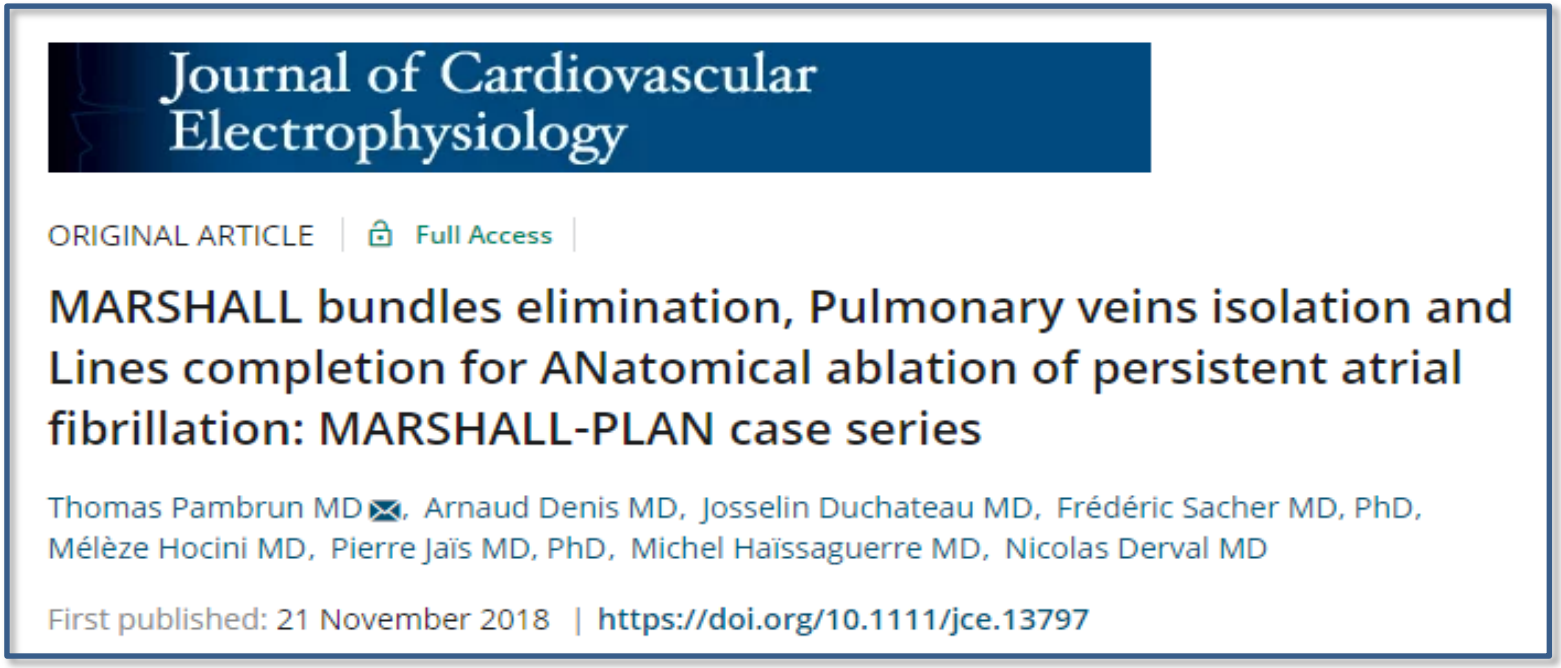
DISCLOSURES

- **Biosense Webster:** consulting fees, speaking fees

- **Boston Scientific:** speaking fees

ANATOMICAL ABLATION OF PERSISTENT ATRIAL FIBRILLATION: THE MARSHALL-PLAN APPROACH



Journal of Cardiovascular Electrophysiology

ORIGINAL ARTICLE | Full Access

MARSHALL bundles elimination, Pulmonary veins isolation and Lines completion for ANatomical ablation of persistent atrial fibrillation: MARSHALL-PLAN case series

Thomas Pambrun MD, Arnaud Denis MD, Josselin Duchateau MD, Frédéric Sacher MD, PhD, Mélèze Hocini MD, Pierre Jaïs MD, PhD, Michel Haïssaguerre MD, Nicolas Derval MD

First published: 21 November 2018 | https://doi.org/10.1111/jce.13797

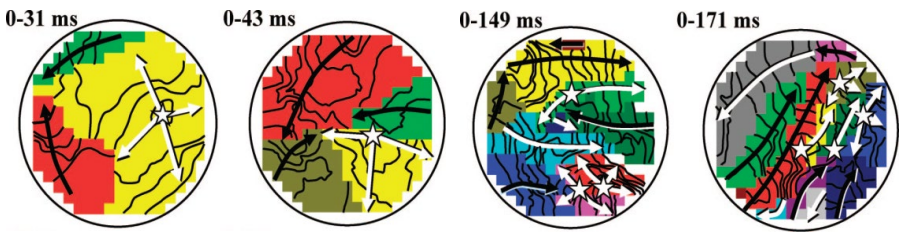
Thomas PAMBRUN, MD

CHU BORDEAUX - LIRYC INSTITUTE

THE PATIENT TAILORED (EGM BASED) APPROACH:

IDENTIFIES AND ELIMINATES THE ELECTRICAL SUBSTRATE THAT MAINTAINS AF

EXPERIMENTAL FINDING



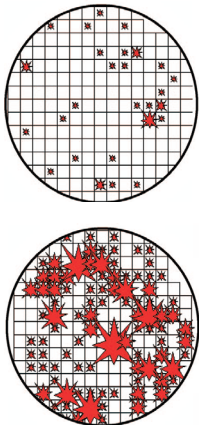
LONGITUDINAL DISSOCIATION

De Groot 2010

ACUTE AF

PERSISTENT AF

EPICARDIAL BREAKTHROUGH



Allessie 2010

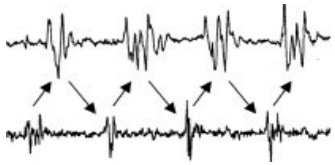
CLINICAL TRANSLATION

ENDOCARDIAL MAPPING

FOCAL ACTIVITY

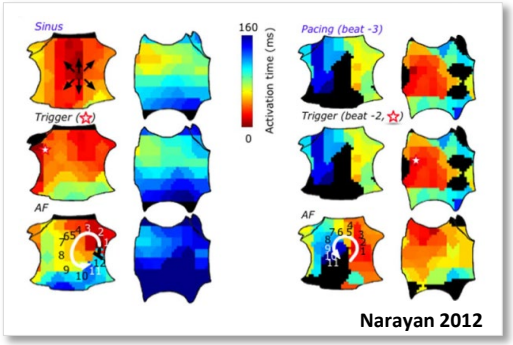
Nademanee 2004

REENTRANT MECHANISM

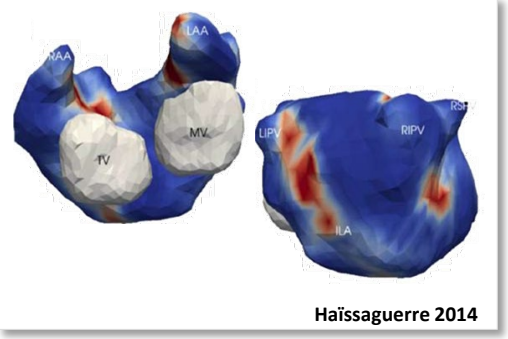


Haïssaguerre 2005

PANORAMIC MAPPING



Narayan 2012



Haïssaguerre 2014

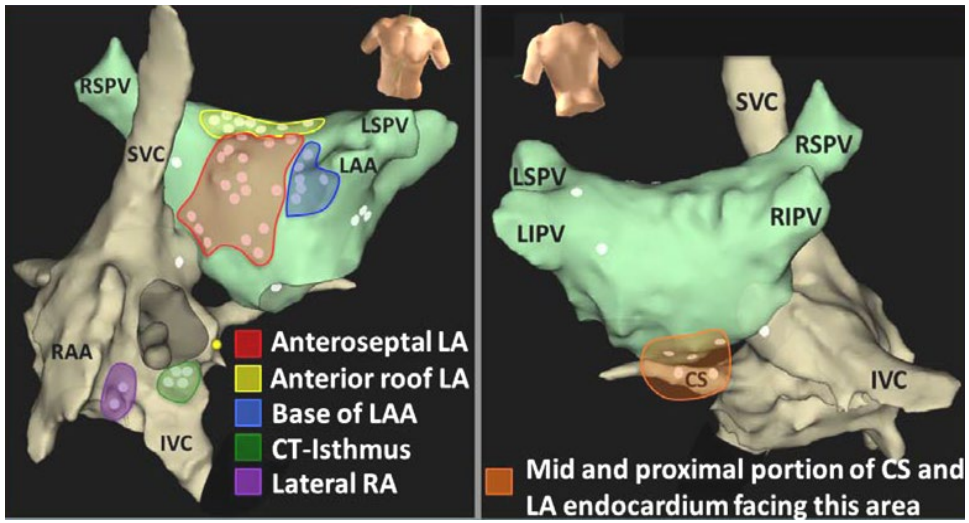
CONSIDERED AS: « A PROOF OF CONCEPT »

CONSIDERED AS: « A CRUCIAL ENDPOINT »

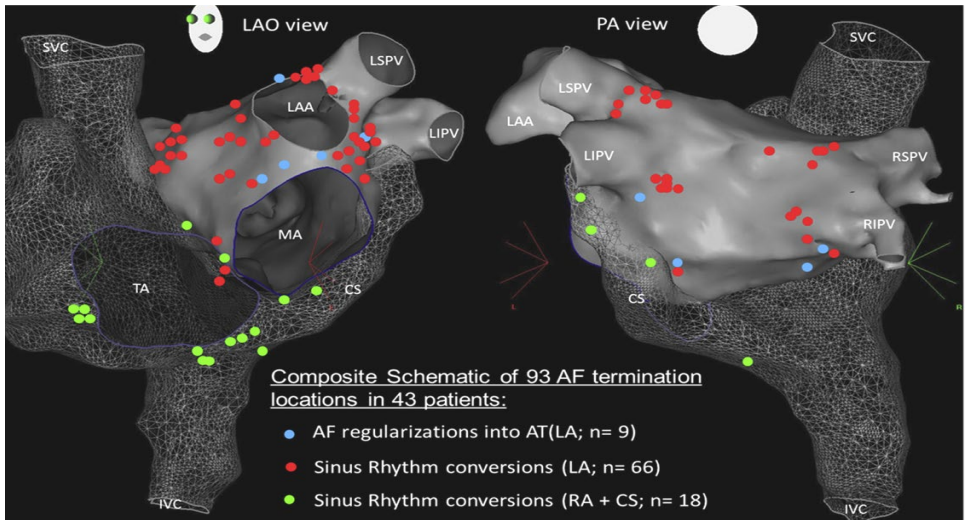
⚠ TERMINATION ⚠

THE PATIENT TAILORED (EGM BASED) APPROACH:

STATISTICALLY ALTERS AREAS OF GREAT IMPORTANCE FOR ATRIAL PHYSIOLOGY

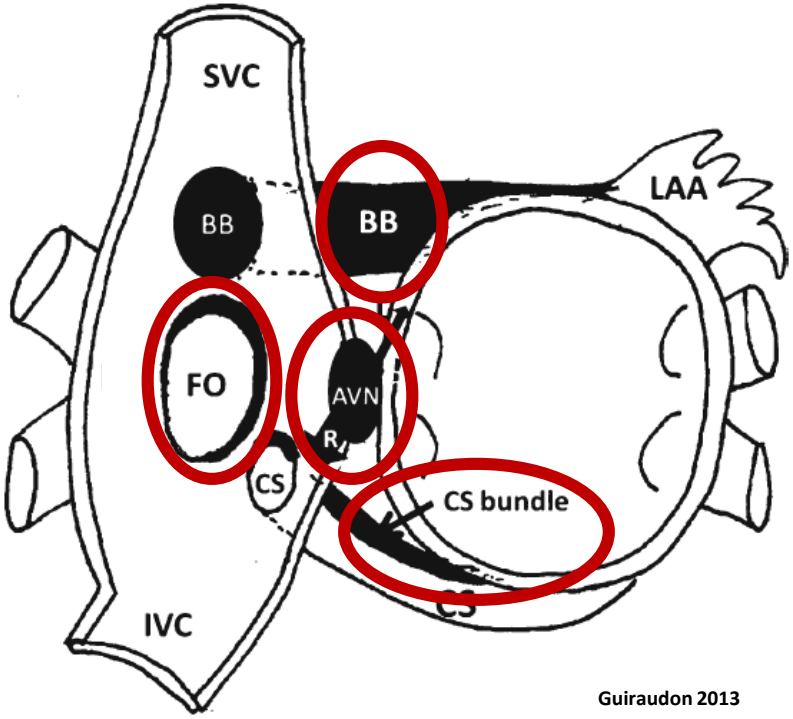


Jadidi 2016



Seitz 2016

ARE ATRIAS…

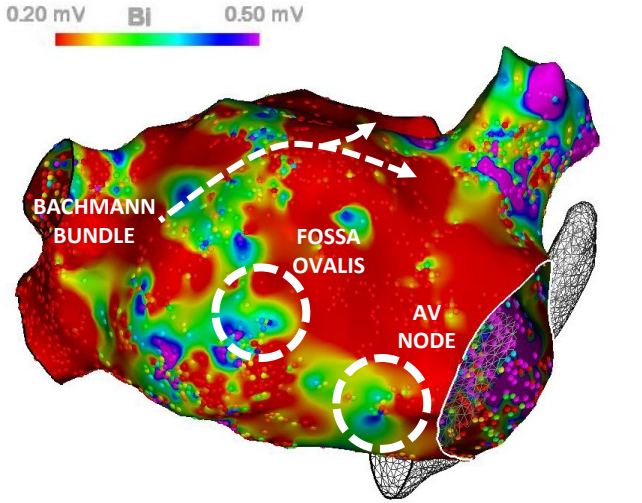


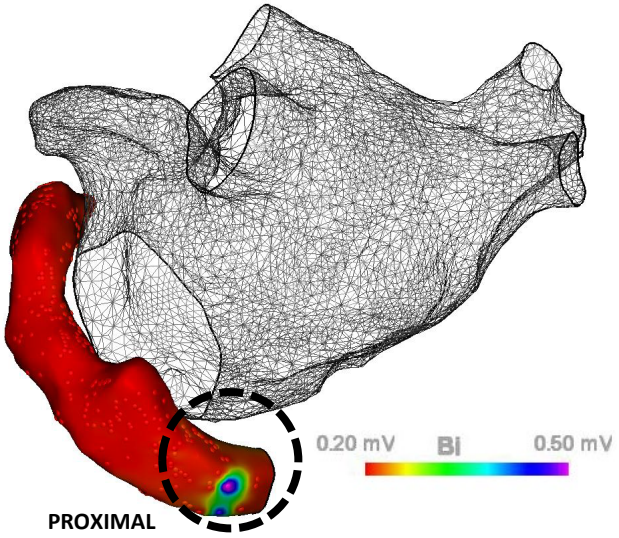
Guiraudon 2013

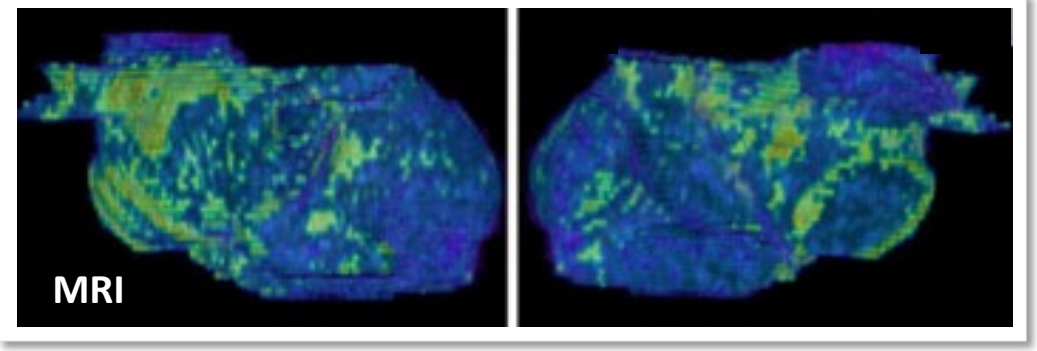
OR COMPLEX ANATOMICAL STRUCTURES ?

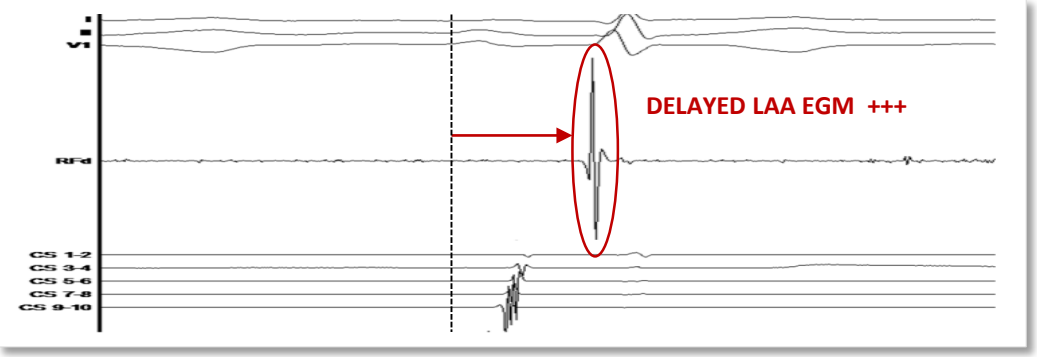
THE 1ST PRICE TO PAY IS ATRIAL CONTRACTION IMPAIRMENT:

