



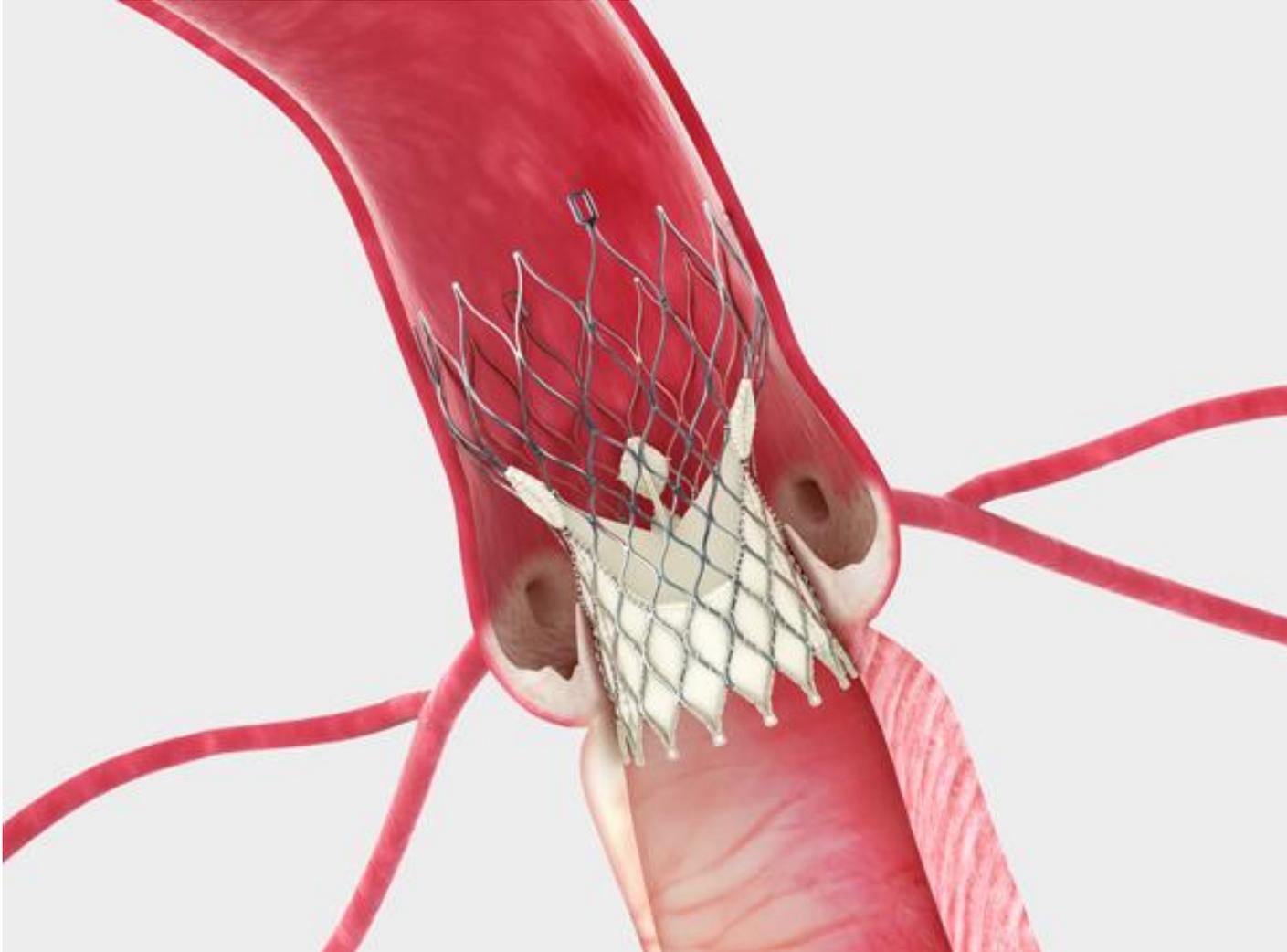
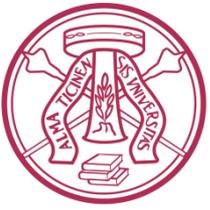
Analisi agli elementi finiti di Impianto Valvolare Aortico Transcatetere in annuli ellittici idealizzati: CoreValve vs. Portico

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Correlatore: **Dott. Alice Finotello**

