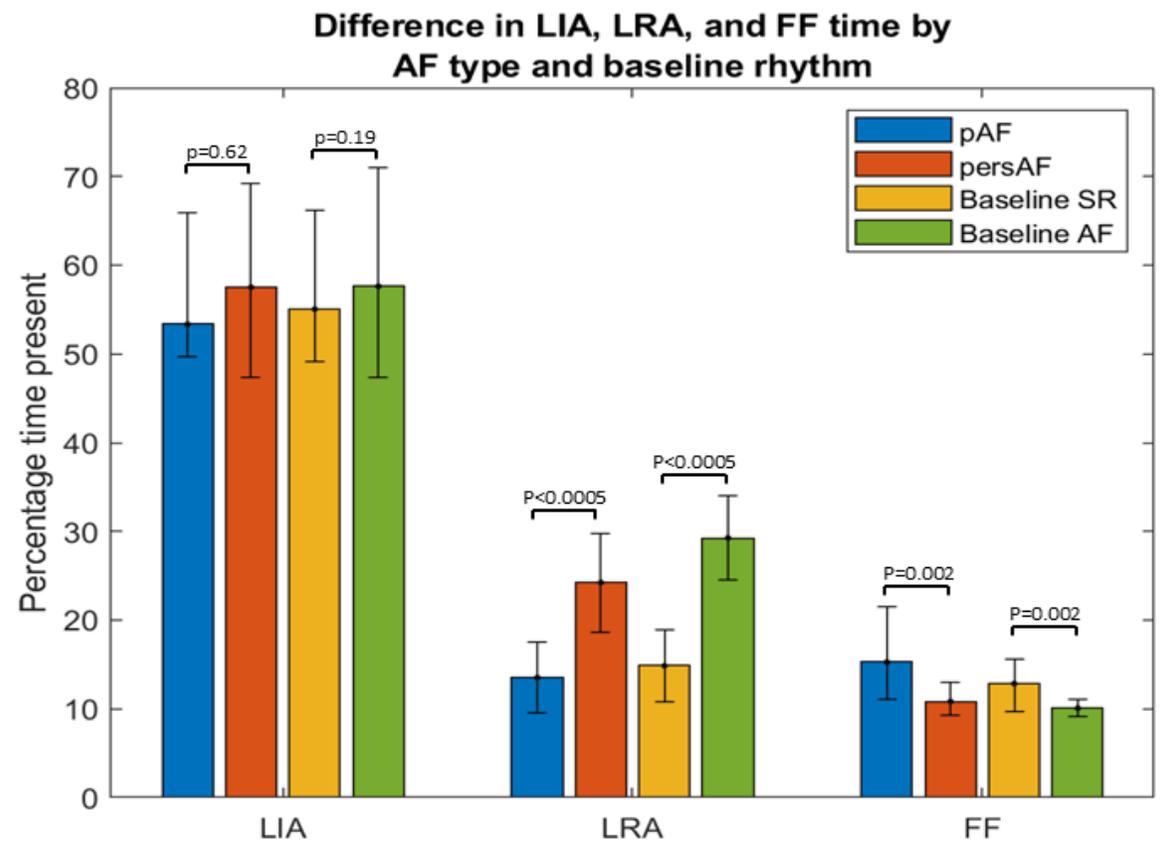


Rotational activations increased by electrophysiological effects of adenosine

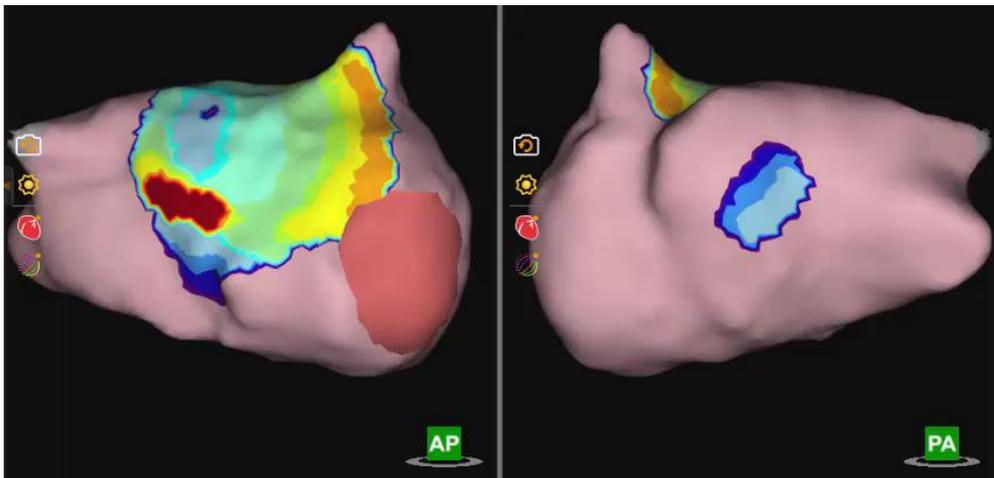