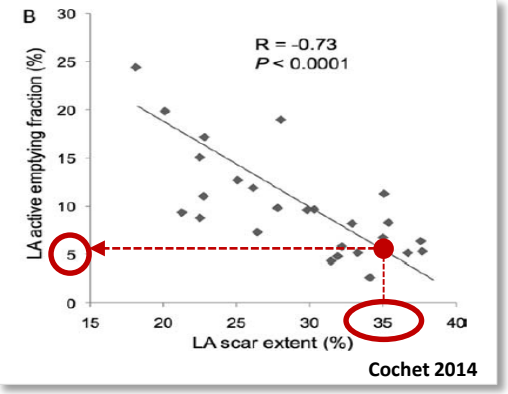
DUE TO MYOCARDIAL MASS DECREASE AND INTER-ATRIAL DISCONNECTION



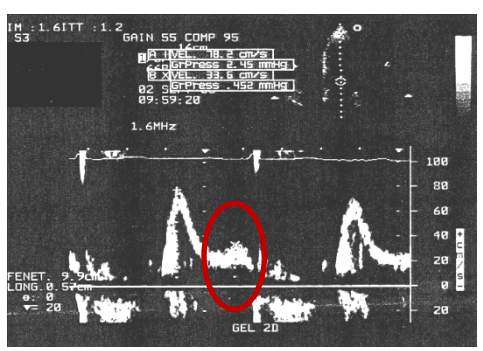








Cochet 2014



Takahashi 2007

THE 2ND PRICE TO PAY IS THE INCOMING TIDE OF ATRIAL TACHYCARDIA:

DUE TO THE PROARRHYTHMOGENIC EFFECT OF SUSPENDED SCARS

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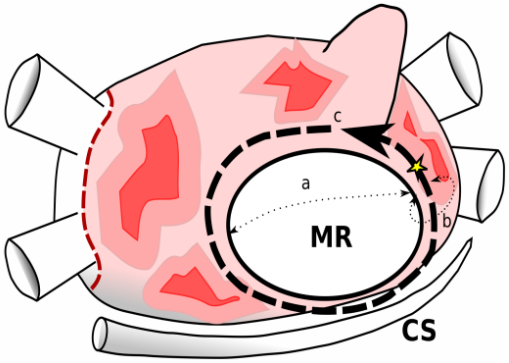
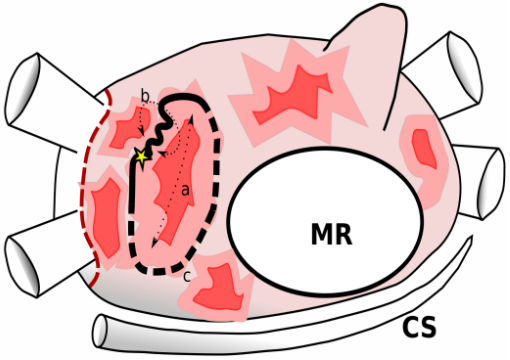
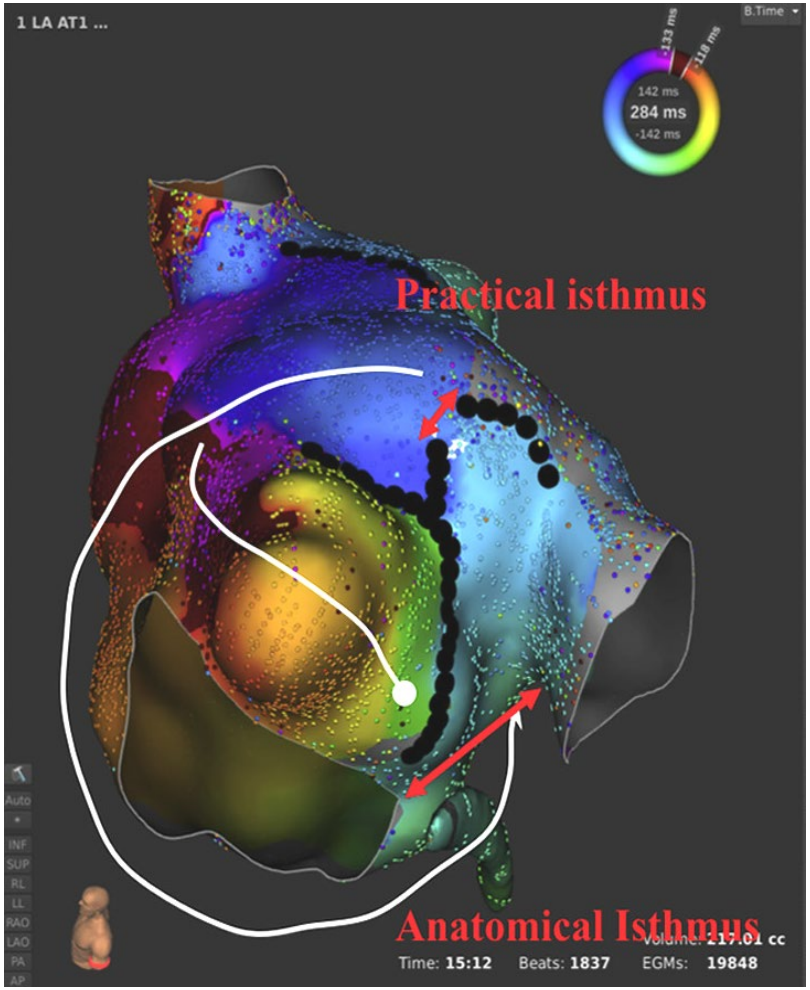
POST ABLATION TACHYCARDIAS

