

# Master Class Tétralogie de Fallot

## Hands-on session

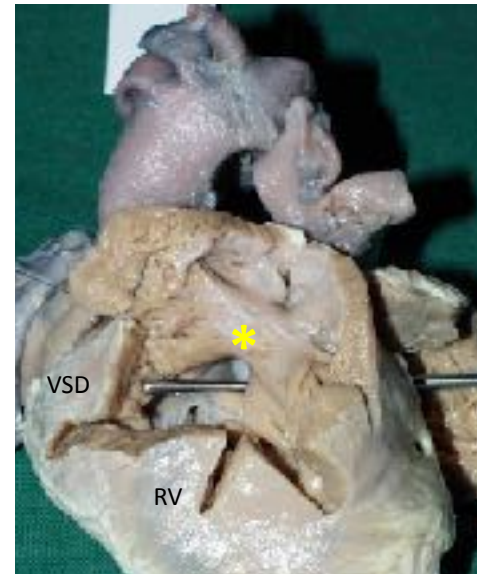
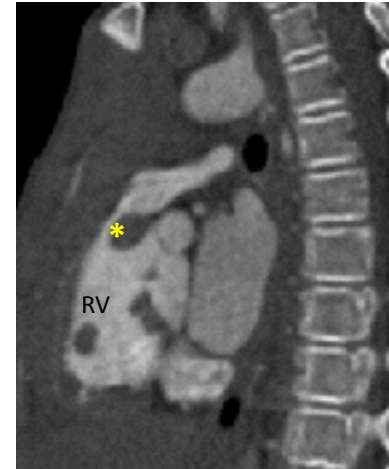
Lucile HOUYEL



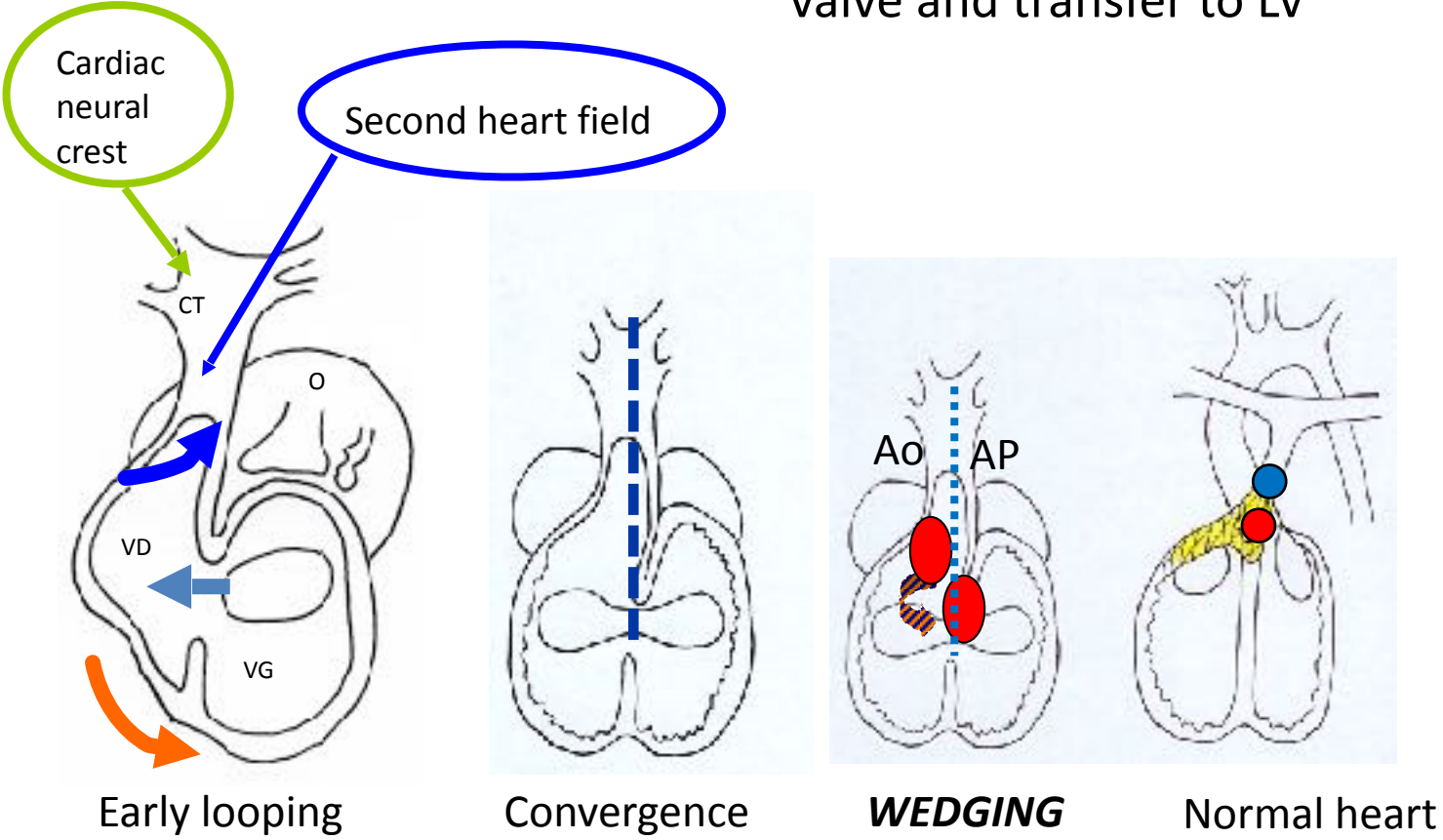
# Tetralogy of Fallot : « monology » of Fallot

- Unique mechanism = anterior malalignment and anterior deviation of the outlet septum

- ➔ Outlet VSD
- ➔ Aortic dextroposition
- ➔ Subpulmonary stenosis
- ➔ Right ventricular hypertrophy

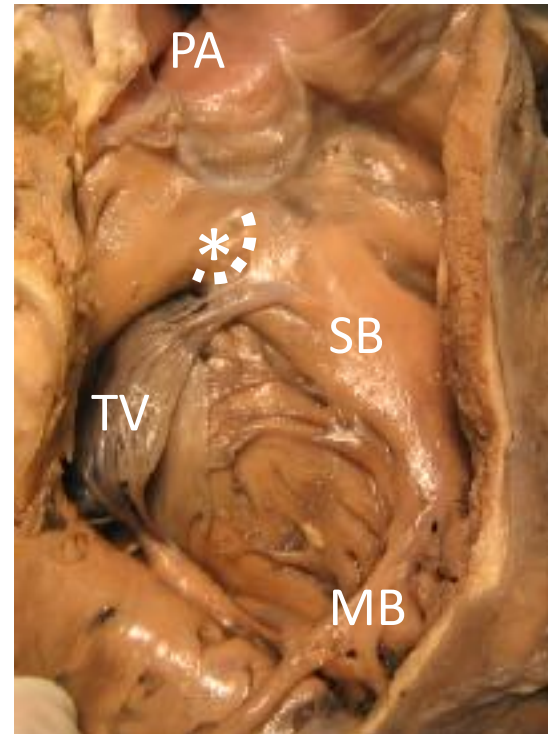
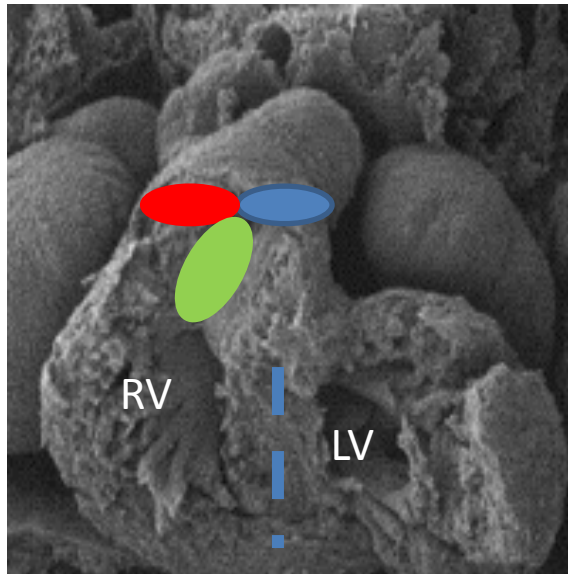


