

PediRhythm VII, Thessaloniki

# Zero- or low-fluoroscopy during ablation of AVNRT

Joel A. Kirsh, MD, FRCPC, CEPS

Cardiology and Critical Care, Hospital for Sick Children

Associate Professor of Pediatrics, University of Toronto



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**YES**☐**NO**☒**IV.**

I am a holder of  
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**A**

... related to  
presentation

**YES**☐**NO**☒**B**

... from any institution

**YES**☐**NO**☒**B**

... from any institution

**YES**☐**NO**☒**B**

... for any institution

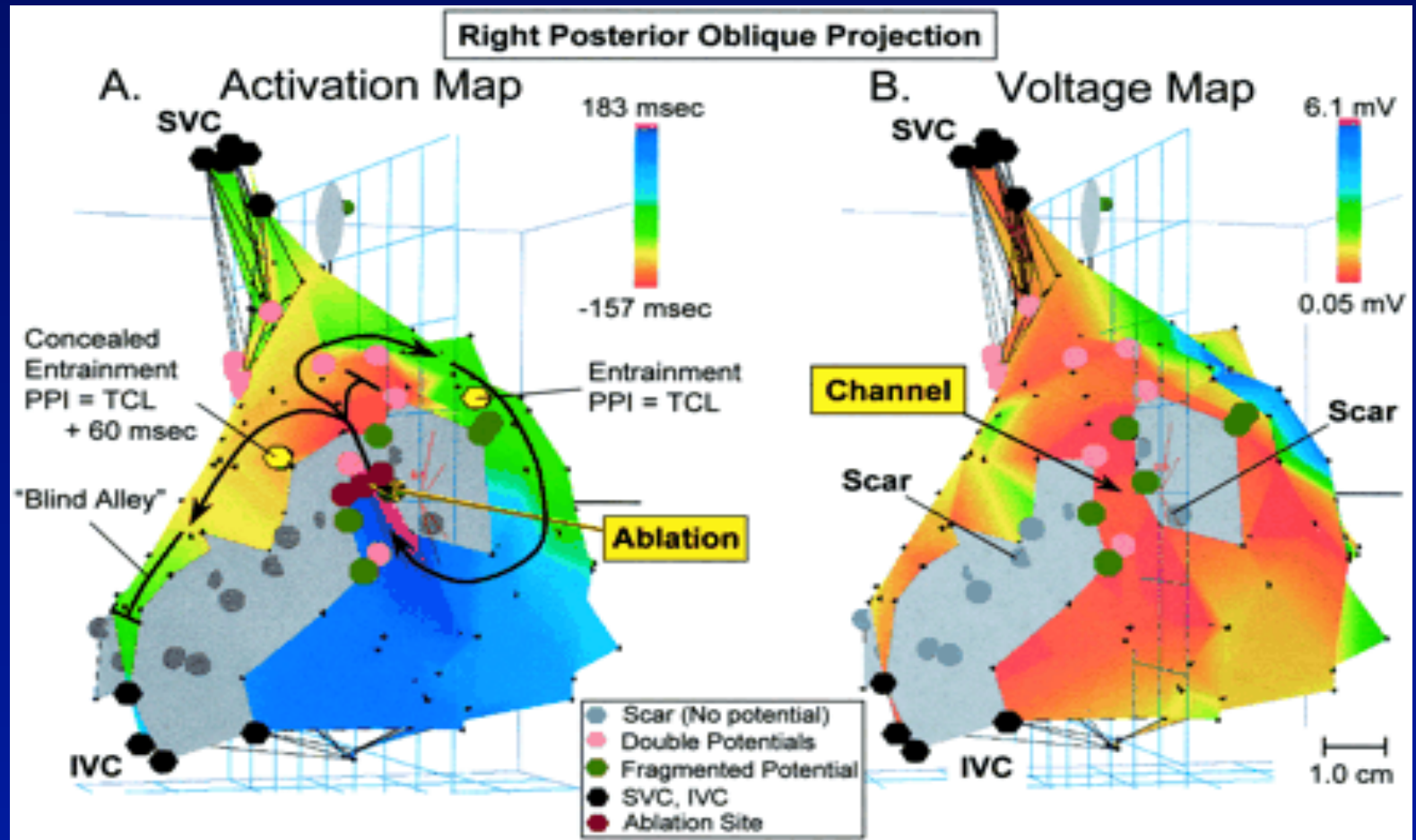
**YES**☐**NO**☒**B**

... not related to  
presentation