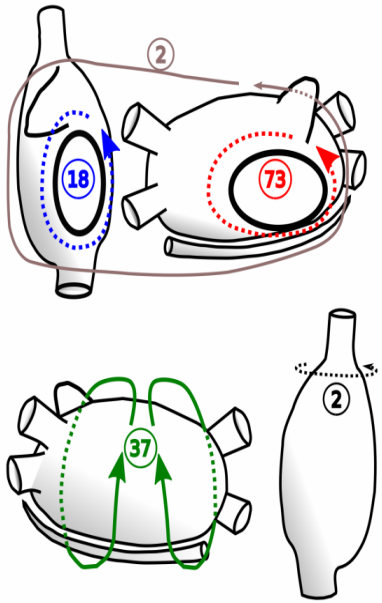
- Healthy tissue
- Border zone
- Scar







MACROREENTRY



~ 60 %

ANATOMICAL ISTHMUSES

Derval In revision

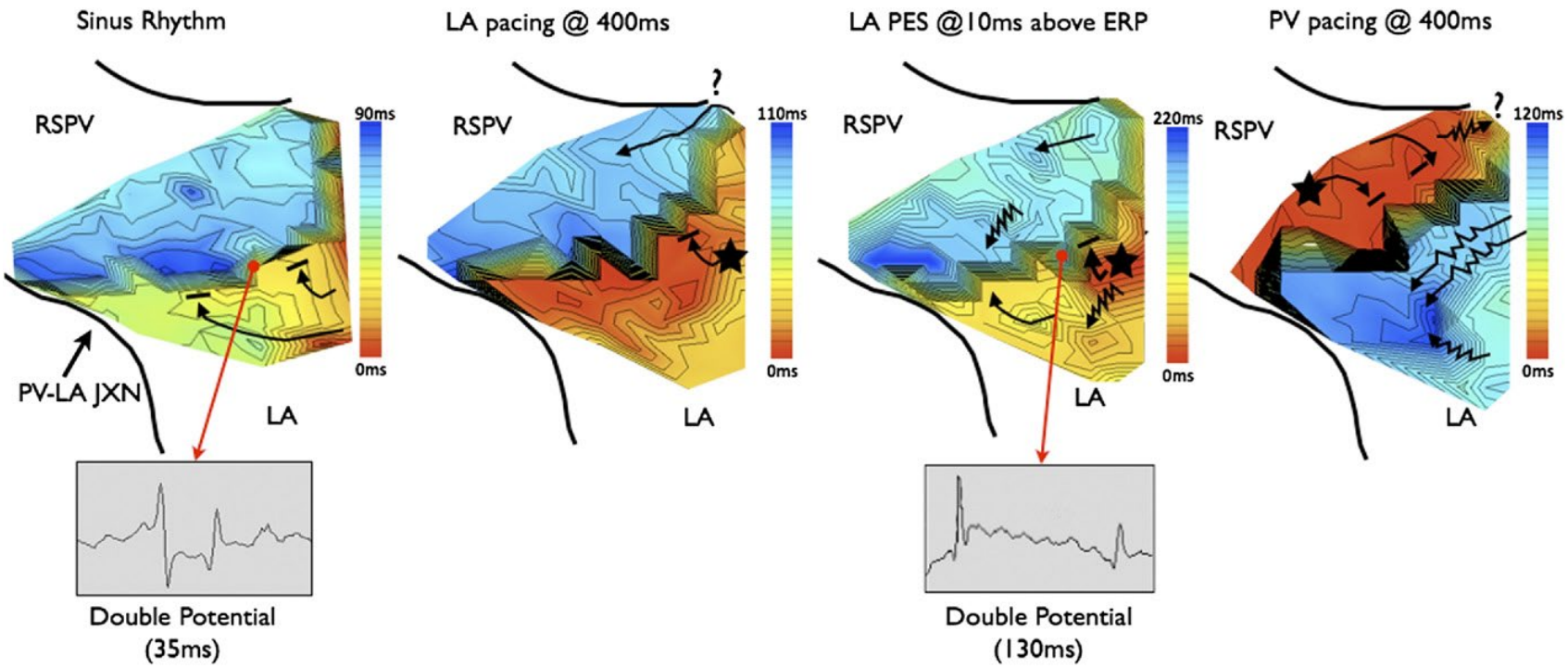
WHAT SHOULD WE DO?

REMEMBERING THAT THE ONLY CLASS I RECOMMENDATION IS ANATOMICAL…

Table 3 Atrial fibrillation ablation: strategies, techniques, and endpoints

	Recommendation	Class
PV isolation by catheter ablation	Electrical isolation of the PVs is recommended during all AF ablation procedures.	I

PULMONARY VEINS ARE CRUCIAL ANATOMICAL STRUCTURES FOR REENTRY…



Kalmann 2012

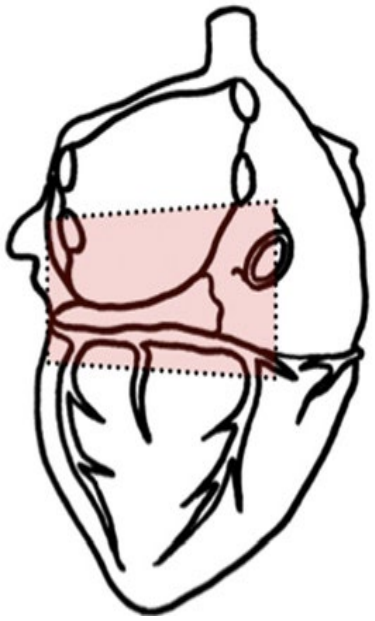
WHAT SHOULD WE DO?

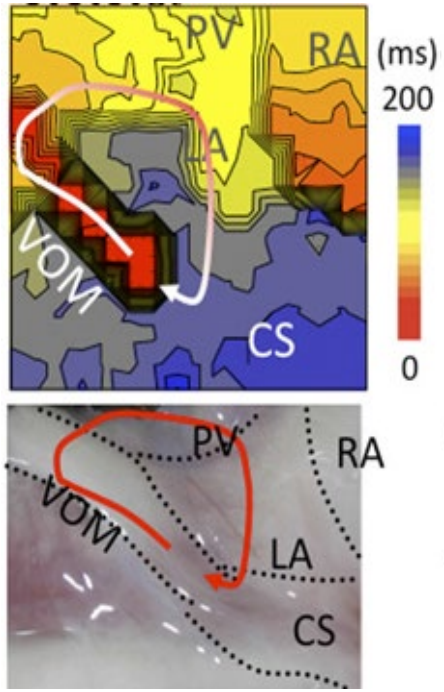
LOOKING FOR OTHER ANATOMICAL STRUCTURES ABLE TO SUPPORT REENTRY

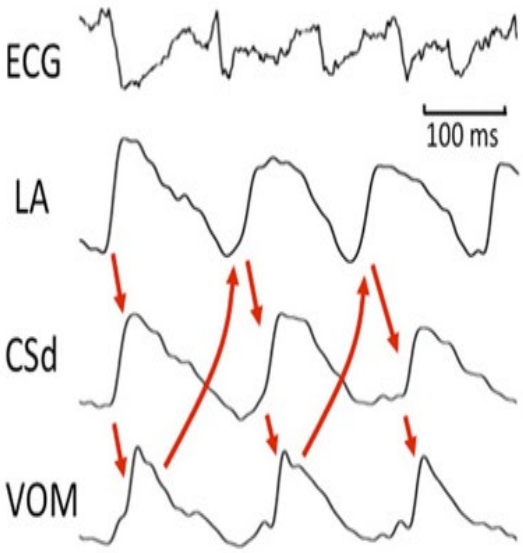
Table 3 Atrial fibrillation ablation: strategies, techniques, and endpoints