A.A. 2017/2018





CoreValve vs Portico

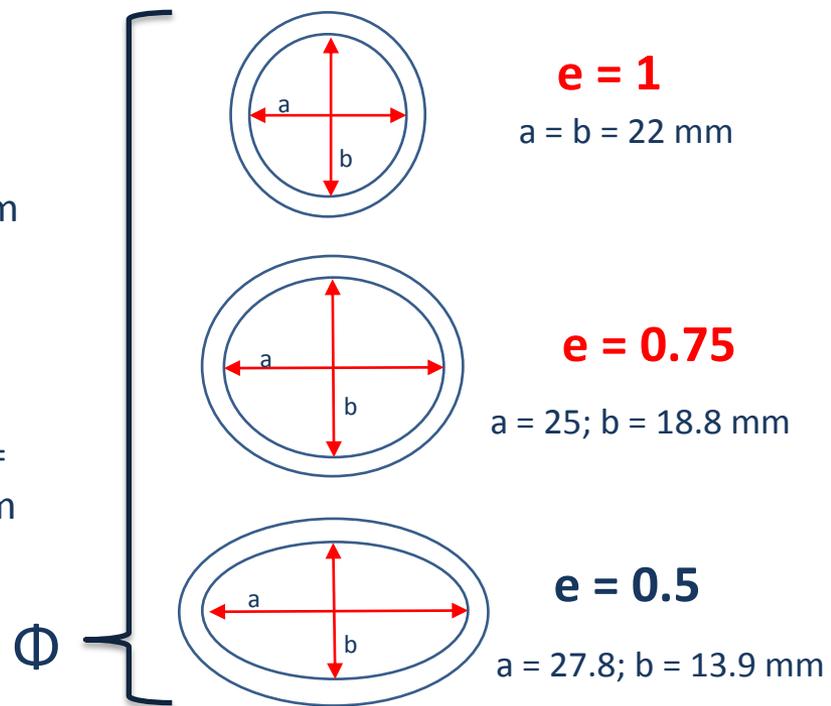
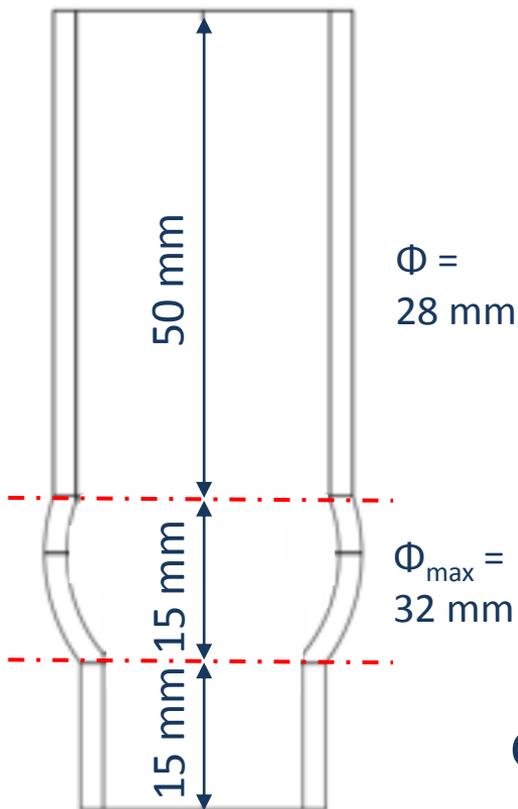
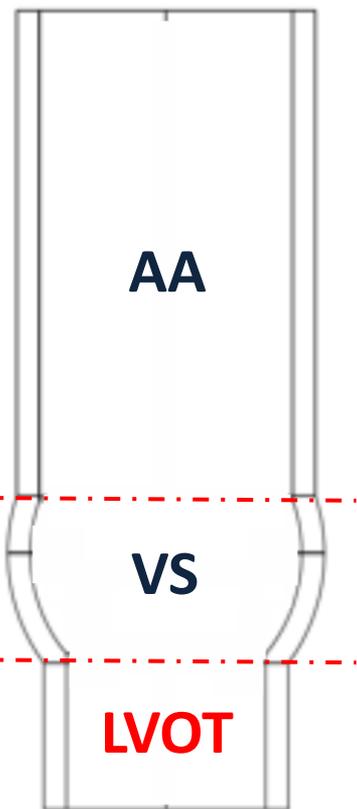
Annuli
ellittici