**YES**☐**NO**☒

# SCORE: 0

# Early uses of 3D mapping



Nakagawa Circulation 2001;103:699-709

# A Fluoroscopic History. . .

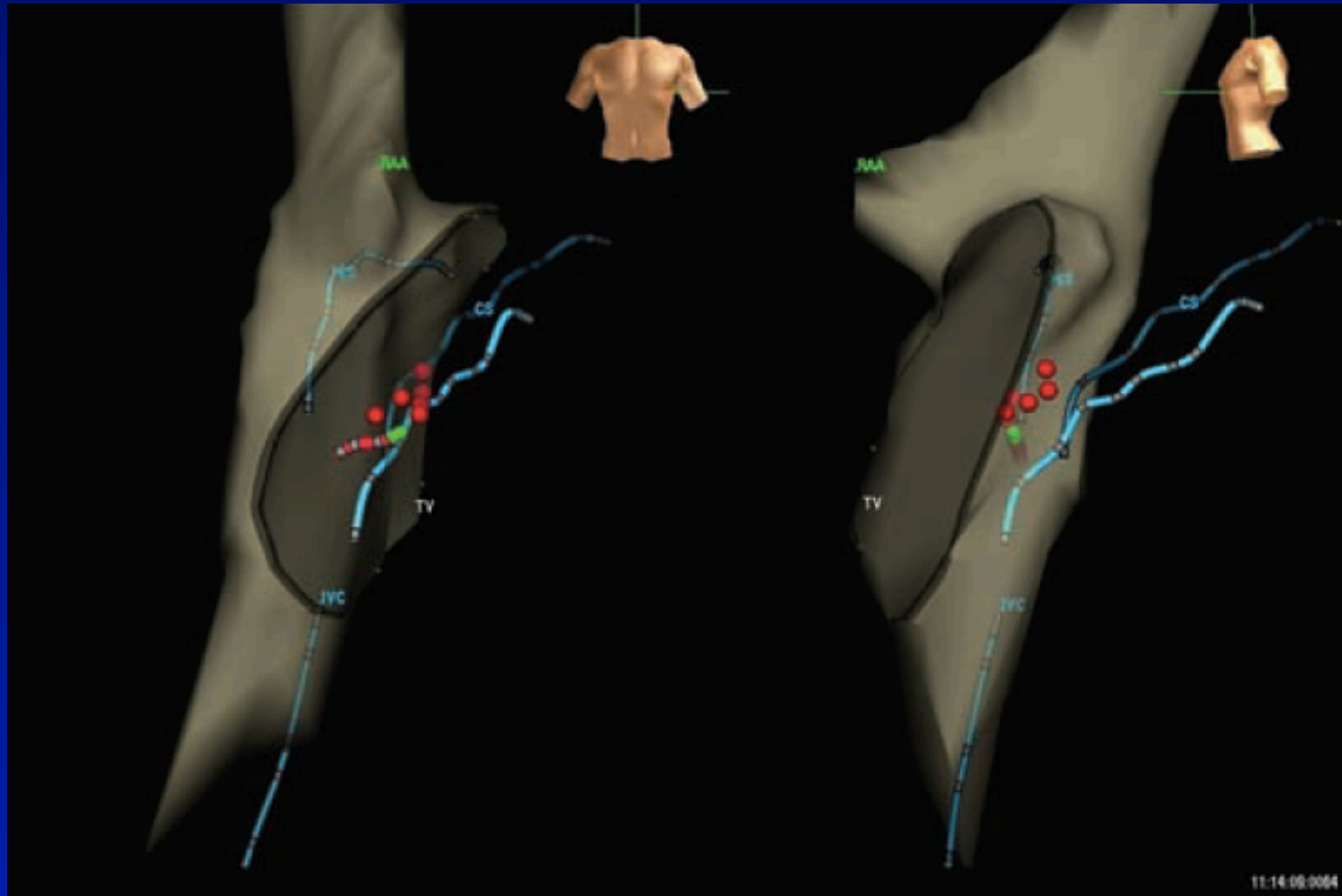
- 8 November 1895 **Wilhelm Röntgen** discovered X-rays.
- 1898 Fluoroscope invented by Thomas Edison.
- 1913 Coolidge Tube (Vacuum Tube)
- 1950s Development of X-ray Image Intensifier and Television Camera.
- 1980s onward: widespread use of digital fluoroscopy

# Risks of ionizing radiation

- Patients:
  - Overall 0.01-0.1% risk per fluoro hour
- Operators:
  - May be as high as 0.3% for busy volume
- Difficult to discern given background rate of 10-20% lifetime risk of cancer