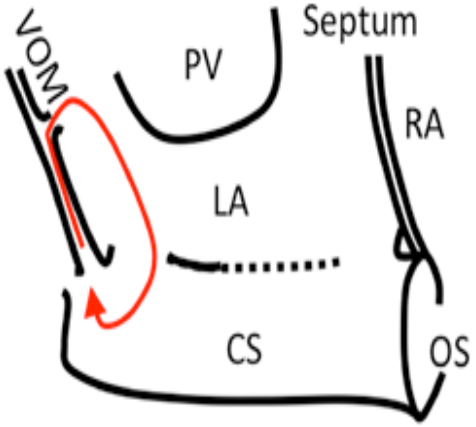
	Recommendation	Class
PV isolation by catheter ablation	Electrical isolation of the PVs is recommended during all AF ablation procedures.	I

BUT OTHER STRUCTURES ARE ALSO NATIVELY DESIGNED TO SUPPORT REENTRY !







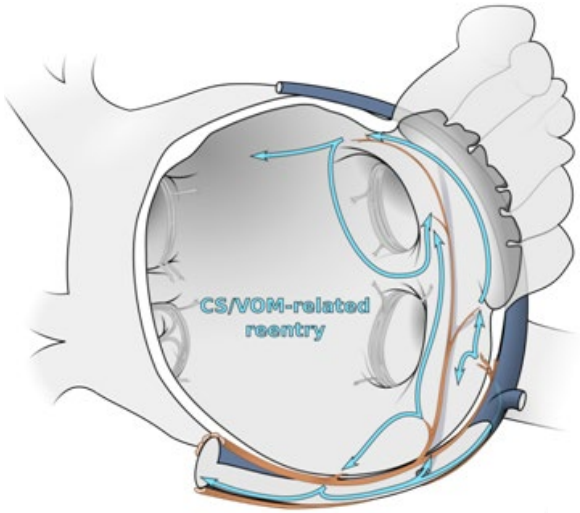


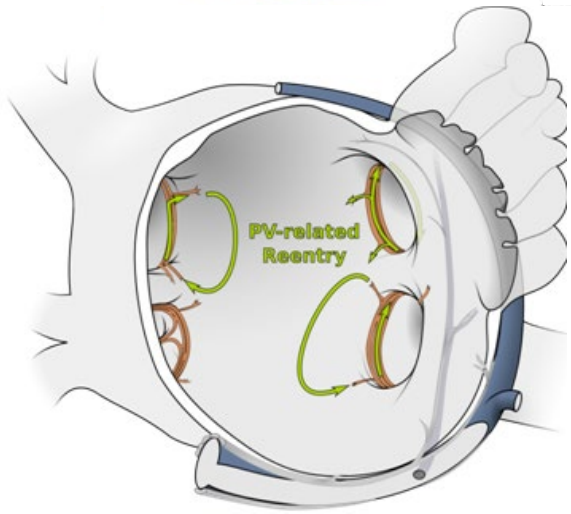
Morita 2012

THE ANATOMICAL APPROACH:

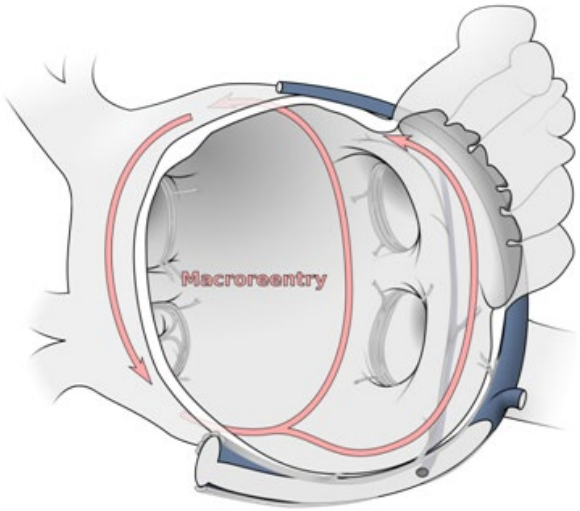
IDENTIFIES ATRIAL STRUCTURES THAT ARE CRUCIAL TO TARGET OR TO RESPECT

1ST STRATEGICAL ENDPOINT
ELIMINATION OF THE FIBRILLATORY PRIMERS

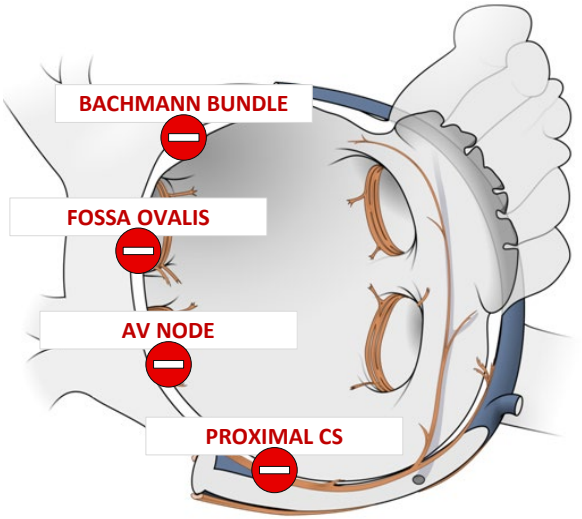




2ND STRATEGICAL ENDPOINT
ELIMINATION OF THE MAIN MACROREENTRIES



3RD STRATEGICAL ENDPOINT
PRESERVATION OF THE ATRIAL PHYSIOLOGY



THE DIFFERENT STEPS OF THE MARSHALL PLAN

HIGH FEASIBILITY OF CLEAR ENDPOINTS EASILY REPRODUCIBLE BY OTHER TEAMS

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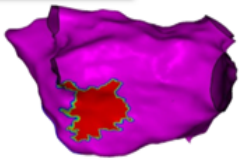
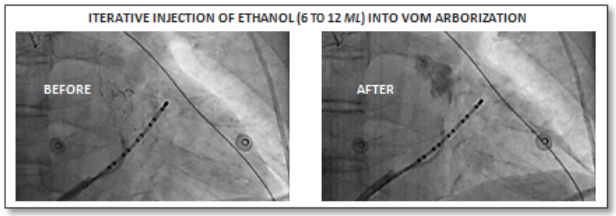
VOM ETHANOL INFUSION