Wedging = rotation of the aortic valve and transfer to LV



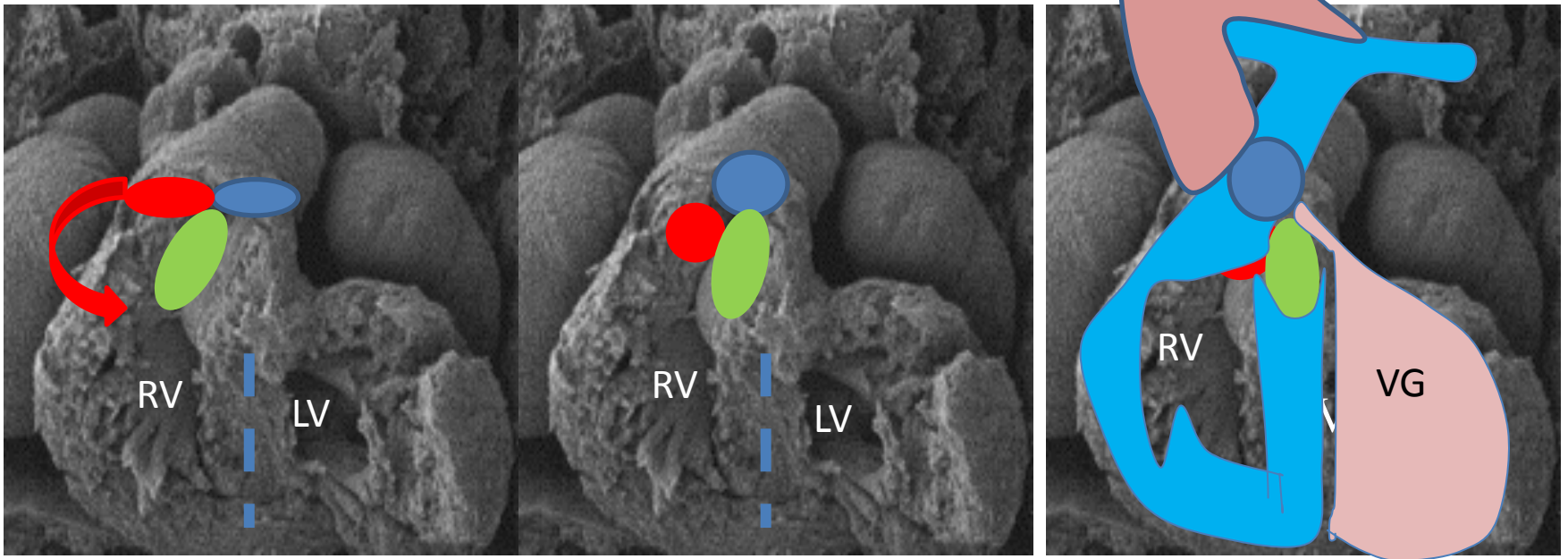
# Formation of the outlet septum

Outlet septum =  
between the aortic and  
pulmonary valves

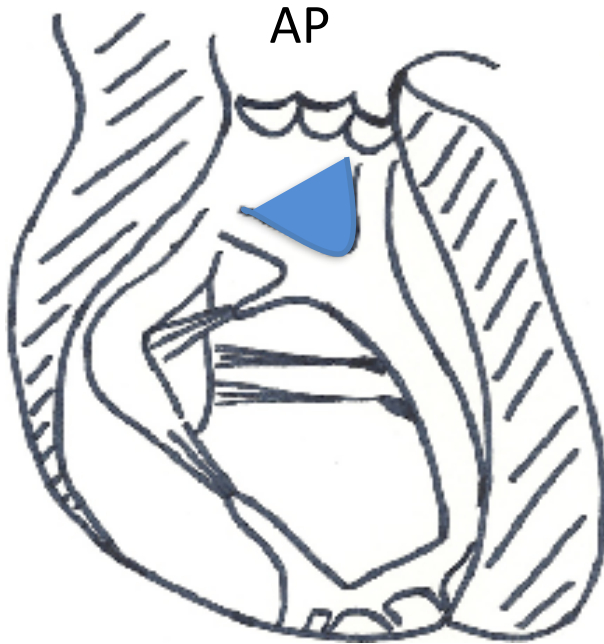


Endocardial cushions of  
the outflow tract  
Wedging (44-49 days)

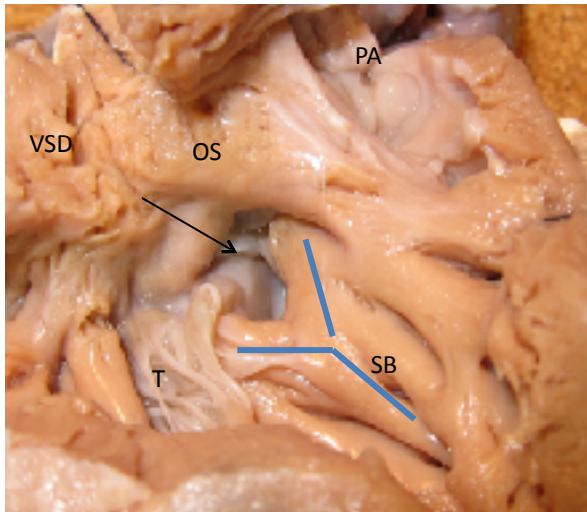
# The outlet septum



## Abnormal development of the outlet septum : Outlet VSD

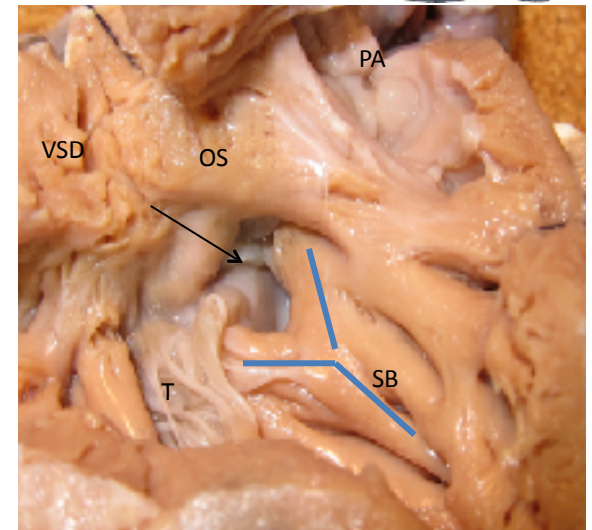
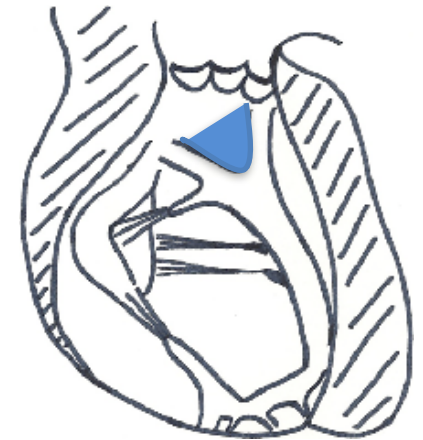


- ❑ « Y » of the septal band = Zone of fusion between the outlet septum and the muscular primitive septum
- ❑ Absence of fusion (outlet septal malalignment) outlet VSD
- ❑ Anomalies of the cardiac neural crest and second heart field