# Elimination of fluoroscopy use in a Pediatric EP Laboratory

Smith G, Clark JM PACE 2007;30:510-518



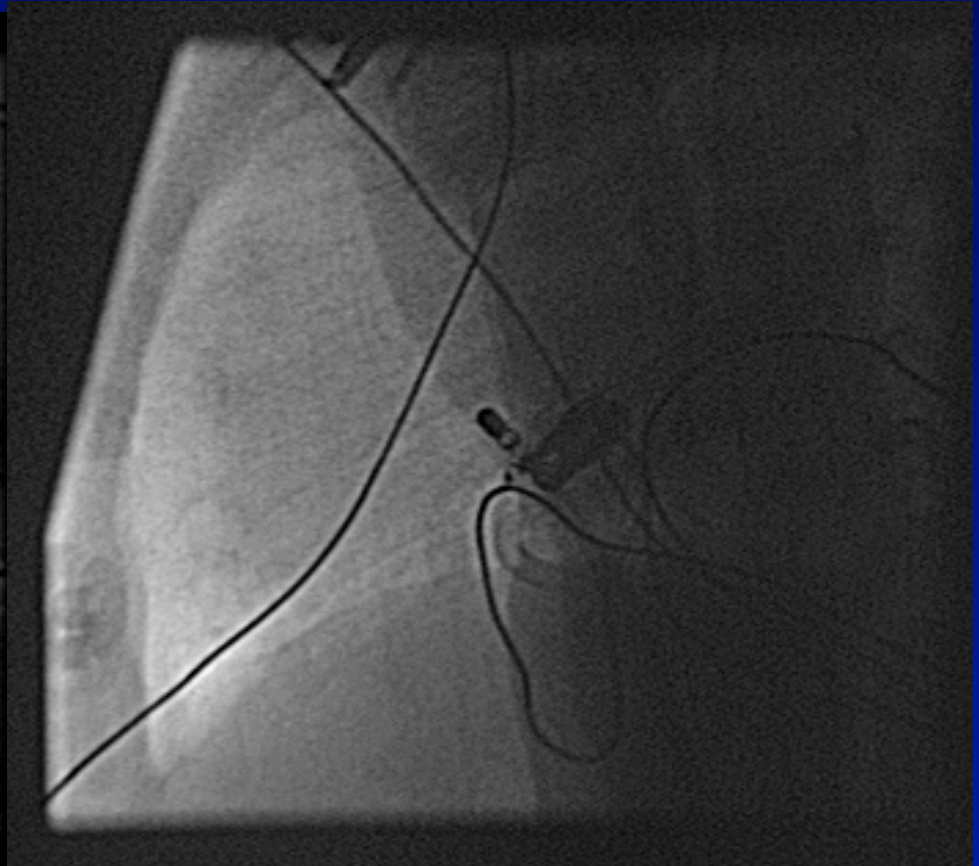
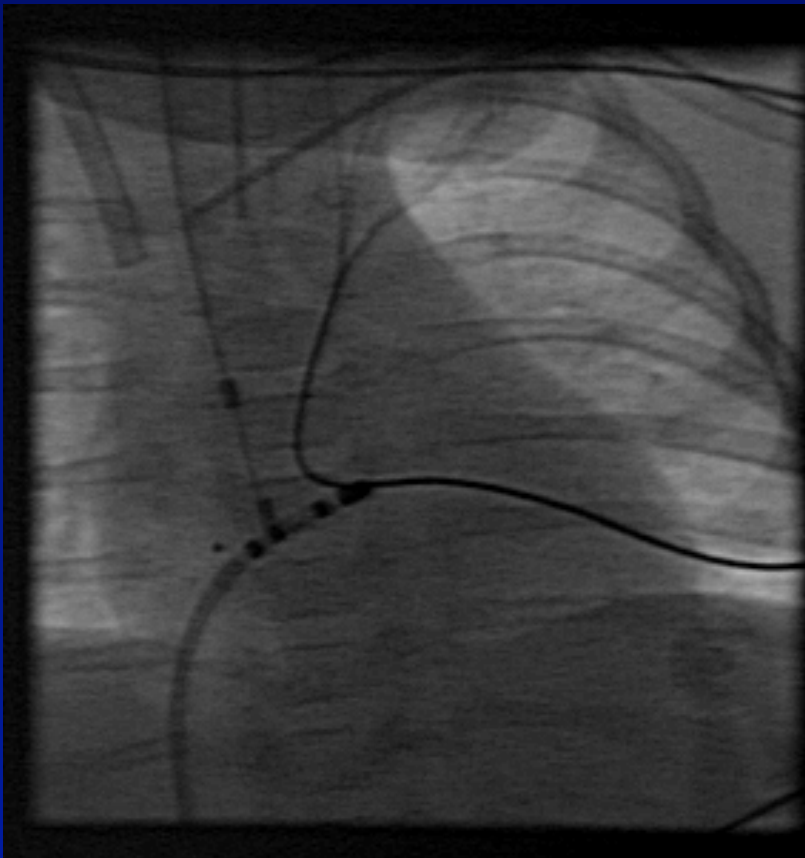
# Fluoroscopy for ablation:

Early . . .

and late.