But sites frequently vary

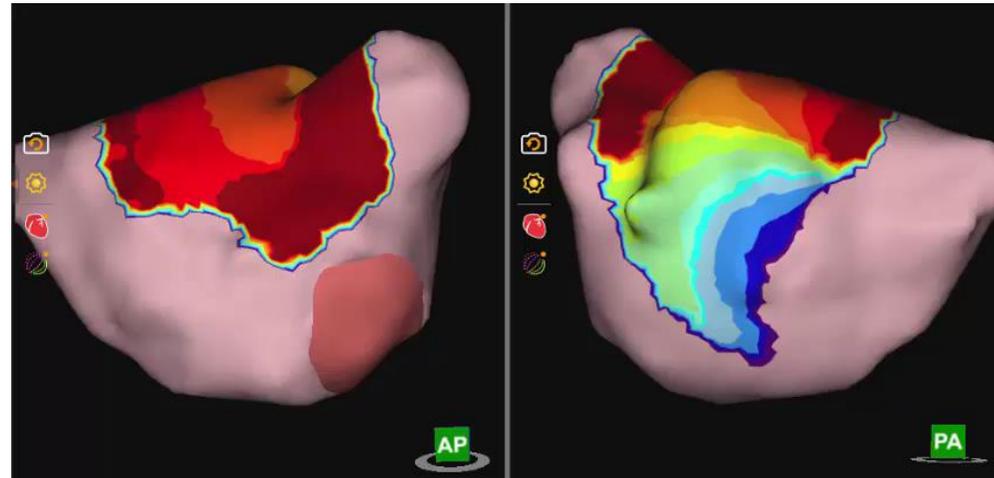
Balance of rotational and focal activation reveals AF phenotype



