

CONTROVERSES ET ACTUALITÉS EN CHIRURGIE VASCULAIRE
CONTROVERSIES & UPDATES IN VASCULAR SURGERY

JANUARY 19-21 2017

MARRIOTT RIVE GAUCHE & CONFERENCE CENTER

PARIS, FRANCE



Examiner les EVAR explantés, pourquoi est-ce important ?

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Grouppe Européen de Recherche sur les Prothèses
Appliquées à la Chirurgie Vasculaire



Les Hôpitaux
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Disclosure

Speaker name:

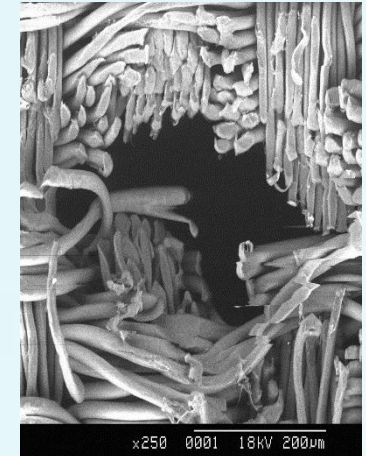
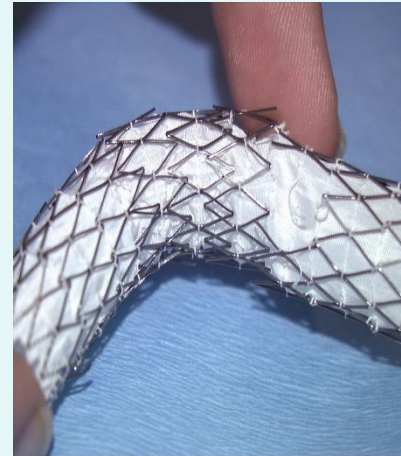
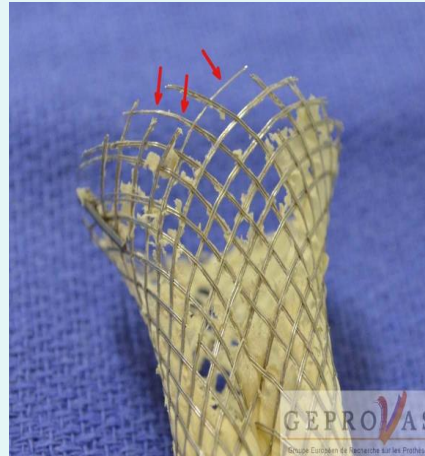
.Nabil CHAKFE.....

- I have the following potential conflicts of interest to report:
- Consulting
- Employment in industry
- Shareholder in a healthcare company
- Owner of a healthcare company
- Other(s)
- I do not have any potential conflict of interest

FIRST GENERATION OF ENDOGRAFTS

First generations of endografts introduced in the 90's

- High rate of graft-related complications¹
- Mechanisms evaluated by our group^{2,3}



1. Leurs LJ et al. Long-term results of endovascular abdominal aortic aneurysm treatment with the first generation of commercially available stent grafts. *Arch Surg* 2007; 142: 33-41.
2. Riepe G et al. Frame dislocation of body middle rings in endovascular stent tube grafts. *Eur J Vasc Endovasc Surg* 1999; 17: 28-34.
3. Chakfé N, et al. The influence of the textile structure on aortic endoprostheses degradation. Evaluation of explanted grafts. *Eur J Vasc Endovasc Surg* 2004; 27: 33-41.

NEW GENERATIONS OF ENDOGRAFTS

Second generation of endografts provided better clinical results BUT:

- Implanted in more and more challenging indications: angulation, ...
- Implanted in more and more challenging locations: thoracic, aortic arch, ...
- Implanted in younger and younger patients: durability ?
- Complications still remain: endotension ?