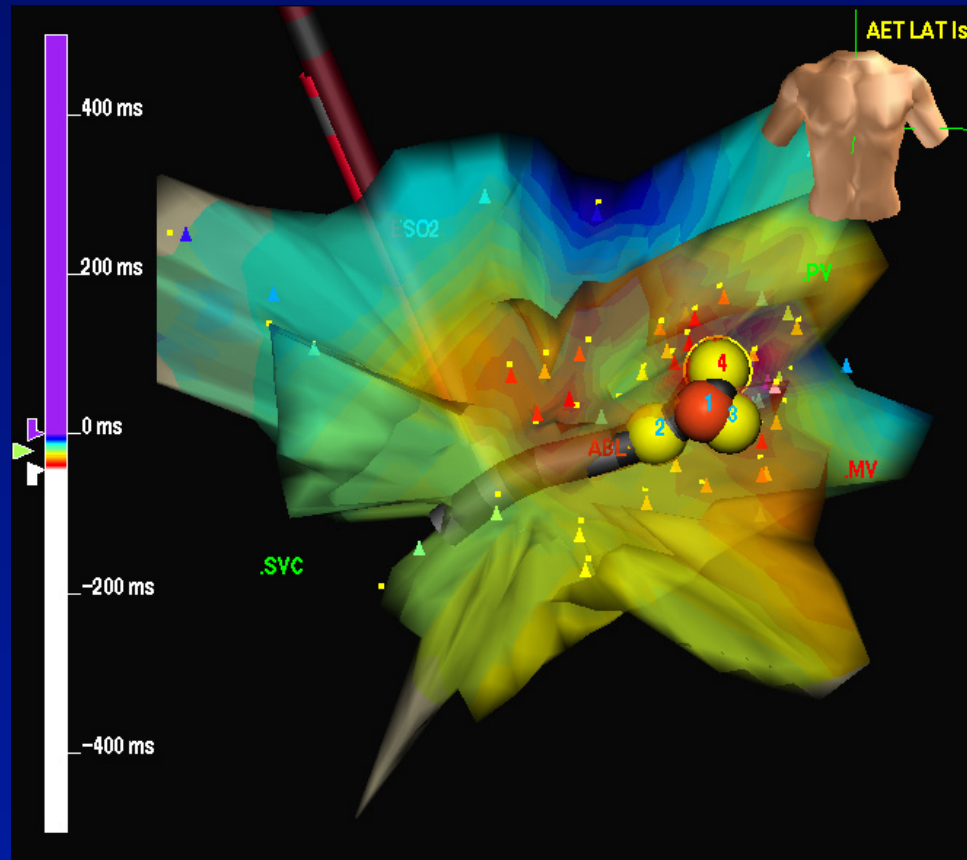
- |                        |                    |
|------------------------|--------------------|
| • Kugler, NEJM 1994    | • Tuzcu, PACE 2007 |
| • Pediatric EP Society | • Clark, PACE 2008 |
| • LFW $59 \pm 43$ min  | • LFW      0 min   |
| • RFW $80 \pm 51$      | • RFW      0       |
| • RAS $61 \pm 34$      | • RAS      0       |
| • RPS $60 \pm 41$      | • RPS      0       |
| • AVNRT $46 \pm 34$    | • AVNRT   0        |