Presenza di
calcificazioni

Geometrie
idealizzate



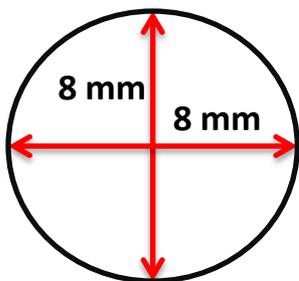
Radice aortica idealizzata



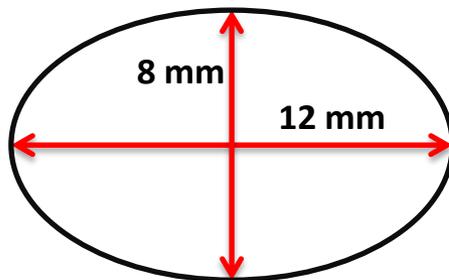


Calcificazioni

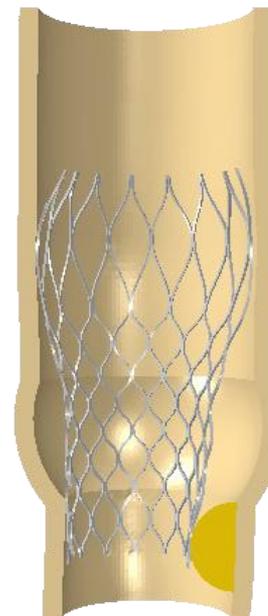
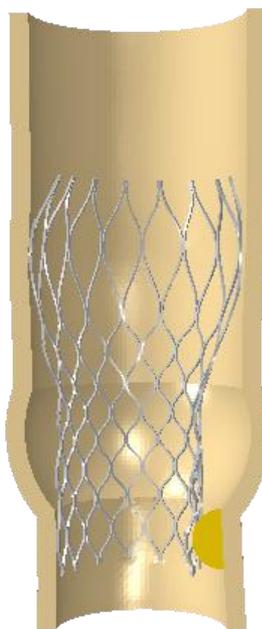
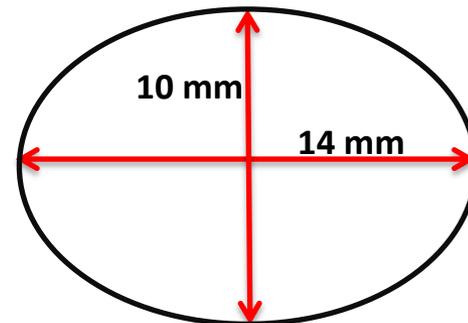
Calcio 1