Phenotypes

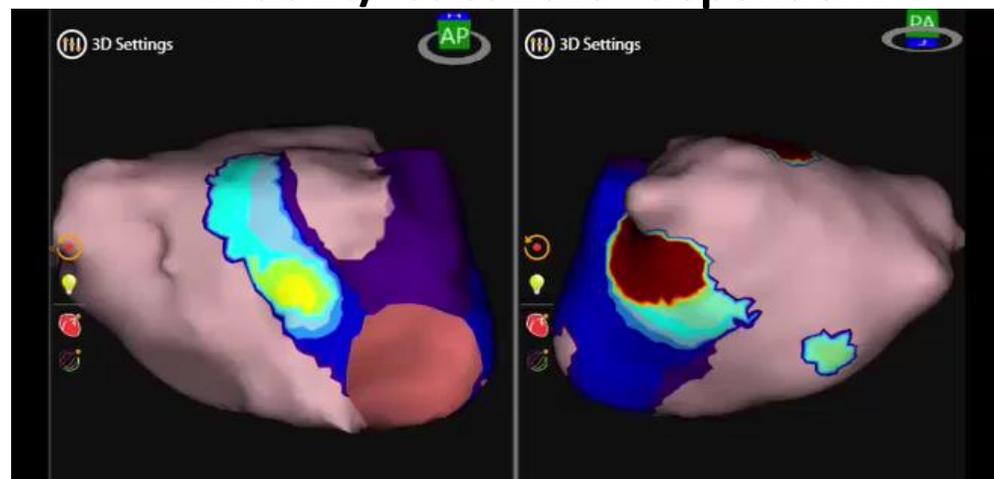
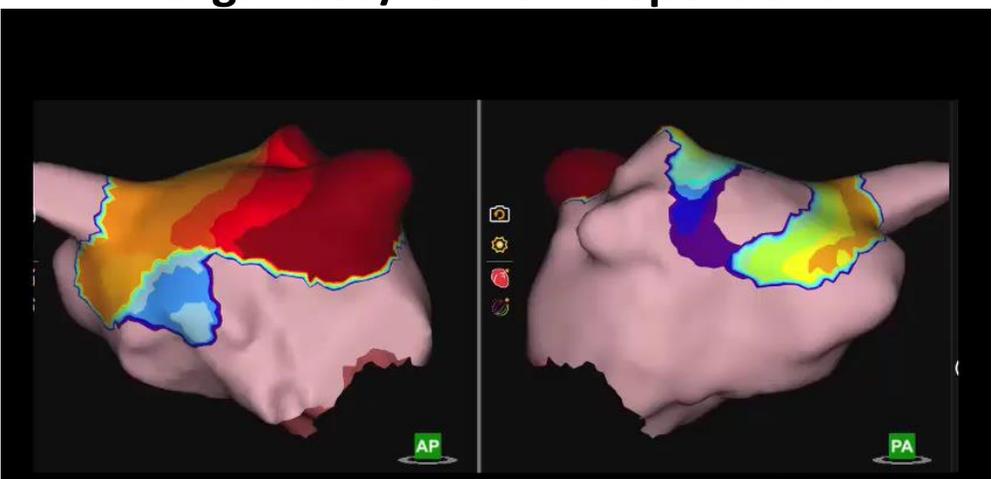