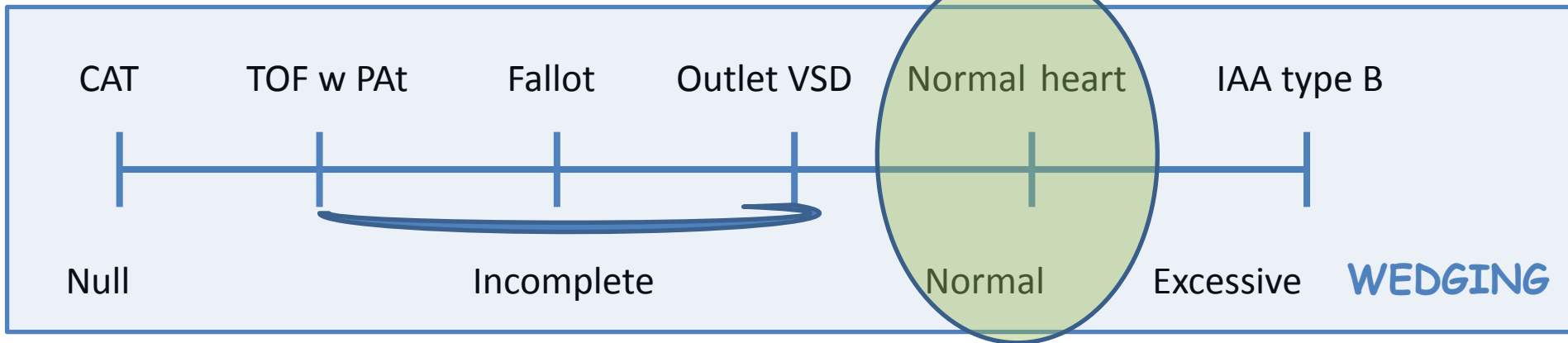
## Conotruncal malformations (cardiac neural crest / second heart field defects)

- Outlet VSD (malaligned or fibrous outlet septum)
- Tetralogy of Fallot
  - With pulmonary stenosis
  - With pulmonary atresia
  - With absent pulmonary valve
- DORV with subaortic or doubly committed VSD
- Common arterial trunk
- Interrupted aortic arch type B



## Conotruncal malformations (cardiac neural crest / second heart field defects)

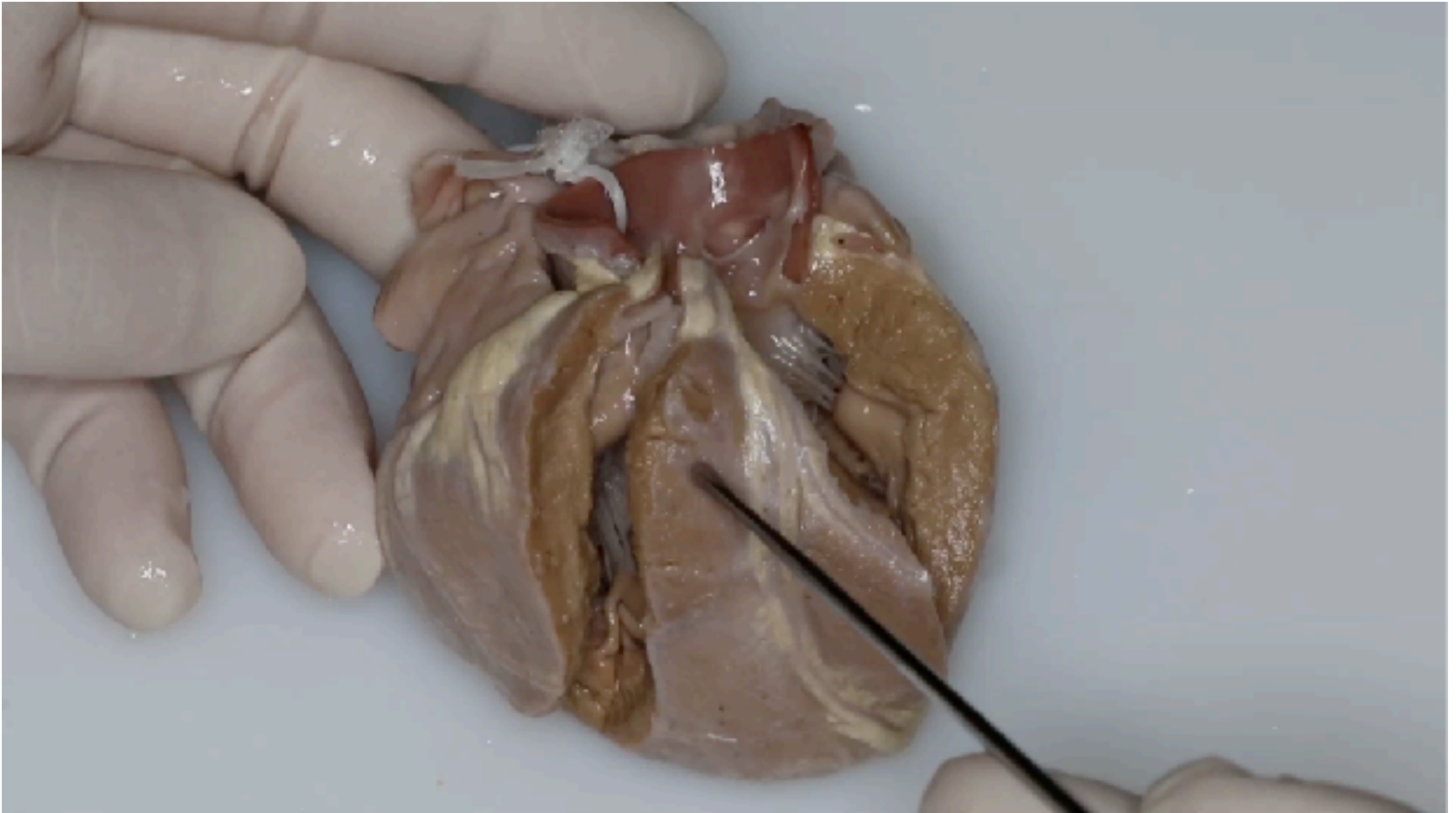
- Anomalies of wedging (rotation) and position of the outlet septum