# AET on ECMO

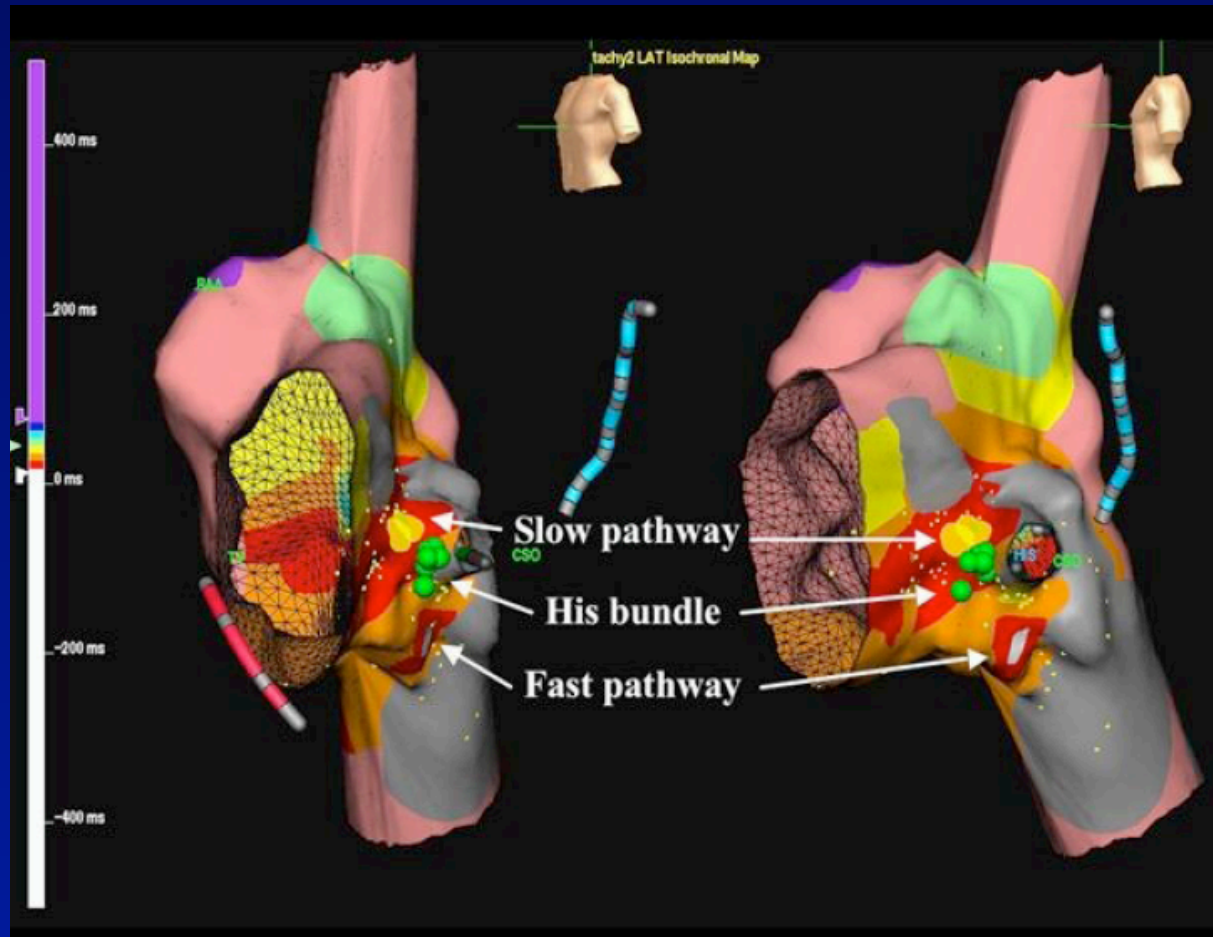




# AET on ECMO



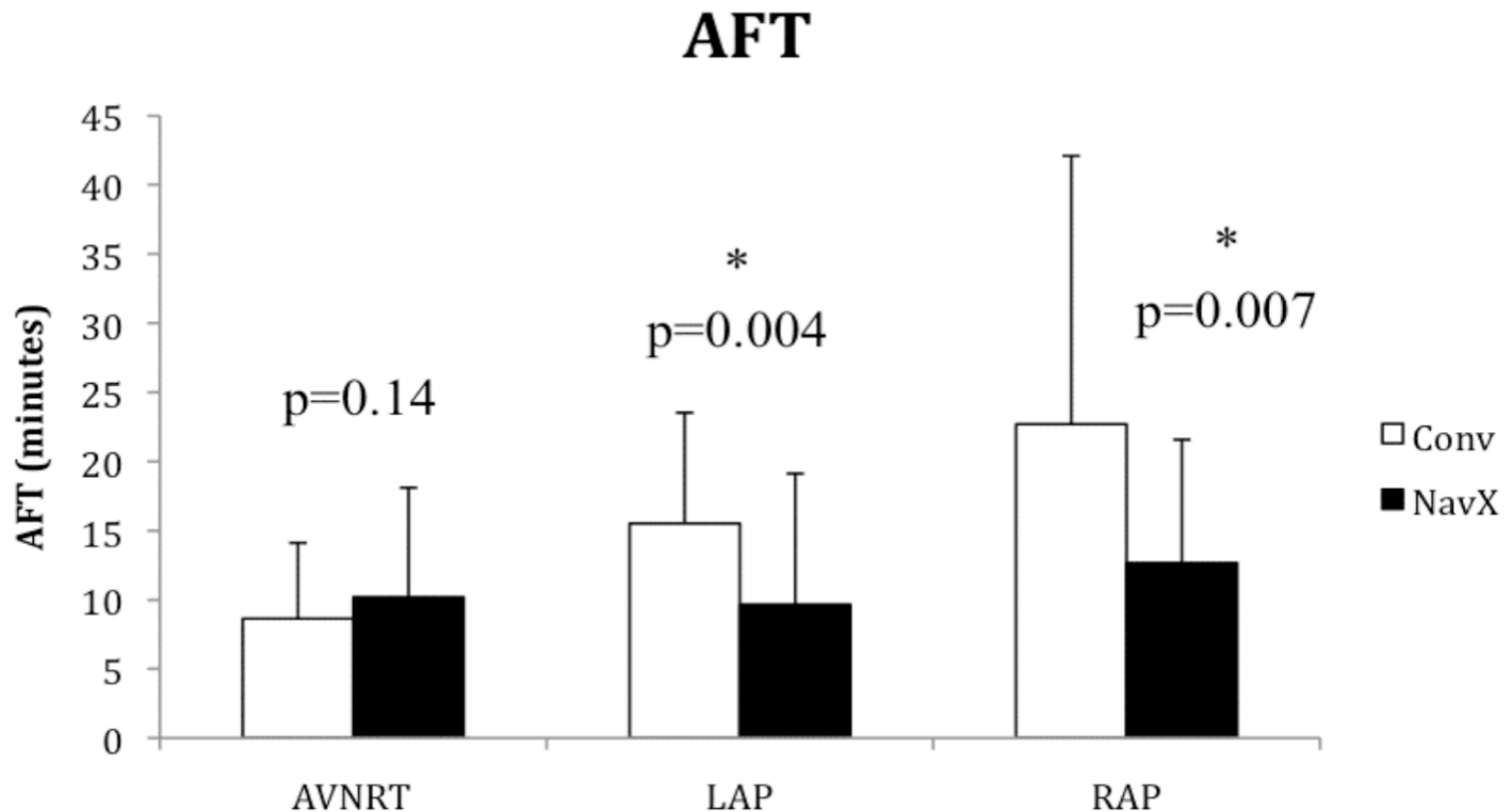
# Ablation of AVNRT in AVSD



Khairy et al, HRJ 2007

# Ablation fluoro times

Neilson, 2006 & Kwong, 2011

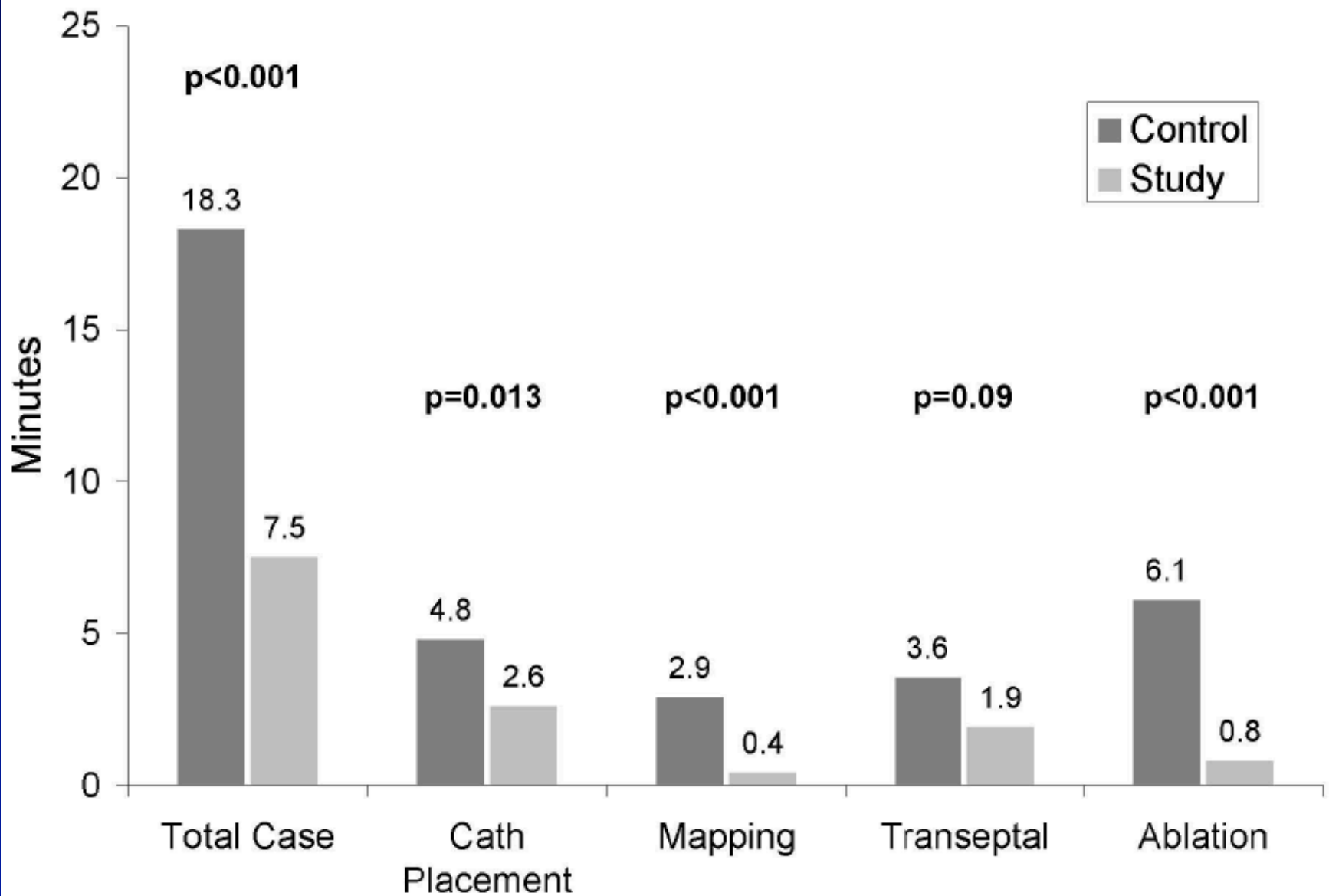


Ablation success 95.7 vs 95.9%,  $p = \text{NS}$

# NavX in Athens

Papagiannis et al, PACE 2006;29:971-8

Table II.			
Procedural Variables in the Two Patient Groups			
	Group A	Group B	P-Value
CL (ms)	307 ± 53.5 220–460	313.6 ± 56.5 220–460	0.629
Fluoroscopy time (minute)	10.4 ± 6.1	24.9 ± 16.0	<0.0001
mean ± SD			
Range	3.1–28.8	4.4–82.0	
Procedure duration (minute)	170 ± 68.5	218 ± 69.3	<0.0001
mean ± SD			
Range	90–420	90–360	
Lesion number, mean ± SD	9.2 ± 10.0	10.3 ± 9.5	0.613
Range	1–49	1–37	
Success rate	40 (95%)	40 (100%)	0.494