Organised/“driver” dependent



Chaotic/“substrate” dependent

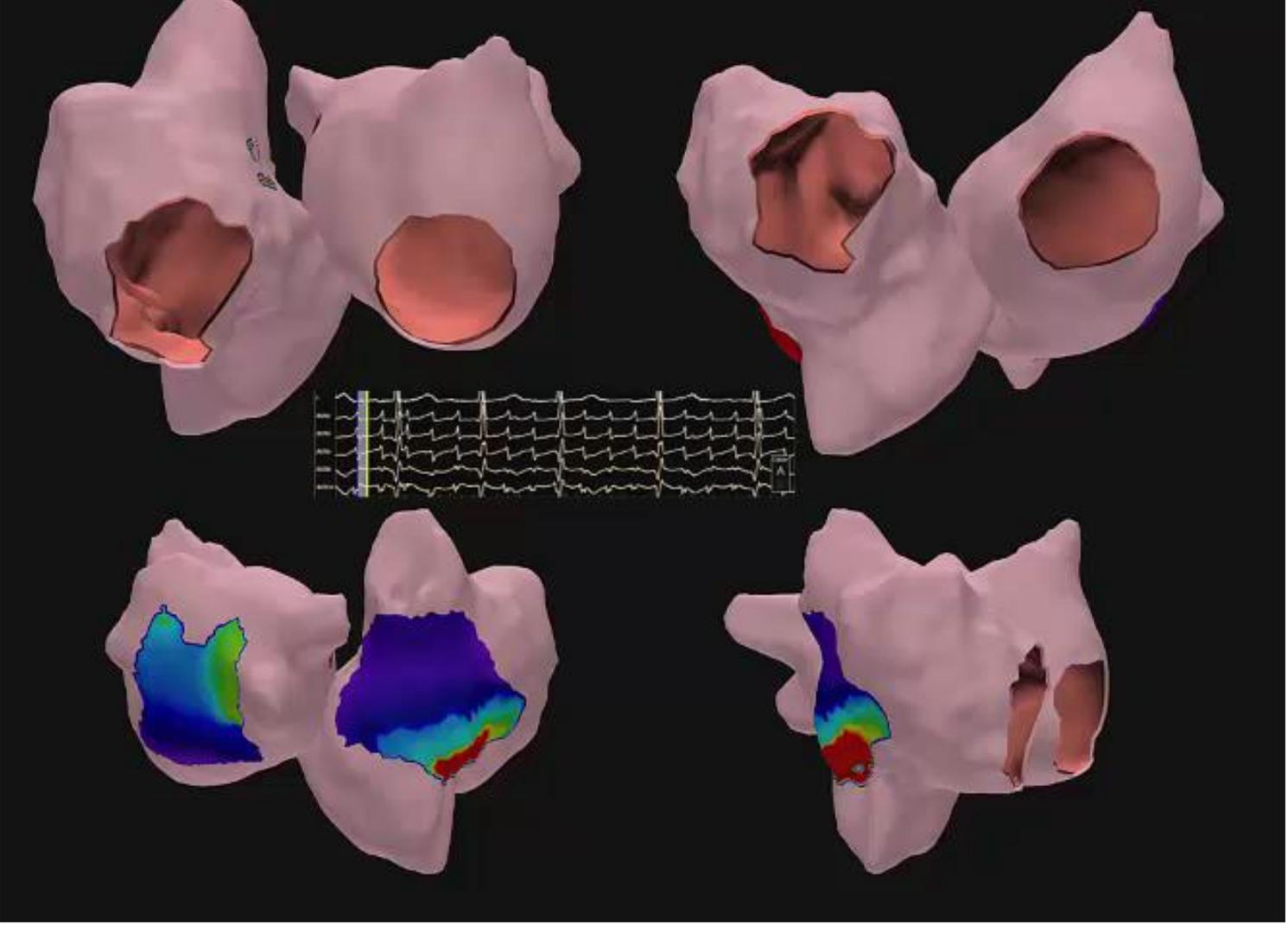
Vs.



Propagation History(D)

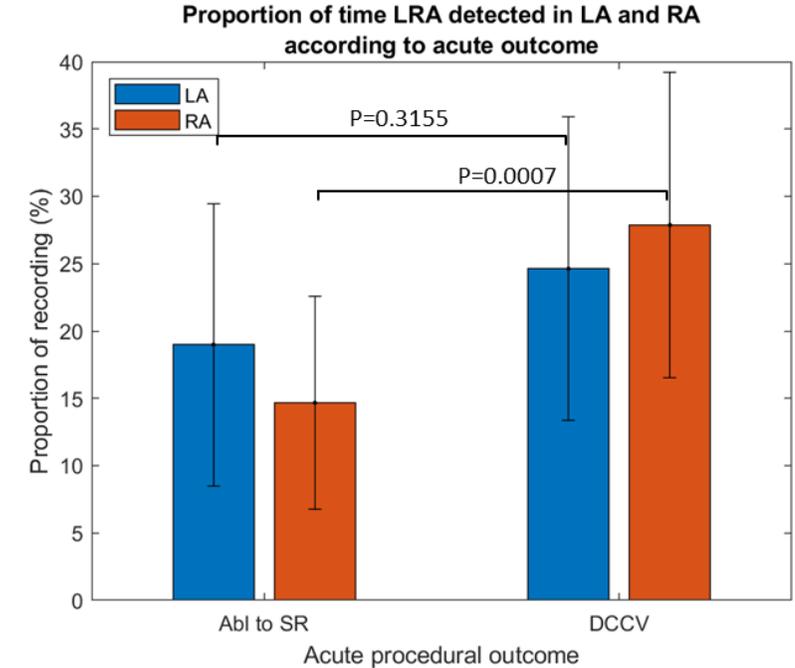
Propagation History(D)