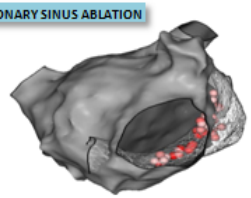


STEP 1

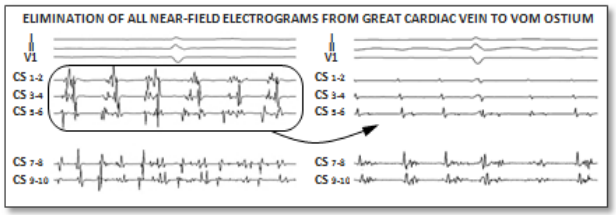


89%

CORONARY SINUS ABLATION

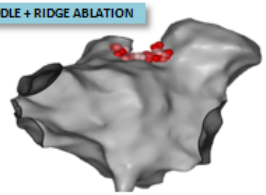


STEP 1

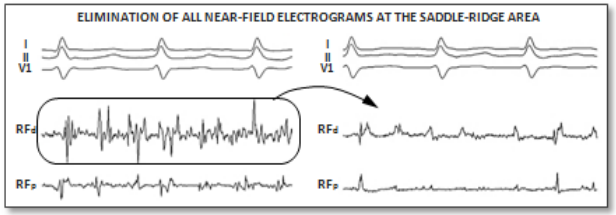


100%

SADDLE + RIDGE ABLATION

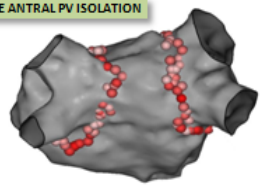


STEP 1

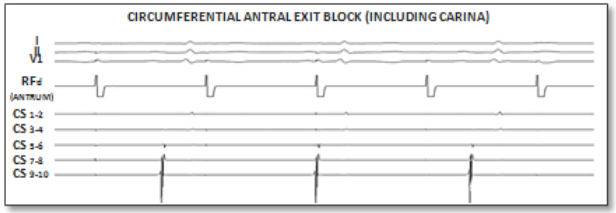


100%

WIDE ANTRAL PV ISOLATION

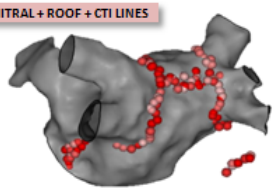


STEP 2

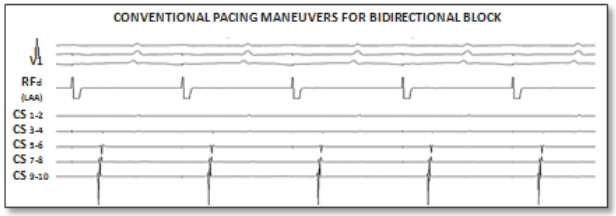


100%

MITRAL + ROOF + CTI LINES



STEP 3



96%

Pambrun 2018

Bordeaux Datas

RESULTS OF THE ANATOMICAL APPROACH

IN TERMS OF ACUTE PROCEDURAL AND LONG-TERM CLINICAL OUTCOME

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AF AT START (%)

62

AF DURATION (MONTHS)

9

LAA CYCLE LENGTH (MS)

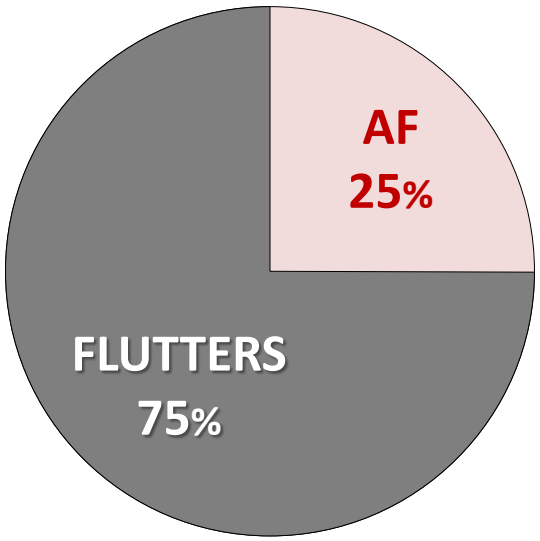
178

LA VOLUME (ML)