Calcio 2



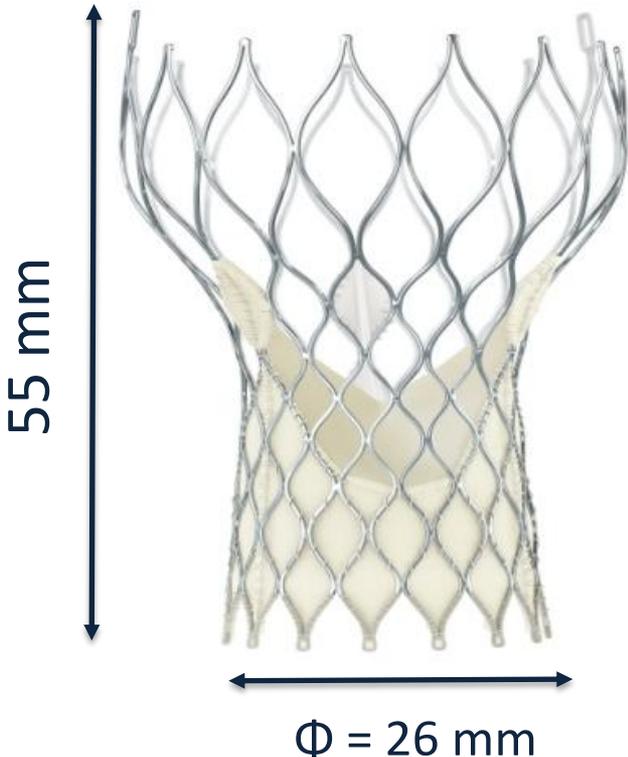
Calcio 3



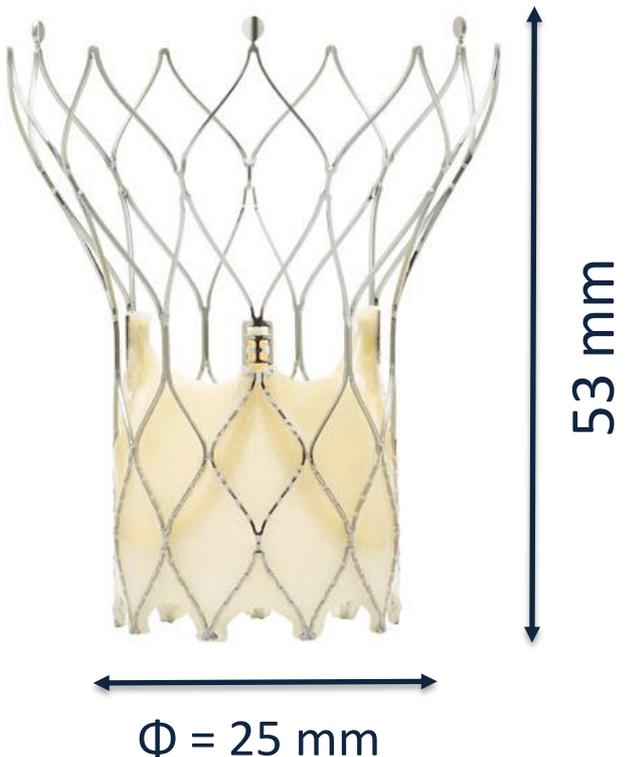
CoreValve, eccentricità = 1



CoreValve vs Portico



Medtronic CoreValve



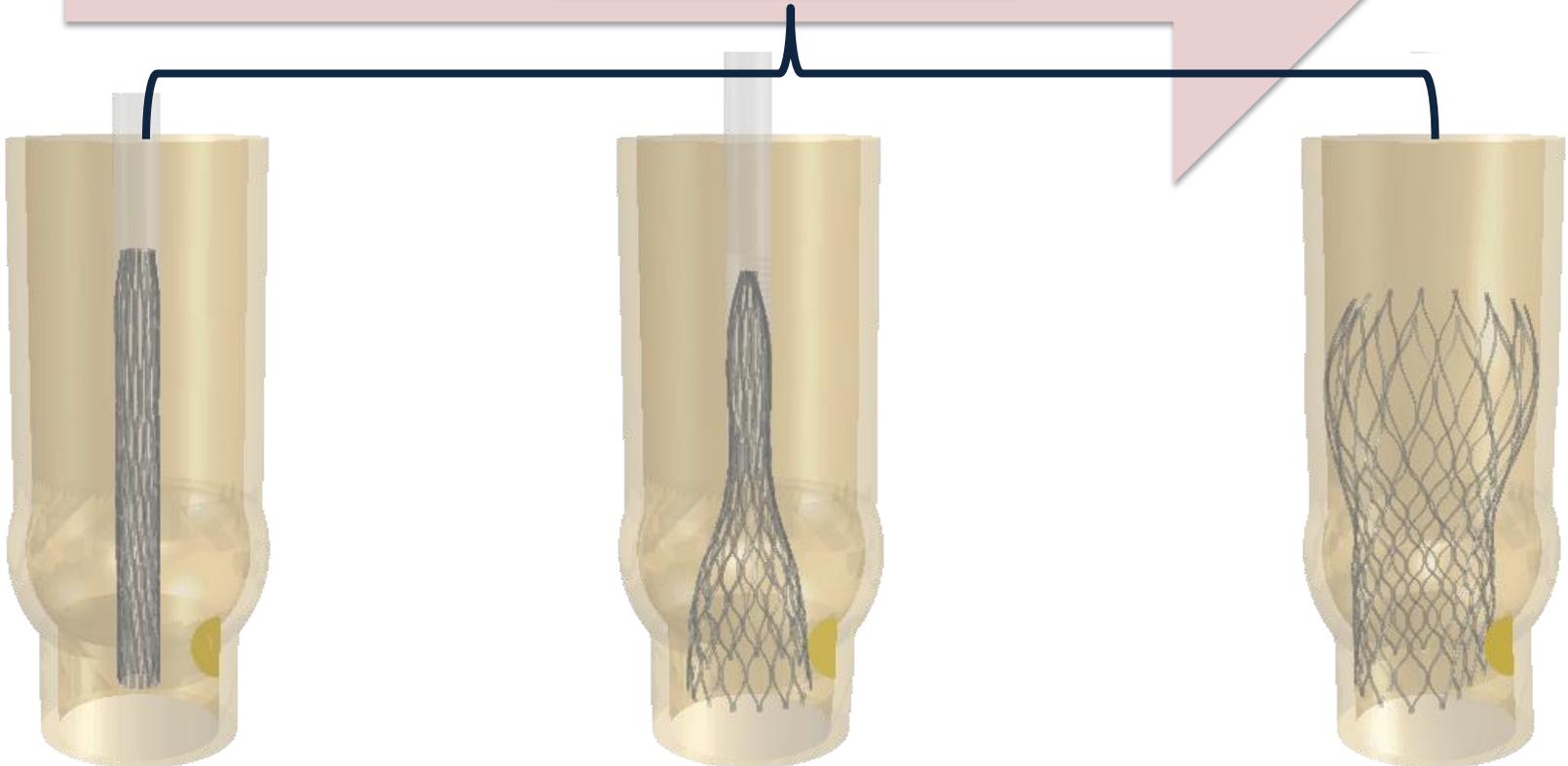
St. Jude Medical Portico