Miyake et al, HRJ 2010

**Table 3** Univariate and multivariate associations with fluoroscopy time and radiation exposure

	Fluoroscopy time	Radiation exposure
<b>Univariate Analysis</b>		
Nonfluoroscopic imaging	<.001	<.001
Diagnosis of AVNRT	.005	.014
Weight	NS	.004
Body mass index	NS	.004
Chest depth	NS	.007
Case difficulty	NS	NS
Calendar quarter	NS	NS
Attending physician	NS	NS
Fellow	NS	NS
<b>Multivariate Analysis</b>		
Nonfluoroscopic imaging	<.001	<.001
Diagnosis of AVNRT	.002	—
Attending physician	.16	.017
Body mass index	—	<.001

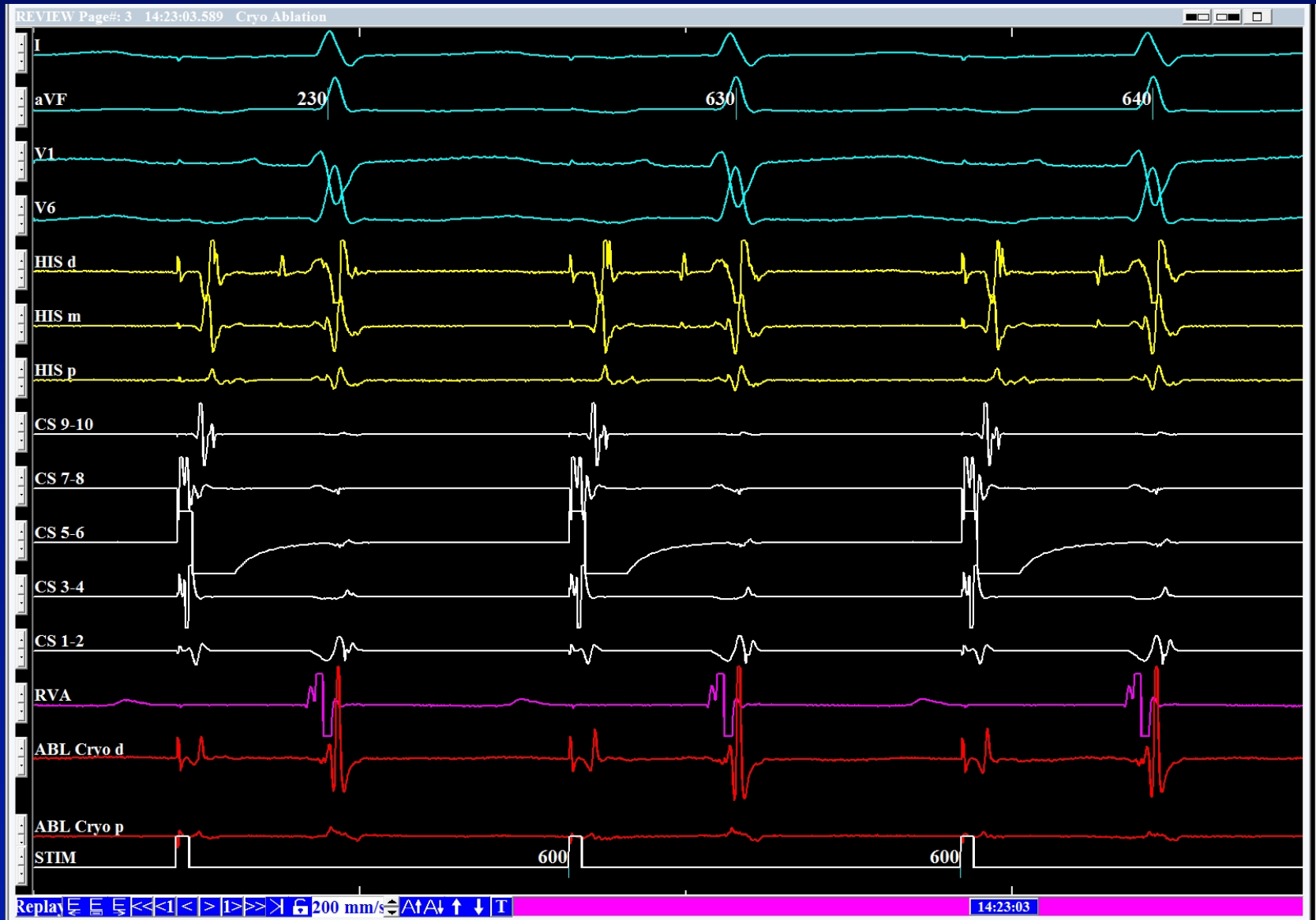
AVNRT = atrioventricular nodal reentrant tachycardia.