198

NO AAR DRUGS AFTER 1 MONTH

SINGLE PROCEDURE +++

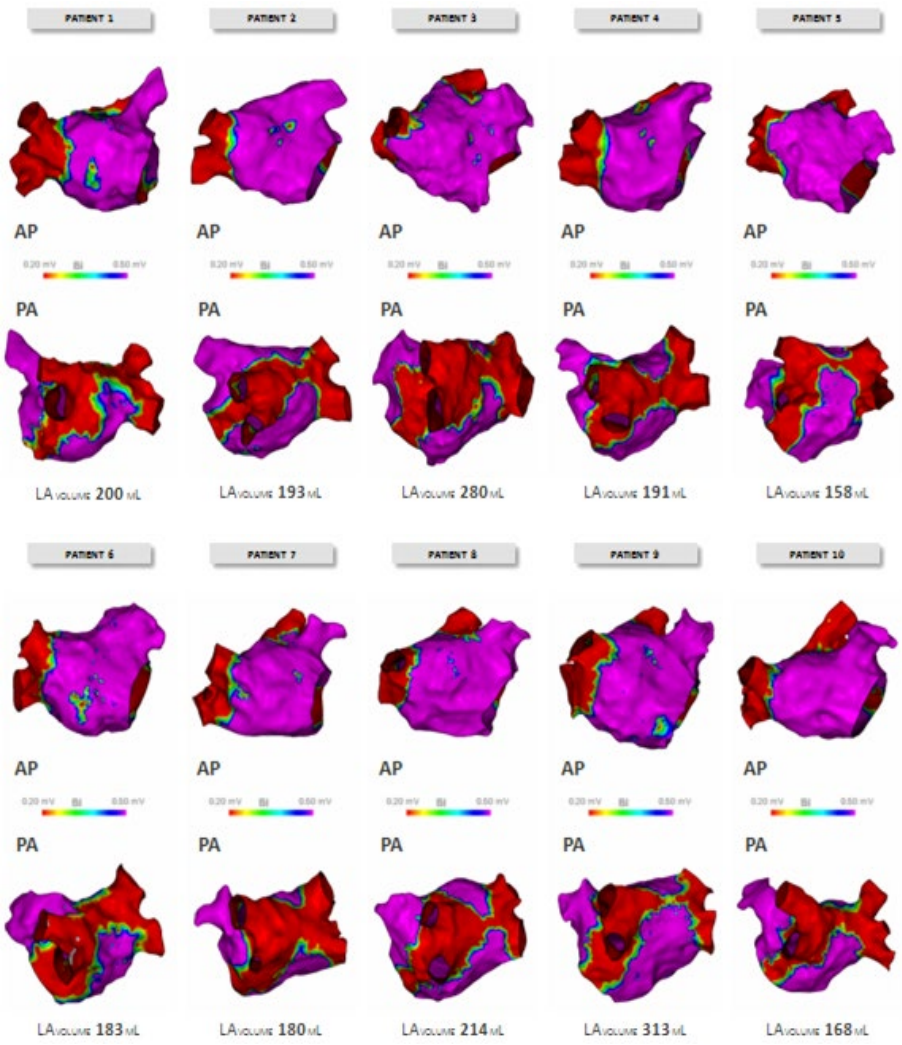


50 PATIENTS

NOTABLE INTEREST REGARDING ATRIAL PHYSIOLOGY PRESERVATION

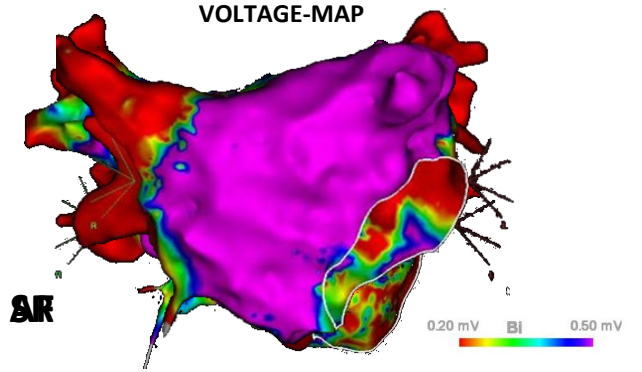
IN TERMS OF ATRIAL CONTRACTION

Pambrun et al – *J Cardiovasc Electrophysiol 2019;30:7-15*

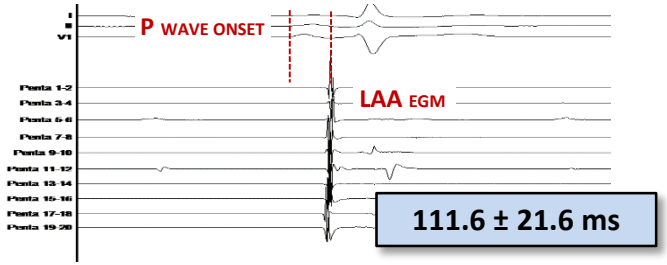


Pambrun 2018

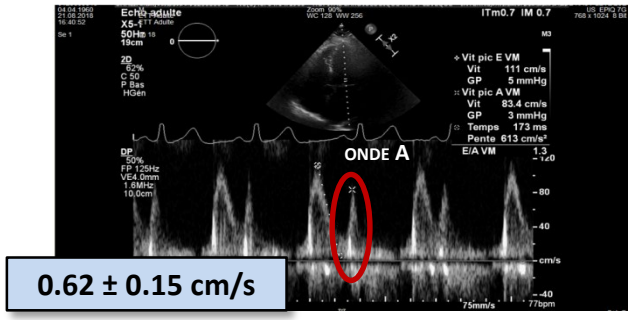
VOLTAGE-MAP



INTER-ATRIAL CONDUCTION



CONTRACTILE FUNCTION (M3)



CONCLUSION

1. Our previous experience with extensive EGM-based AF ablation has shown some important pitfalls

2. These pitfalls have urge us to propose a new ablation strategy taking into account crucial anatomical considerations

3. The Marshall-Plan targets native atrial structures which have proved to be clearly involved in the fibrillatory process

4. The Marshall-Plan also targets atrial structures which have proved to support post-ablation stable reentries

5. Through a clear succession of endpoints, this lesion set respects atrial physiology and ensures good 1-year results

6. Although promising, these results call for a long-term follow-up (24 months) in a randomized study to be confirmed

C·H·U
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ET MODÉLISATION CARDIAQUE
BORDEAUX

THANK YOU !

C·H·U
Hôpitaux de Bordeaux

L'INSTITUT DE RYTHMOLOGIE
ET MODÉLISATION CARDIAQUE
BORDEAUX

BRIEF COMPARISON OF THE TWO APPROACHES

IN TERMS OF ACUTE PROCEDURAL RESULT AND LONG-TERM CLINICAL OUTCOME

AF AT START (%)		
62	62	79
Bordeaux (50)	Seitz (105)	Jadidi (85)

AF DURATION (MONTHS)		
9	12	-
Bordeaux (50)	Seitz (105)	Jadidi (85)

LAA CYCLE LENGTH (MS)		
178	182	168
Bordeaux (50)	Seitz (105)	Jadidi (85)

LA VOLUME (ML)		
198	-	-
Bordeaux (50)	Seitz (105)	Jadidi (85)

ON AAR DRUGS AFTER BLANKING (%)		
0	44	0
Bordeaux (50)	Seitz (105)	Jadidi (85)