**PRE-
PROCESSING**

ANALISI FEM

**POST-
PROCESSING**



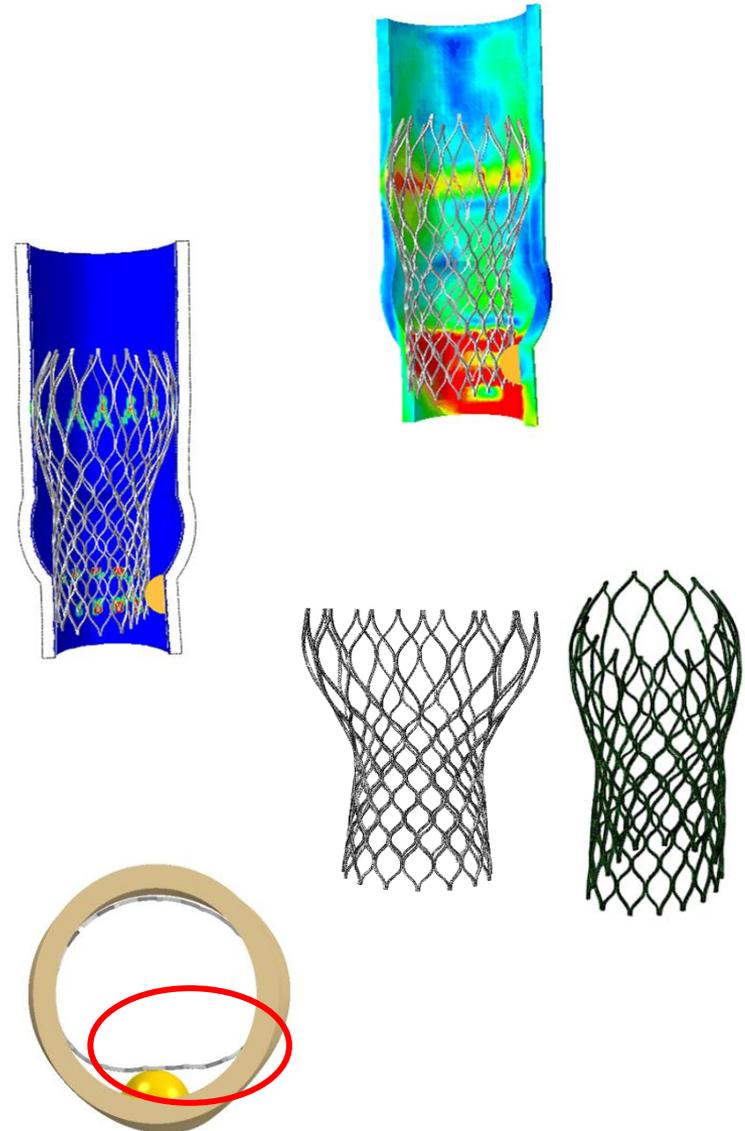


Stress di Von Mises

Area di contatto

Deformazione stent

Leak paravalvolare





Area di contatto



CoreValve
(e=1, calcio 2)

vs.