- All share the same VSD: outlet VSD



# Tetralogy of Fallot

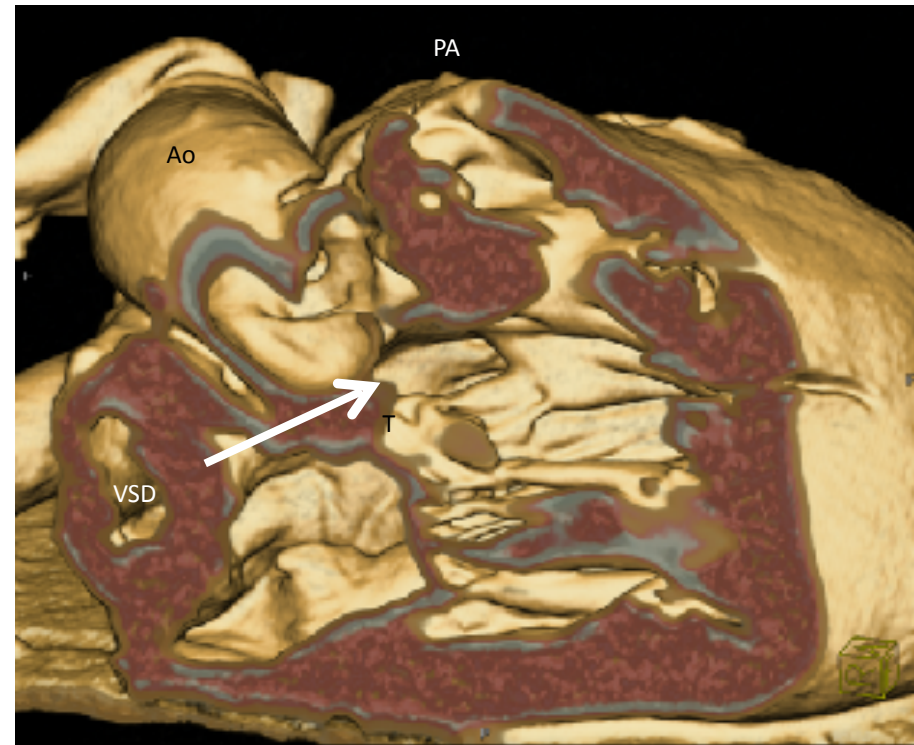


# Tetralogy of Fallot

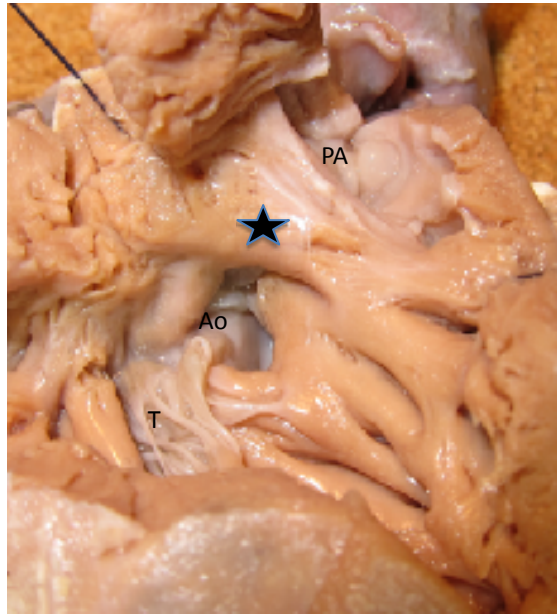
## The ventricular septal defect

# Tetralogy of Fallot : the VSD

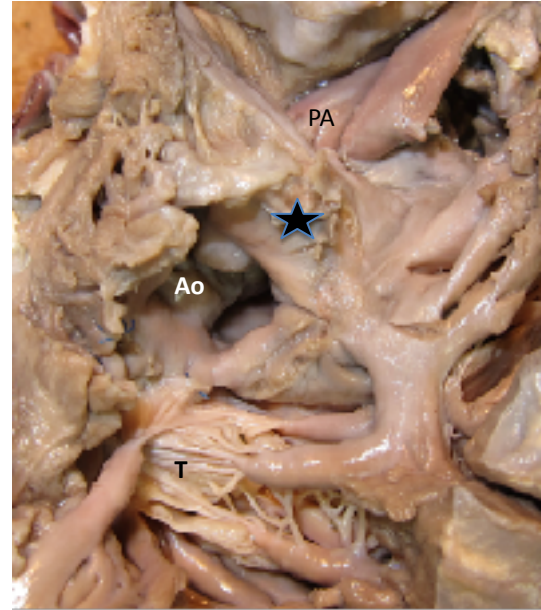
- Outlet VSD
- Located between the two limbs of the septal band
- Beneath the overriding aortic valvar orifice
- Variations :
  - Postero-inferior rim
  - Absent (fibrous) outlet septum
- Additional muscular VSD



# The VSD in TOF: the postero-inferior rim



Fibrous (« perimembranous »)



Muscular

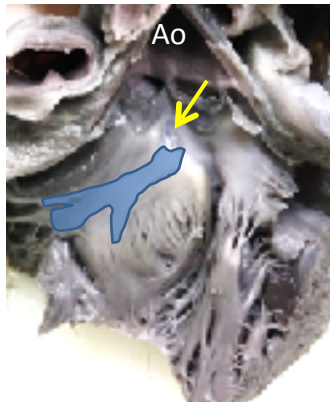
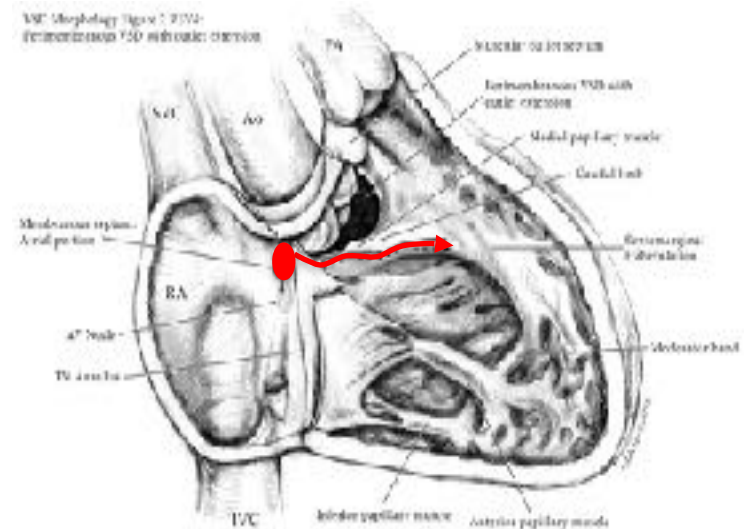
Ao-tricuspid fibrous continuity	47/71 : 66%	Mostefa-Kara JTCS 2015
	139/164 : 85%	Khan EJCTS 2019

# Tetralogy of Fallot : the VSD



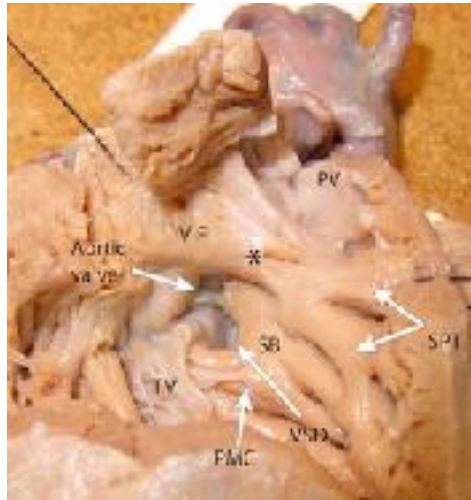
# The VSD: the conduction tissue

- Importance of the postero-inferior rim for the surgeon
- Conduction tissue vulnerable if fibrous (« perimembranous »)

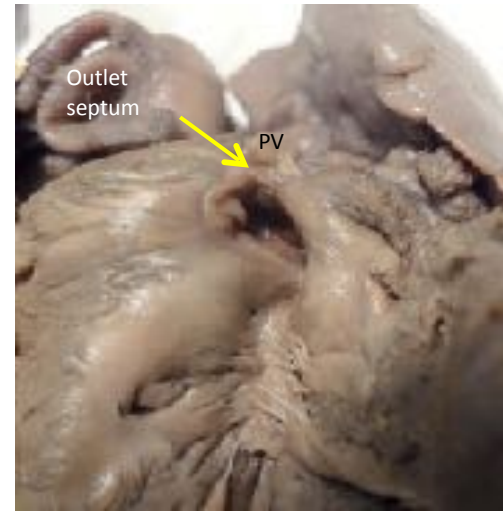


Outlet VSD with fibrous postero-inferior rim (perimembranous extension)

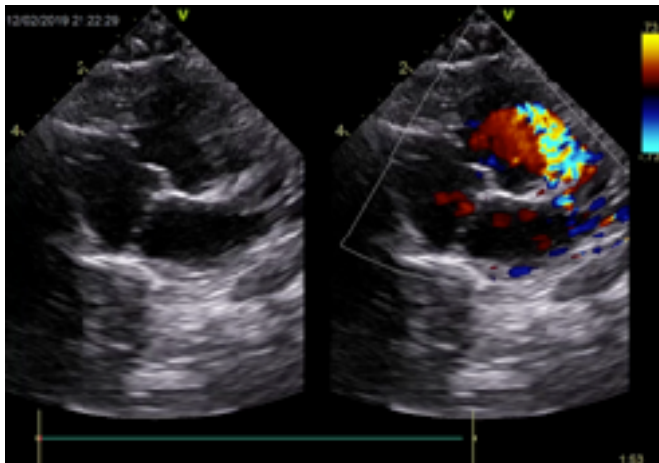
# The VSD in TOF: the postero-inferior rim