Role of the right atrium



Balanced propagation was most common: n=33 (66%)

Clear dominant chamber was seen in 17
LA dominant in 8
RA dominant in 9



Experience to date: UNCOVER AF Trial

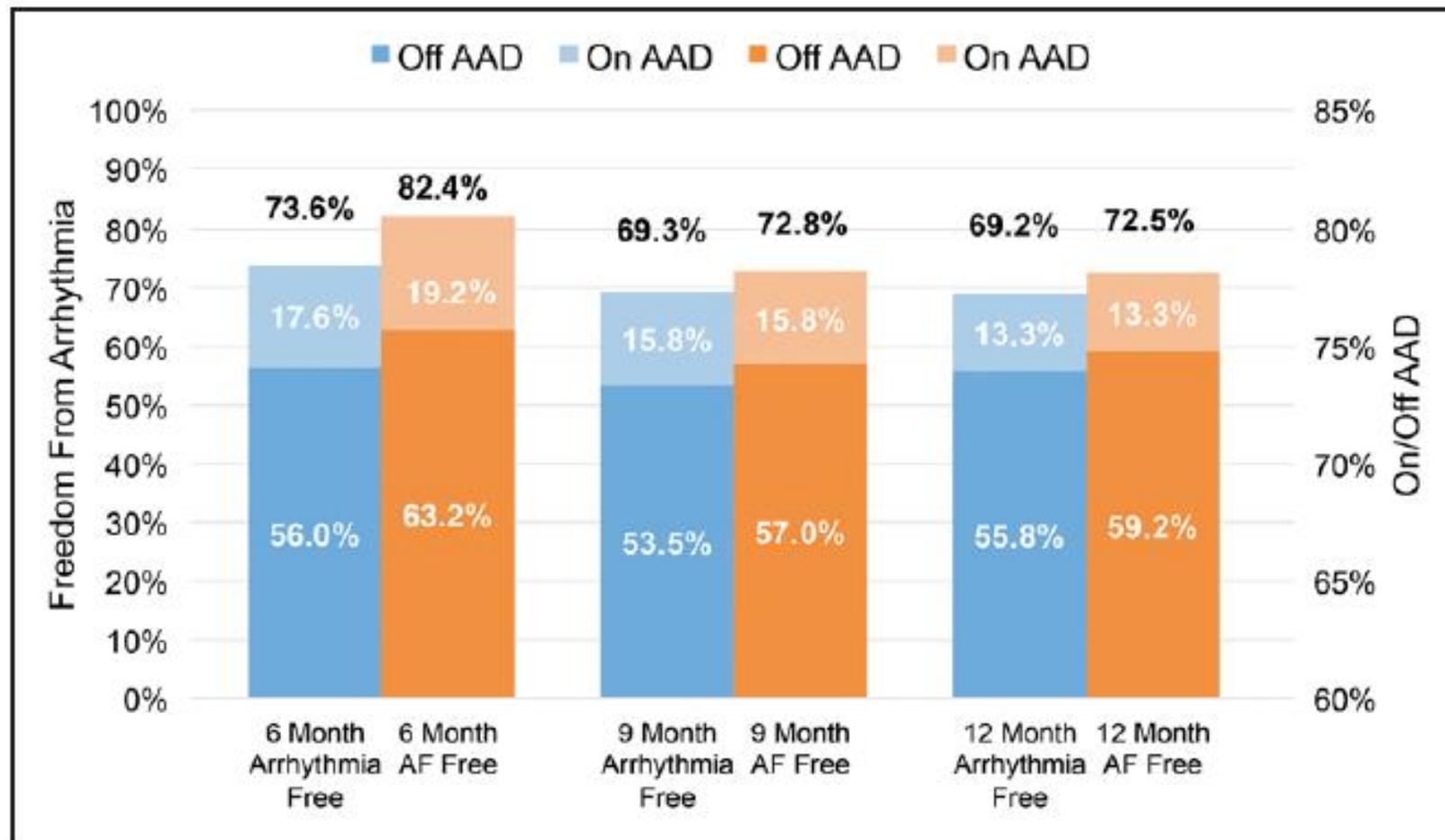
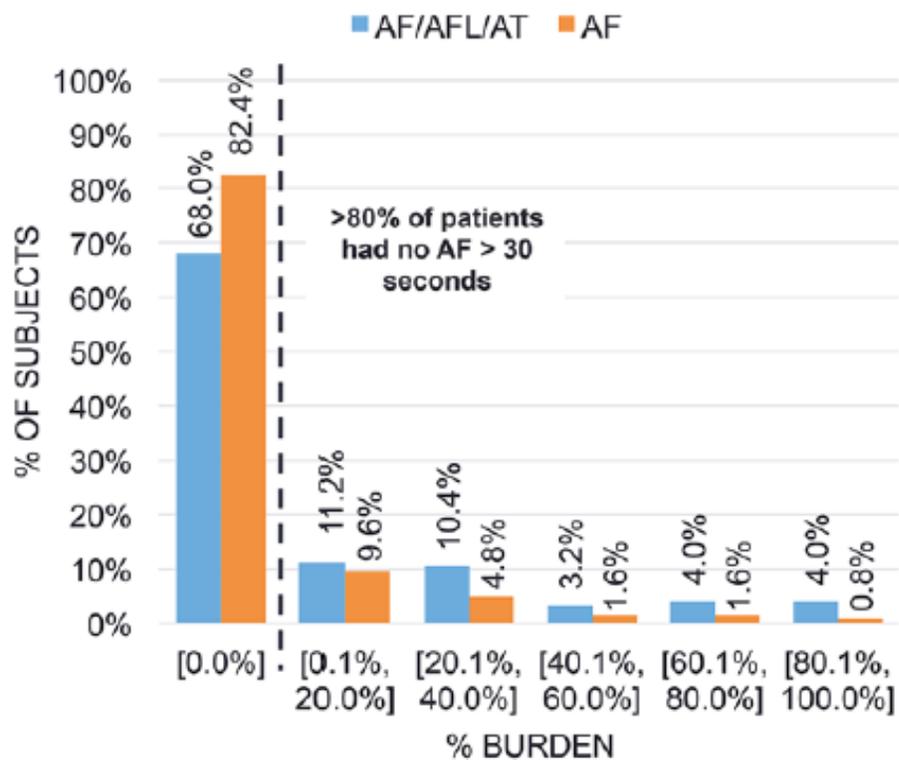
Circulation: Arrhythmia and Electrophysiology