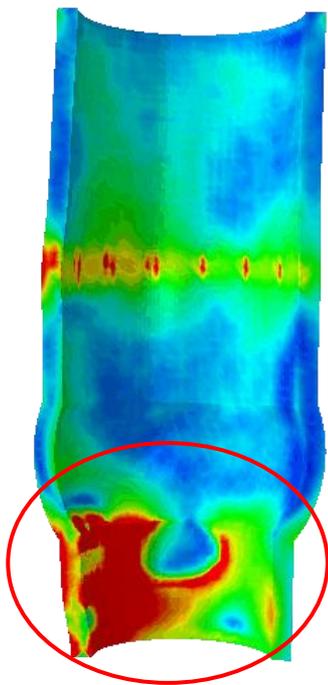
Portico
(e=1, calcio 2)

Stent-root interaction area [mm^2] – eccentricità 1		
Calcio	CoreValve	Portico
-----	742	237
Calcio 1	522	290
Calcio 2	603	255
Calcio 3	498	281

CoreValve >> Portico

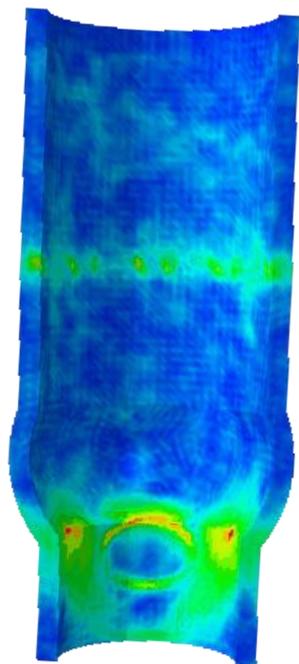


Stress di Von Mises



CoreValve
(e=1, calcio 2)

vs.



Portico
(e=1, calcio 2)

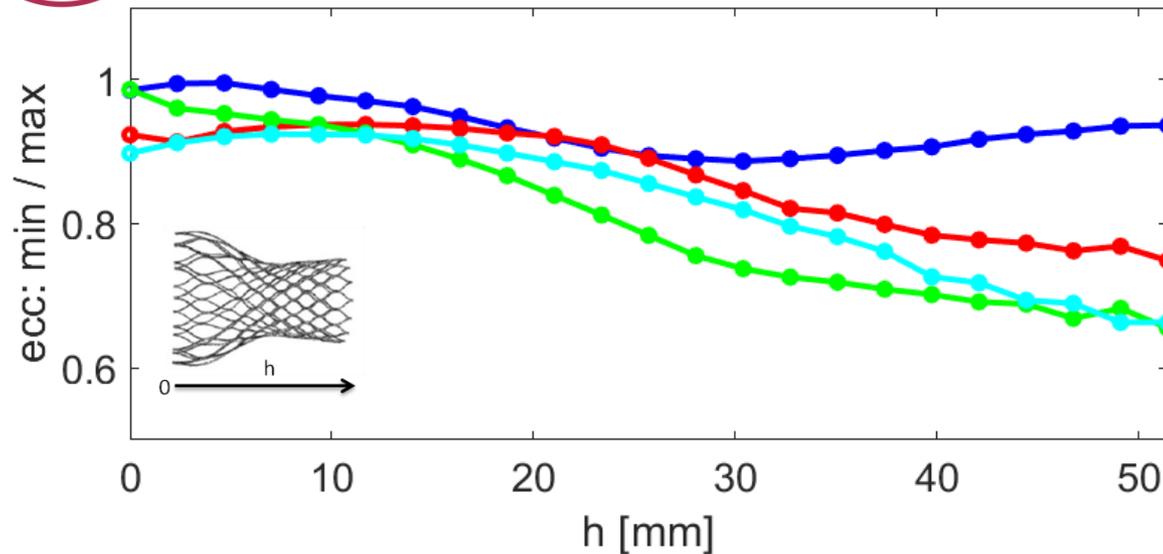
Von Mises stress [kPa/kPa] – eccentricità 1		
Calcio	CoreValve	Portico
-----	29/134	10/174
Calcio 1	62/237	21/185
Calcio 2	56/360	20/166
Calcio 3	56/243	23/237