Fibrous postero-inferior rim

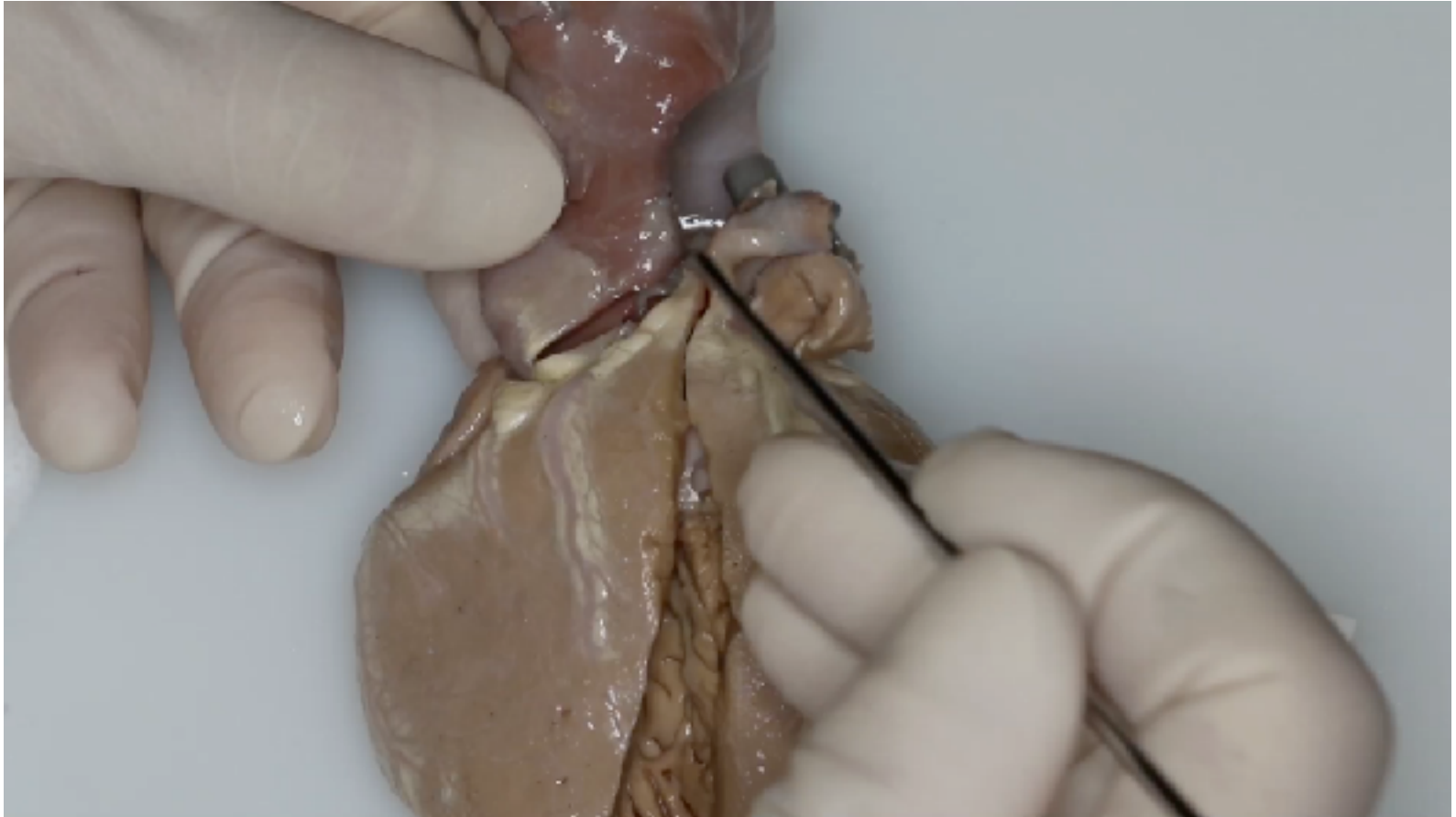


Muscular postero-inferior rim



# Tétralogie de Fallot

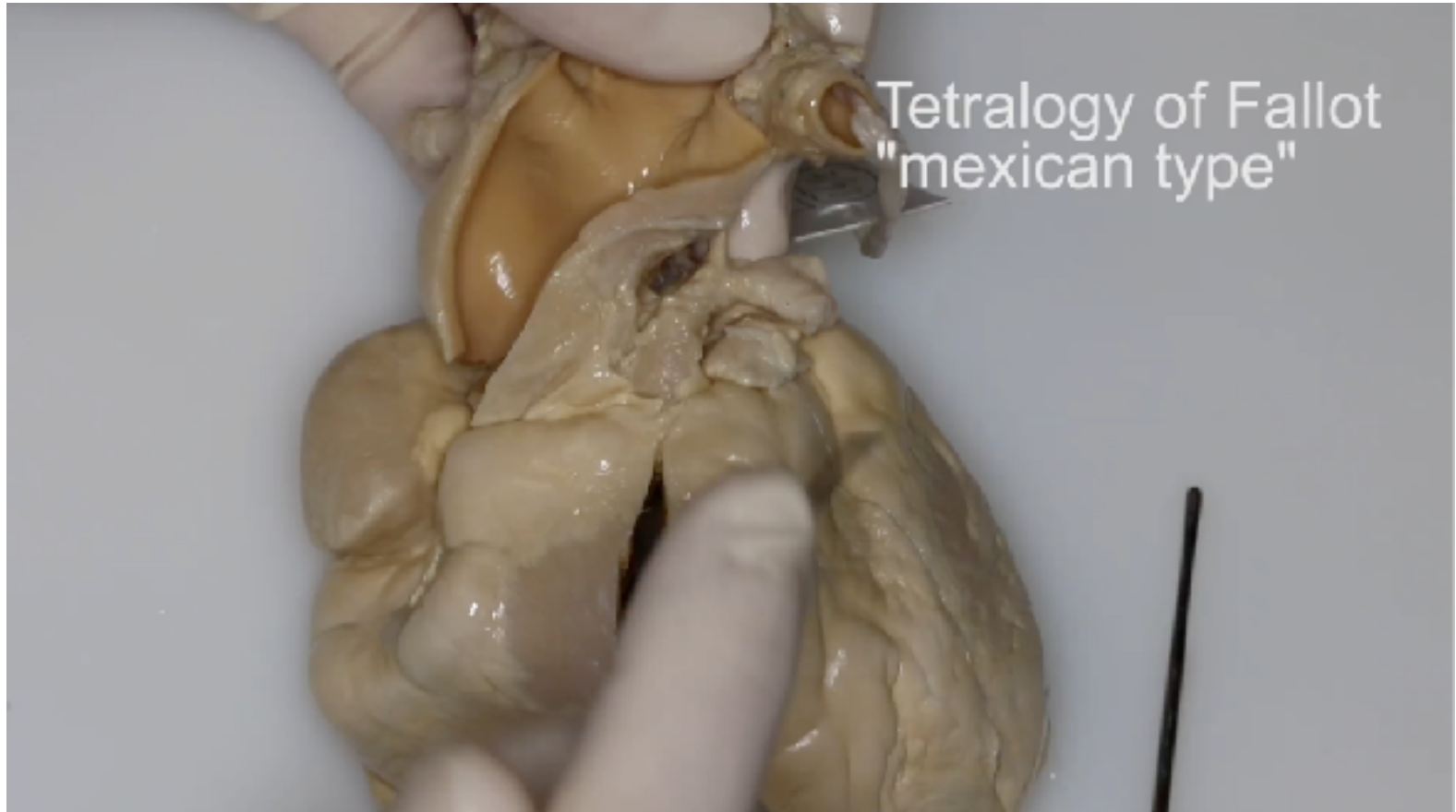
## Septum conal long





Tetralogy of Fallot : the VSD

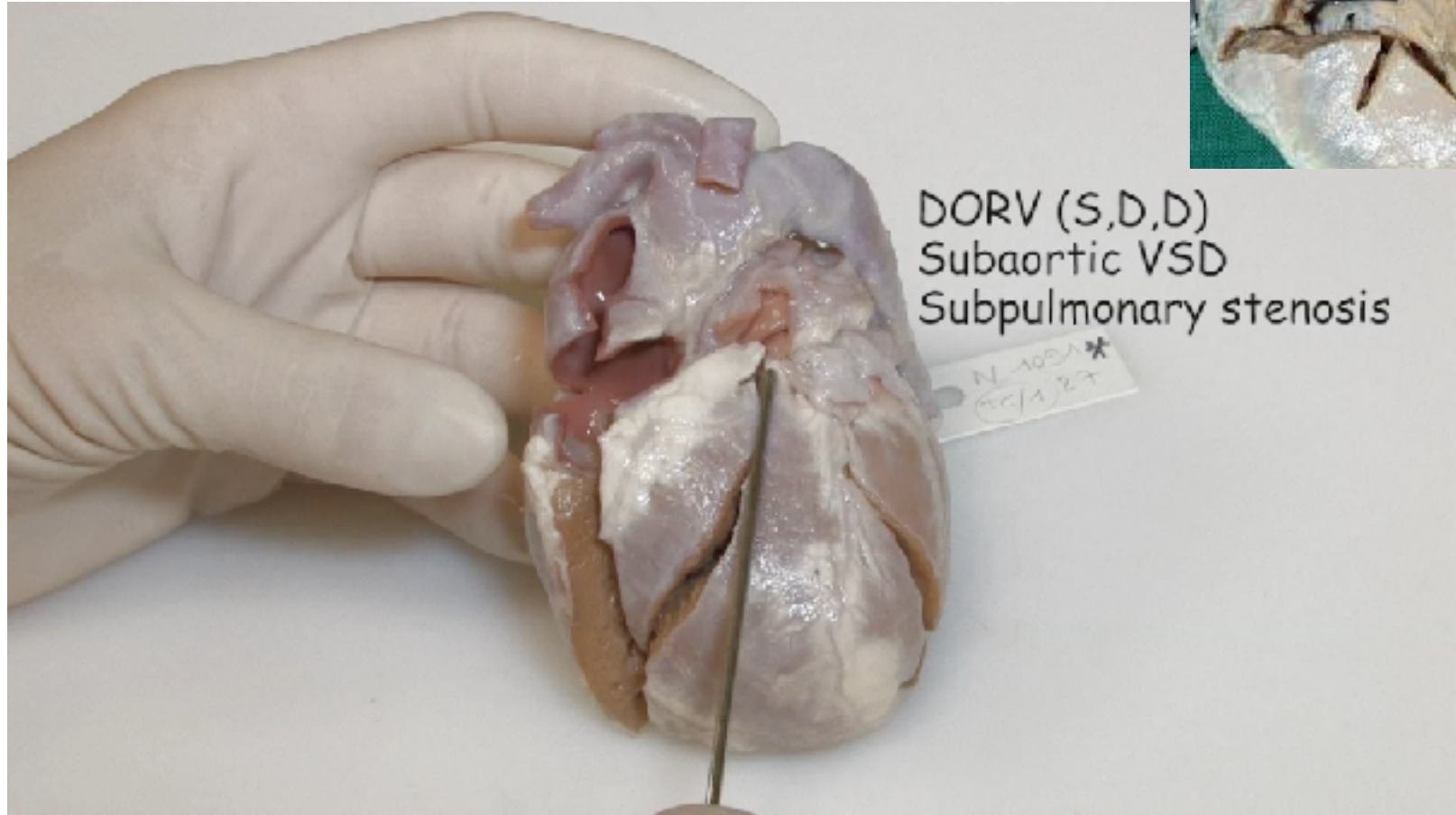