# Near zero fluoroscopic exposure during catheter ablation of supraventricular arrhythmias: the NO-PARTY trial

Casella et al, Europace 2016;18:1565-1572

- 262 pts (6 centres) conventional vs low-fluoro
- No difference: success, complications recurrence
- Significant reduction in:
  - Total fluoroscopy time (0 vs 14 min)
  - Patient radiation dose (0 vs 8.9 mSv)
  - Operator radiation dose (1.6 vs 25.3 uSv)
- 96% reduction in lifetime attributable risk

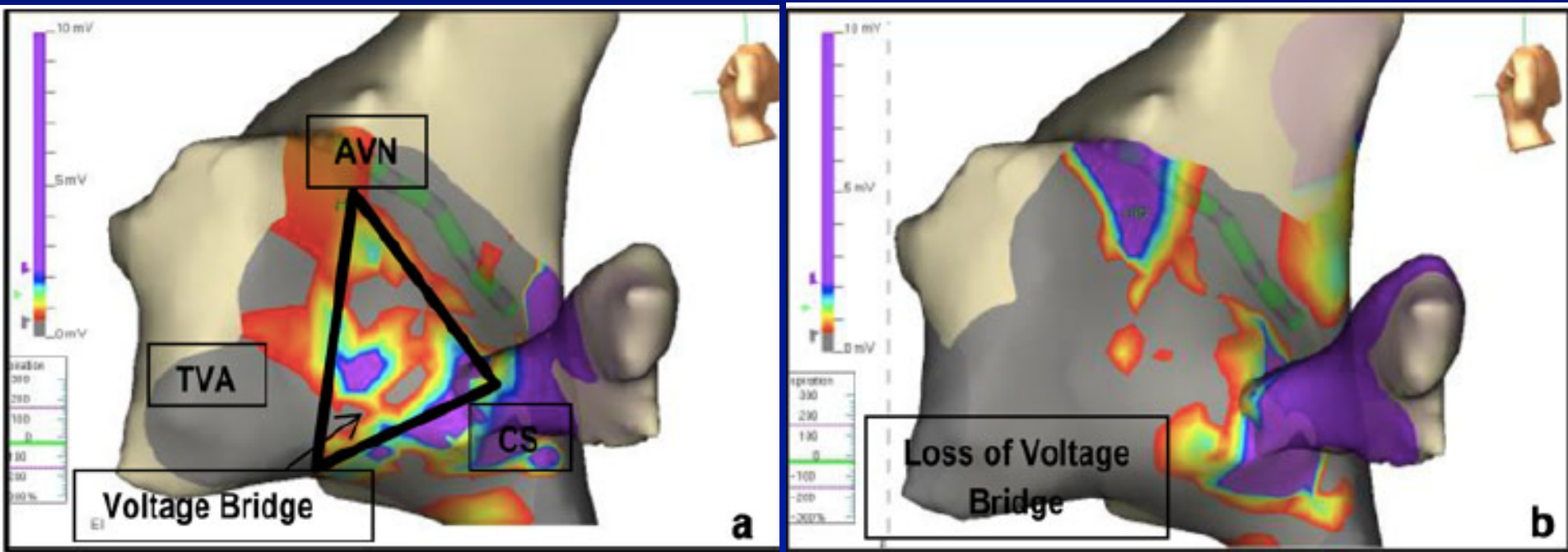
# Challenging cryoablation of SP





# Voltage mapping for slow pathway visualization and ablation

Malloy et al, Pediatr Cardiol 2014;35:103-7



# Being an EP is a pain in the neck . . .

## **Prevalence and Risk Factors for Cervical and Lumbar Spondylosis in Interventional Electrophysiologists**

DAVID BIRNIE, M.B., Ch.B., M.D.,\* JEFF S. HEALEY, M.D., M.Sc.,†  
ANDREW D. KRAHN, M.D.,‡ KAMRAN AHMAD, M.D.,§ EUGENE CRYSTAL, M.D.,¶  
YAARIV KHAYKIN, M.D.,\*\* VIJAY CHAUHAN, M.D.,†† FRANCOIS PHILIPPON, M.D.,‡‡  
DEREK EXNER, M.D.,§§ BERNARD THIBAUT, M.D.,¶¶  
TOMASZ HRUCZKOWSKI, M.D., M.Sc.,\*\*\* PABLO NERY, M.D.,\* ARIEH KEREN, M.D.,\*  
and DAMIAN REDFEARN, M.B., Ch.B., M.D.†††

- Cervical spondylosis 21% (controls 6%)
- Lumbar spondylosis 26% (controls 17%)
- Longer career associated with higher risk

# Other Health Benefits



# Summary:

## Zero or low-fluoro for AVNRT

- Achievable with equivalent outcomes
- Suitable for “special cases” (eg CHD)
- Helpful in challenging cases
- Reduced risks to participants:
  - Patients – ionizing radiation
  - EPs – radiation & musculoskeletal



Thanks!  
You've touched  
my heart.



I hope  
your hands  
were clean.

♡  
Olivia Mills

PediRhythm VII, Thessaloniki

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