CoreValve > Portico



Deformazione dello stent

CoreValve - eccentricità 1



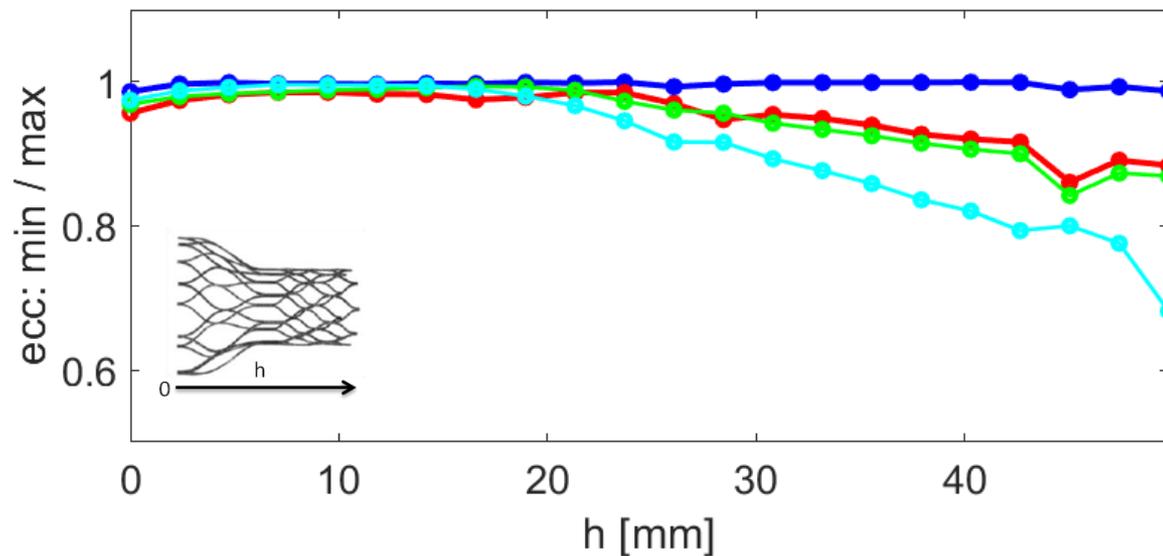
No calcio

Calcio 1

Calcio 2

Calcio 3

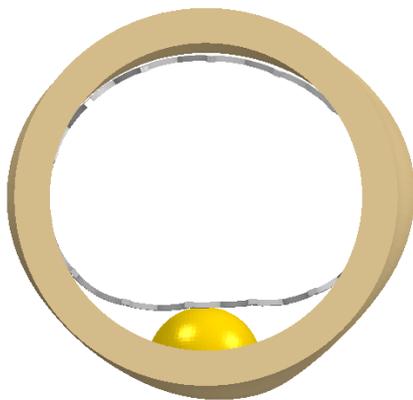
Portico - eccentricità 1





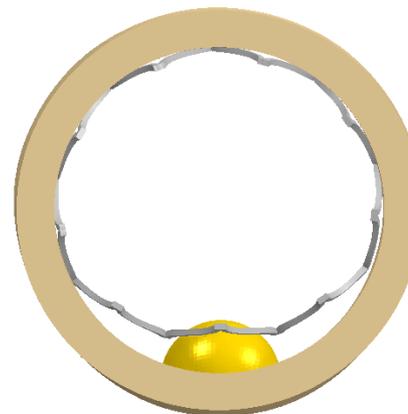
Leak paravalvolare

Paravalvular leakage [mm^2] – eccentricità 1		
Calcificazione	CoreValve	Portico
-----	0	0
Calcio 1	21	22
Calcio 2	35	23
Calcio 3	39	39



CoreValve
($e=1$, calcio 1)

vs.



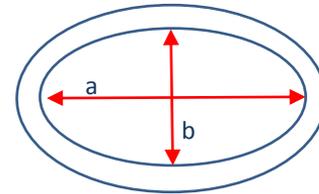
Portico
($e=1$, calcio 1)



- Area di contatto & Stress di Von Mises: **CoreValve** vs. Portico
- Deformazione dello stent: CoreValve vs. **Portico**
- Leak paravalvolare: CoreValve vs. **Portico**



$e=0.5$

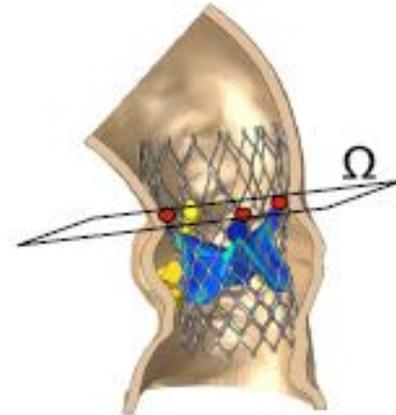


$e = 0.5$

$a = 27.8; b = 13.9 \text{ mm}$



Simulazioni
patient-specific





Grazie