# Juxta-arterial doubly committed VSD



# Tetralogy of Fallot or DORV?

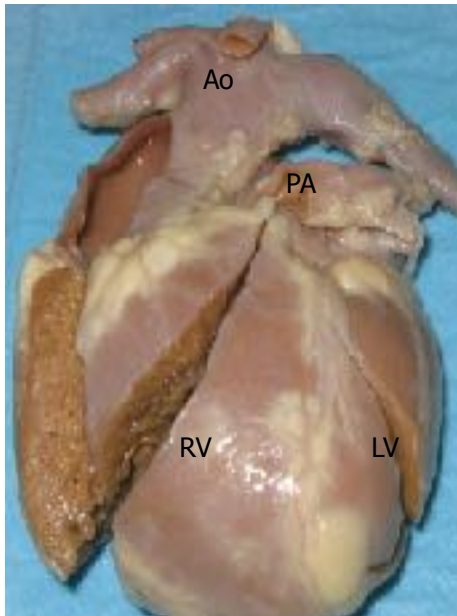


# Tetralogy of Fallot or DORV « Fallot-type » ?

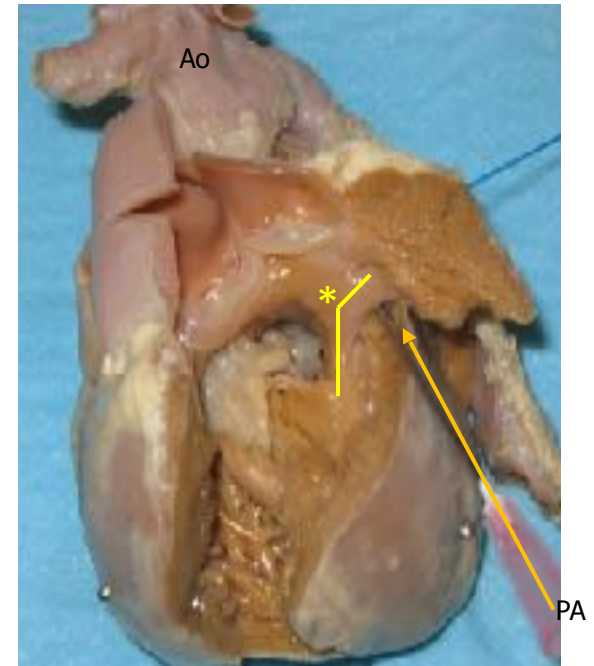




Tetralogy of Fallot :  
overriding aorta



DORV, subaortic VSD,  
subpulmonary stenosis  
« Fallot-type »