Circ Arrhythm Electrophysiol. 2019;12:e007233. DOI: 10.1161/CIRCEP.11

ORIGINAL ARTICLE

Targeting Nonpulmonary Vein Sources in Persistent Atrial Fibrillation Identified by Noncontact Charge Density Mapping

UNCOVER AF Trial

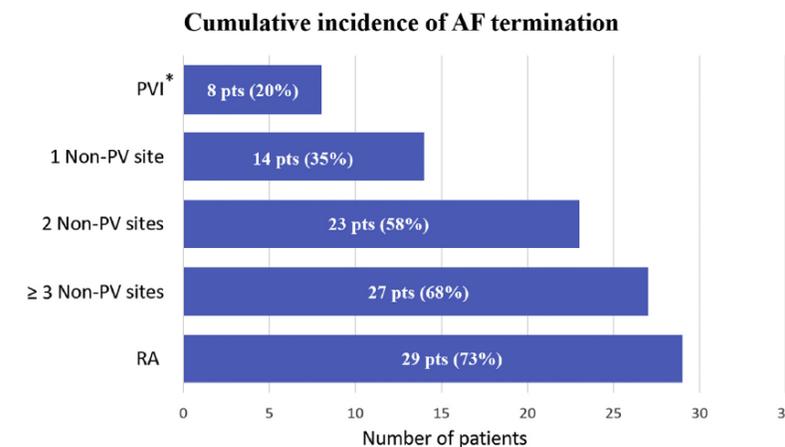
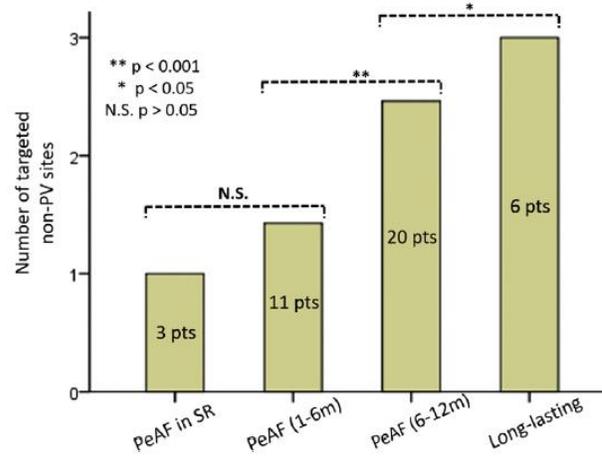
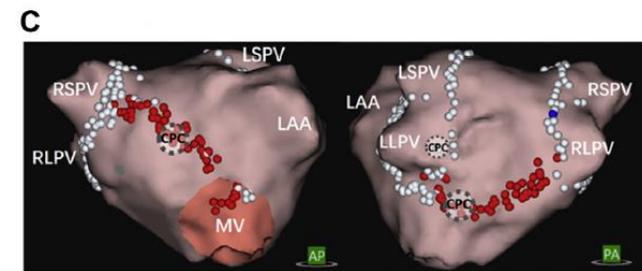
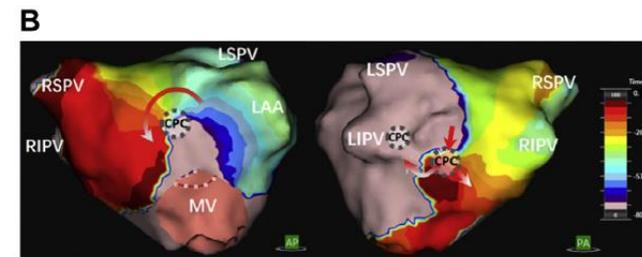
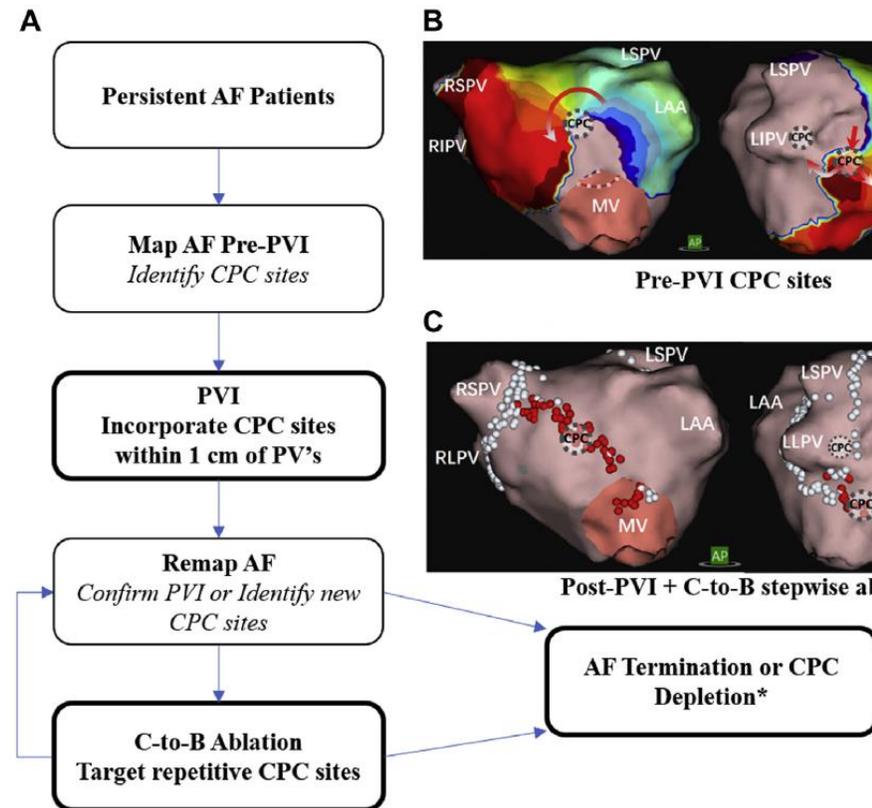
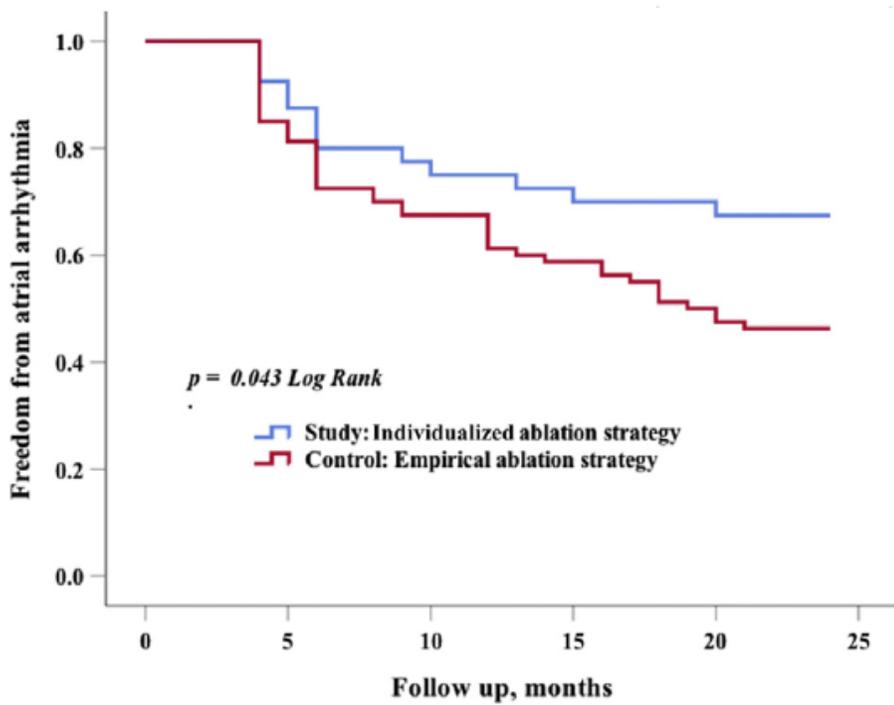


Individualized ablation strategy to treat persistent atrial fibrillation: Core-to-boundary approach guided by charge-density mapping

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<https://doi.org/10.1016/j.hrthm.2021.02.014> (Heart Rhythm 2021; ■:1-9)



Non-contact mapping with AcQMAP

- Identifies complex patterns of propagation during AF
- Map → Re-map approach
- Individualised strategy considering mechanistic hierarchy and “electro-phenotype”
- Core-to-boundary ablation
- Rapid “Supermap” of regular ATs and to assess block in linear lesions
- Don’t forget the right atrium

Now for the “live case in a box”





Prof. Tim Betts

**Oxford University Hospitals NHS Foundation
Trust and
University of Oxford Department of Cardiovascular
Medicine**