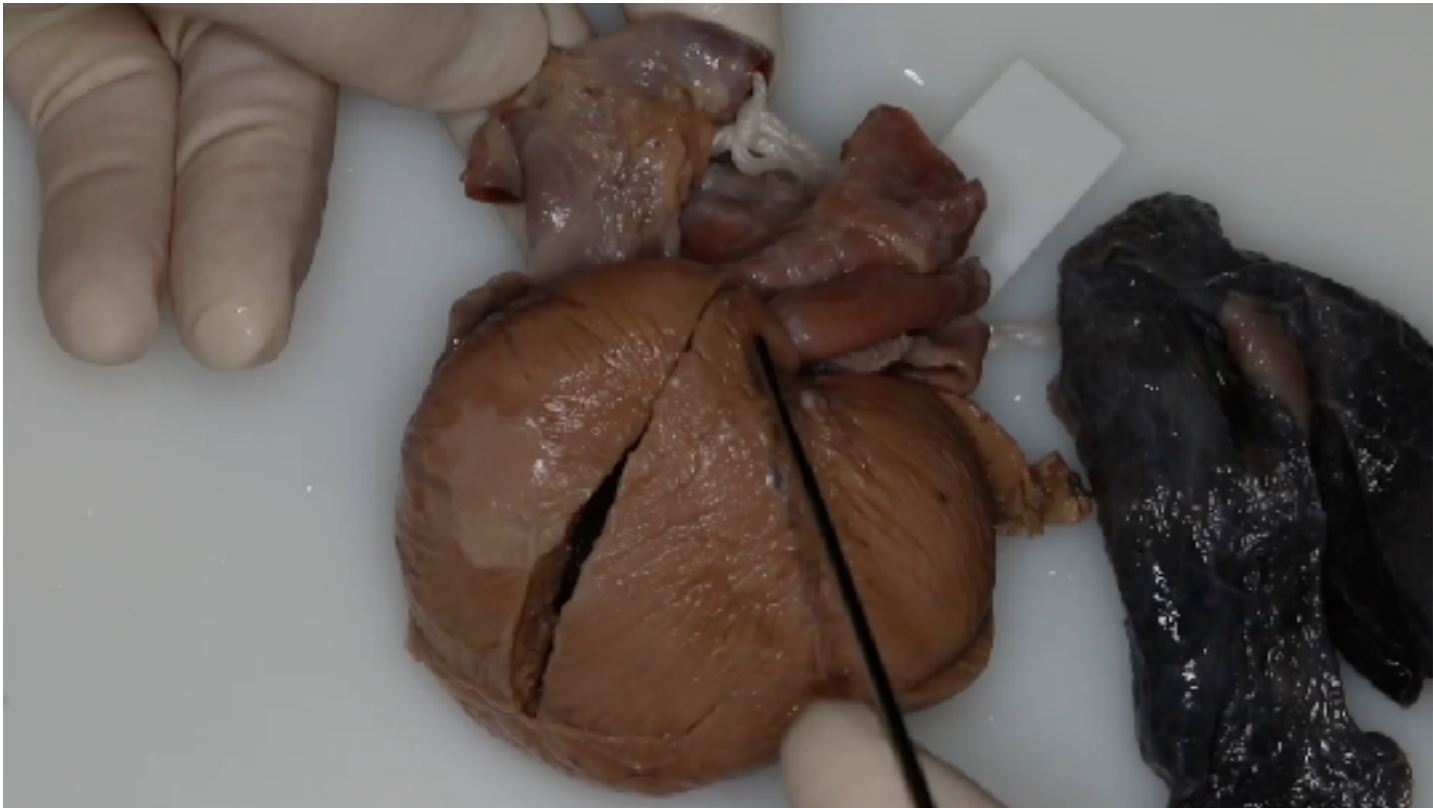


Tetralogy of Fallot  
The pulmonary valve

TOF : the pulmonary valve



# Tetralogy of Fallot with absent pulmonary valve

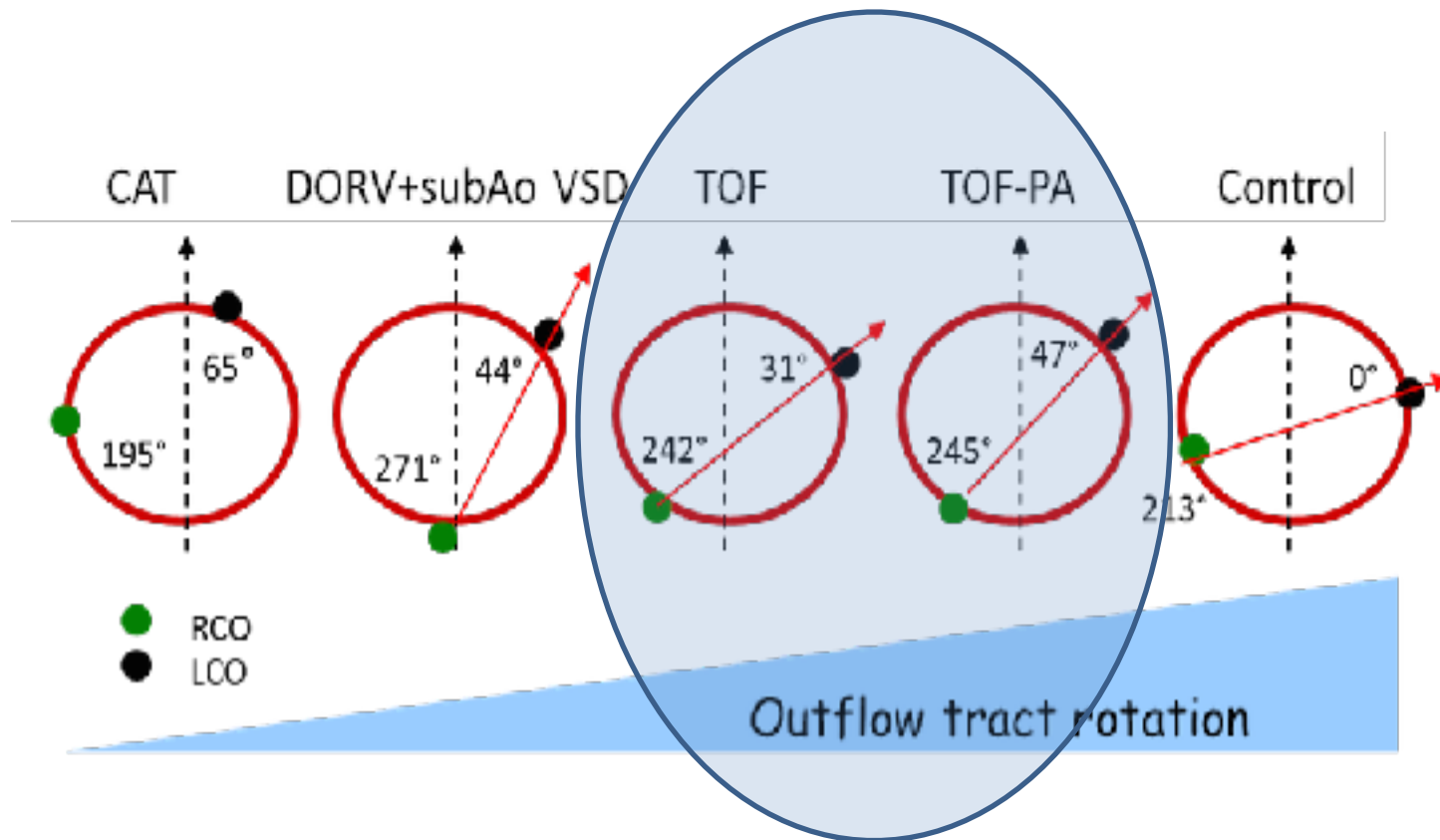


# Tetralogy of Fallot

## The coronary arteries

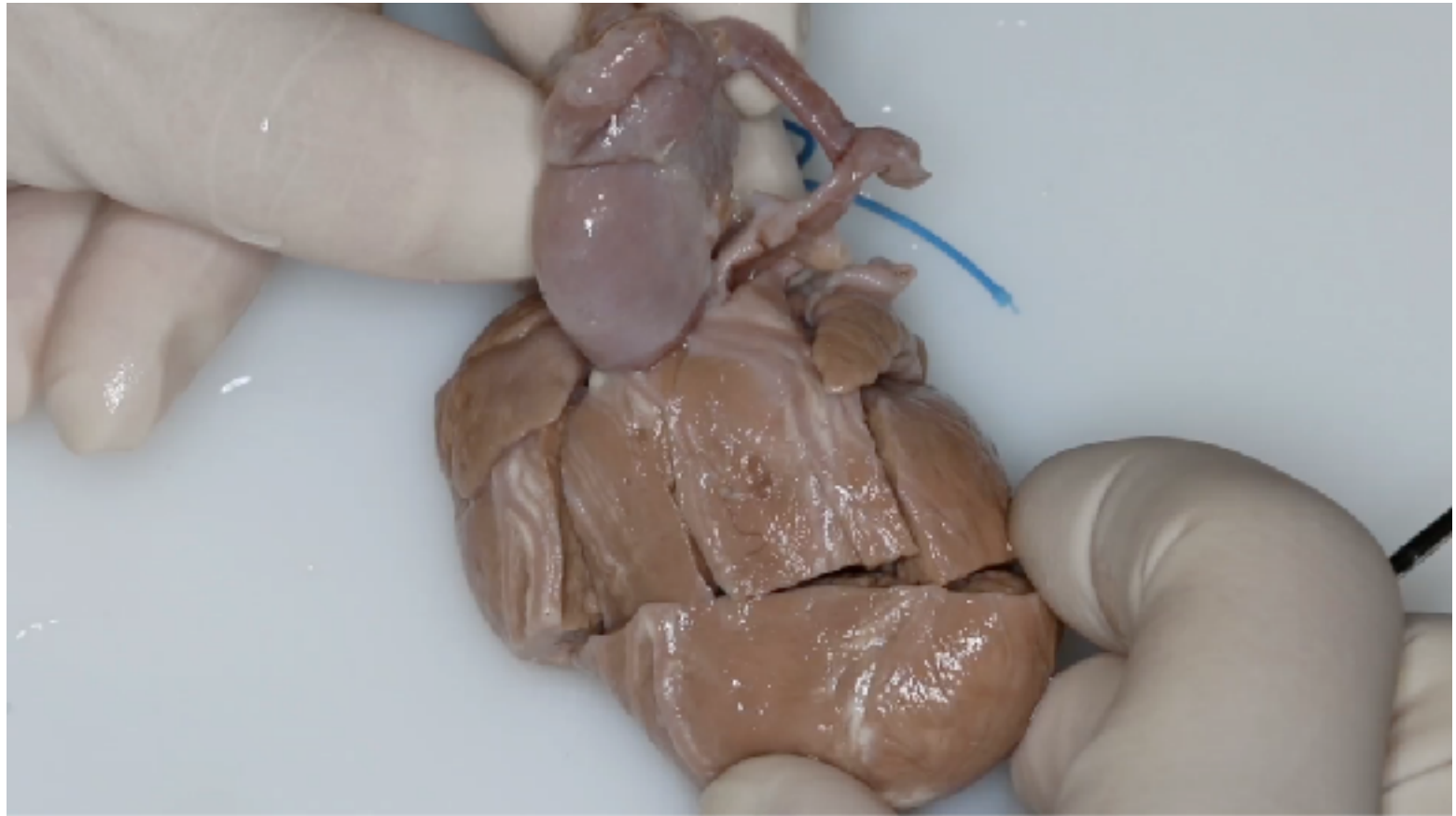


# TOF: the coronary arteries



Houyel L, Bajolle F. et al. *J Anat* 2013;222:349-357.

Anterior interventricular coronary artery connected to the RCA and crossing the RVOT



# Tetralogy of Fallot: associations

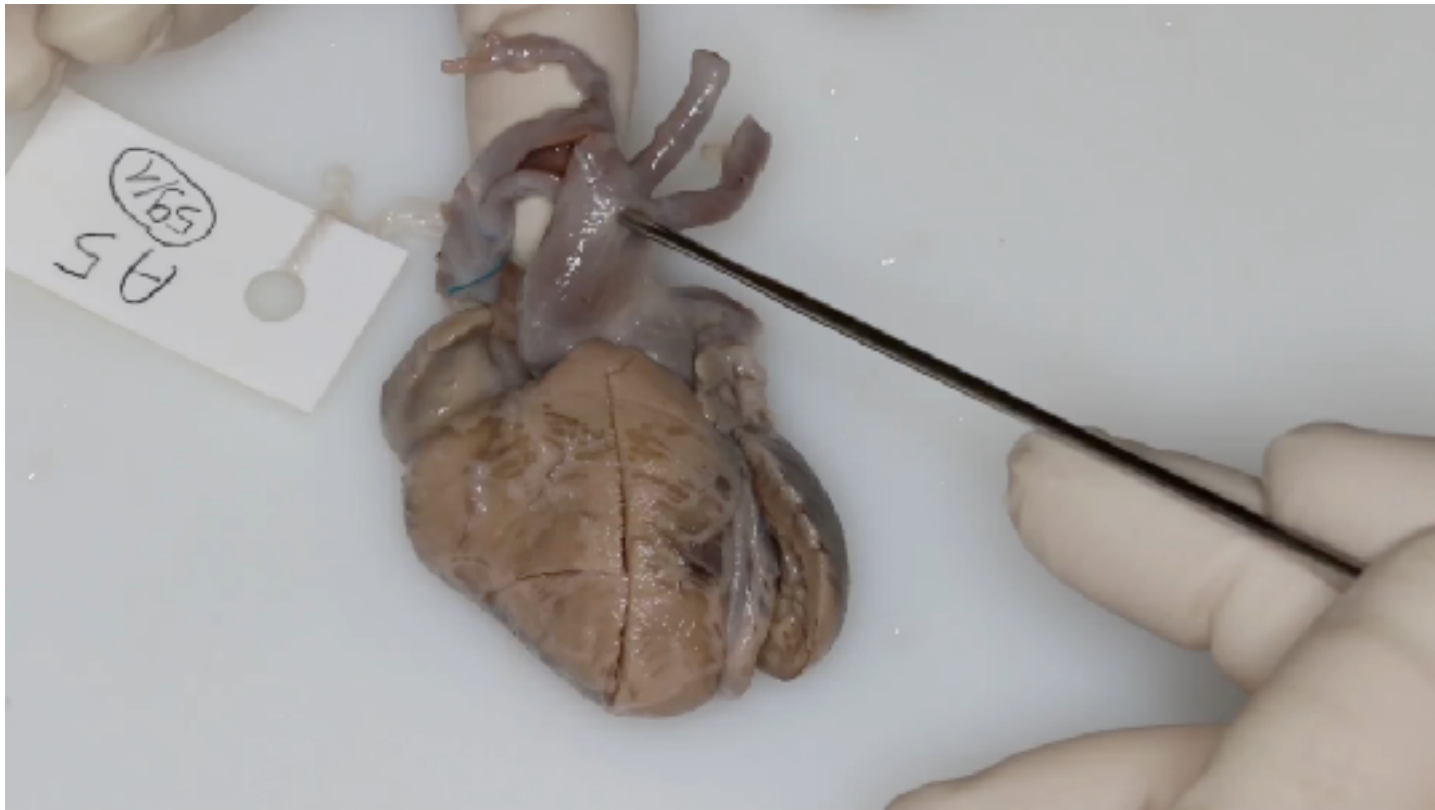


# Tetralogy of Fallot and atrioventricular septal defect



# Tetralogy of Fallot

## Aorto-pulmonary window



# Conclusion

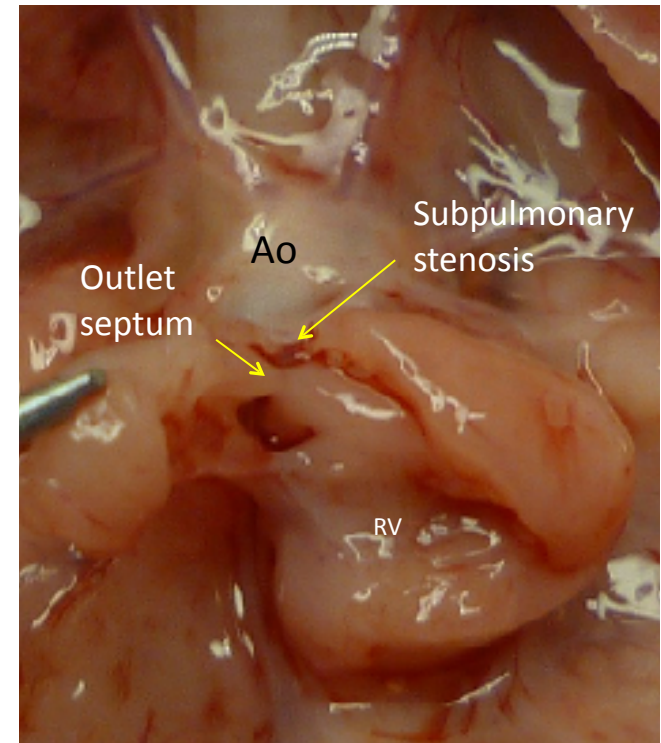
## The anatomic variants of tetralogy of Fallot

❑ Common anatomic basis = Anterior malalignment and deviation of the outlet septum

- Outlet VSD
- Overriding aorta
- RVOT obstruction

❑ Anatomic variants

- Postero-inferior rim of the VSD
  - ❑ Fibrous « perimembranous »
  - ❑ Muscular
- Outlet septum
  - ❑ Muscular
  - ❑ Fibrous
- Pulmonary valve
  - ❑ Absent
  - ❑ Atretic



Fetal heart  
15 WG

# TETRALOGY OF FALLOT

YEEHAW!

BOOT SHAPED HEART

PULMONARY STENOSIS

"OVERRIDING AORTA",  
DISPLACEMENT OF THE AORTA  
OVER THE VENTRICULAR  
SEPTAL DEFECT

RIGHT VENTRICULAR  
HYPERTROPHY

VENTRICULAR  
SEPTAL DEFECT