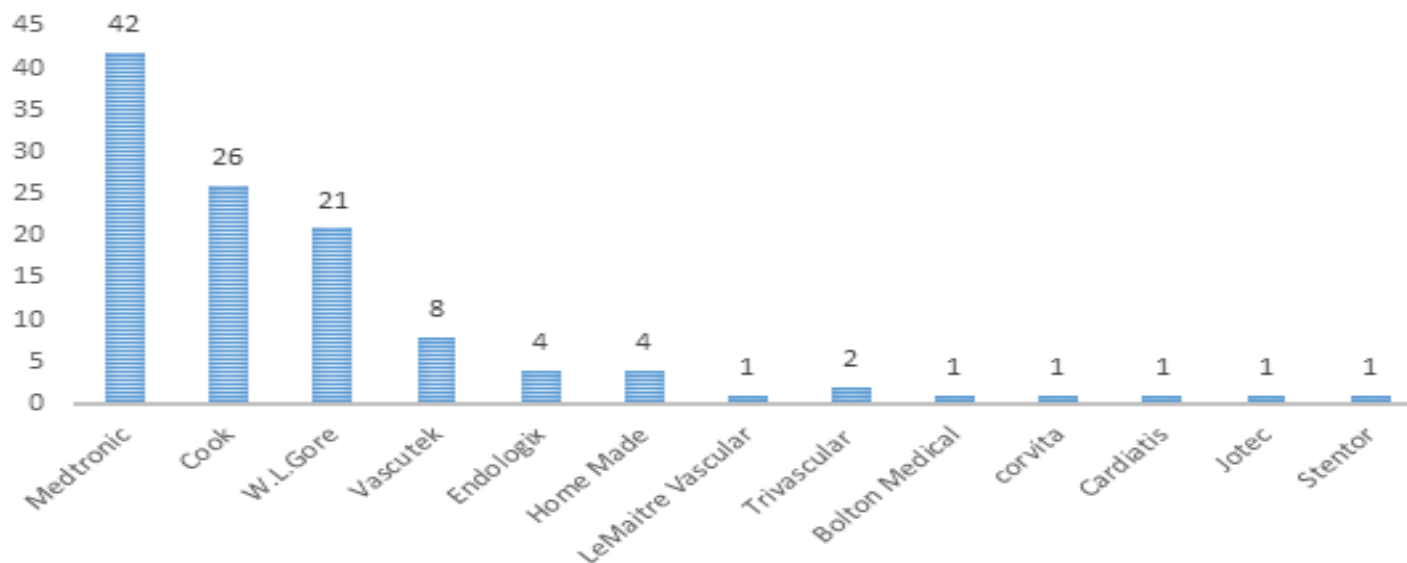
A EUROPEAN COLLABORATIVE RETRIEVAL PROGRAM

From January 2011 to June 2016 we collected 114 endografts



Société de Chirurgie Vasculaire et
Endovasculaire de Langue Française

2011-2016 ENDOPROSTHESIS PER BRAND



European Society
for Vascular Surgery

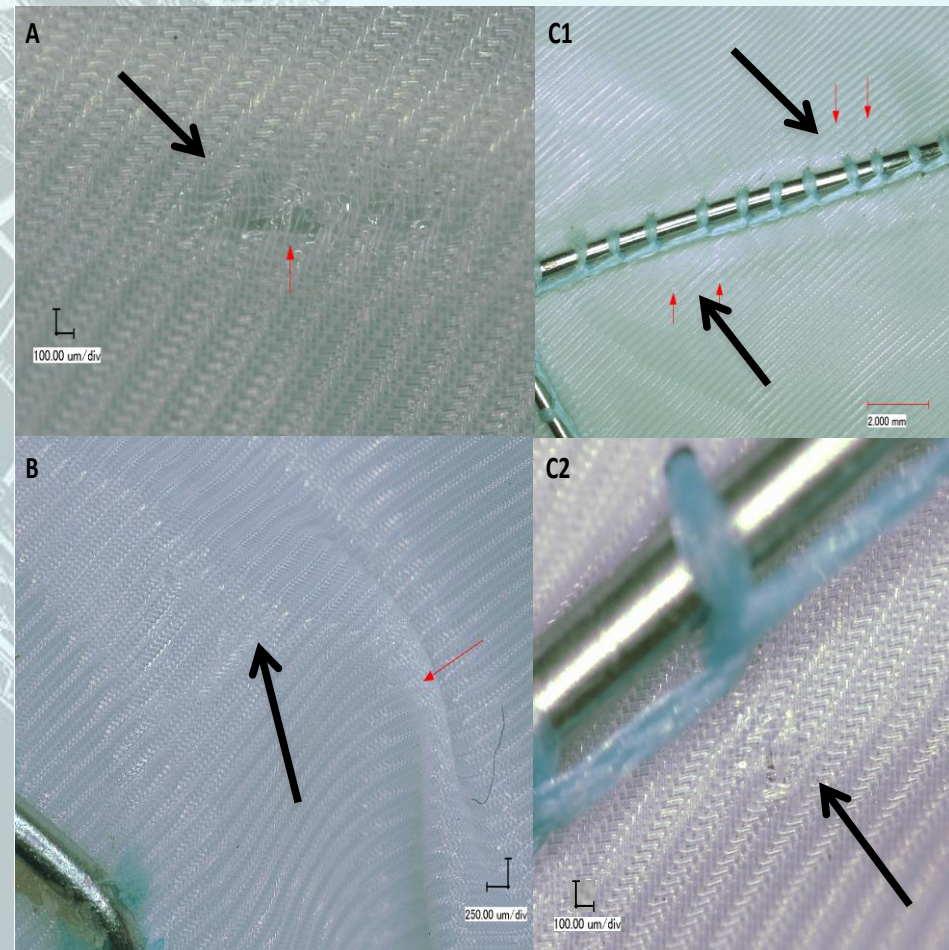
TEXTILE ENDOPROSTHESES



Endografts structural characteristics:

Classification of fabric degradation:

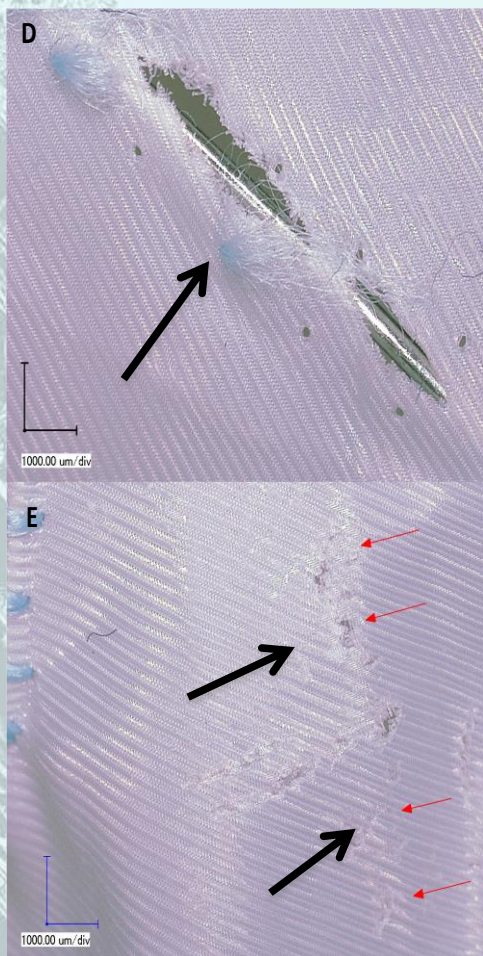
- **IOS**, Indentation of a Stent (A)
- **KIN**, Kinking (B)
- **IOK**, Indentation of a Knot (C1, C2)



TEXTILE ENDOPROSTHESES



Endografts structural characteristics:



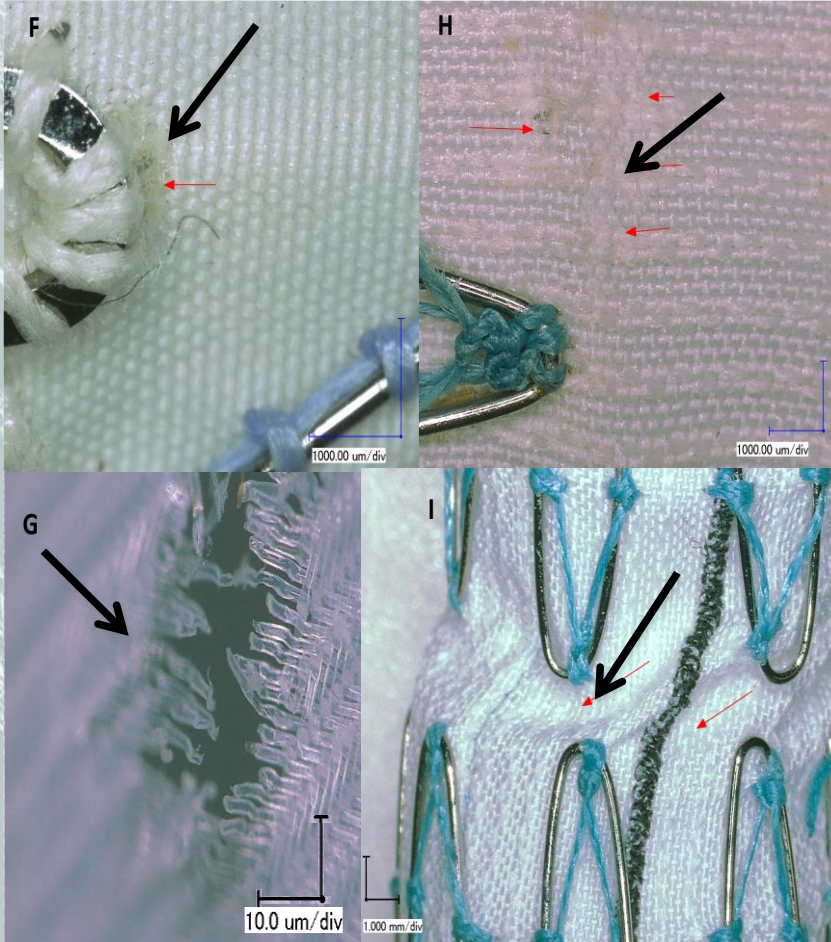
Classification of fabric degradation:

- **AFM**, Abrasion Fabric-Metal (D)
- **AFC**, Abrasion Fabric-Calcification (E)

TEXTILE ENDOPROSTHESES



Endografts structural characteristics:



Classification of fabric degradation:

- **AFS**, Abrasion Fabric Stitches (F)
- **FOF**, Fatigue of Fabric (G)
- **AFF**, Abrasion Fabric Fabric (H)
- **TOF**, Twisting of the Fabric (I)

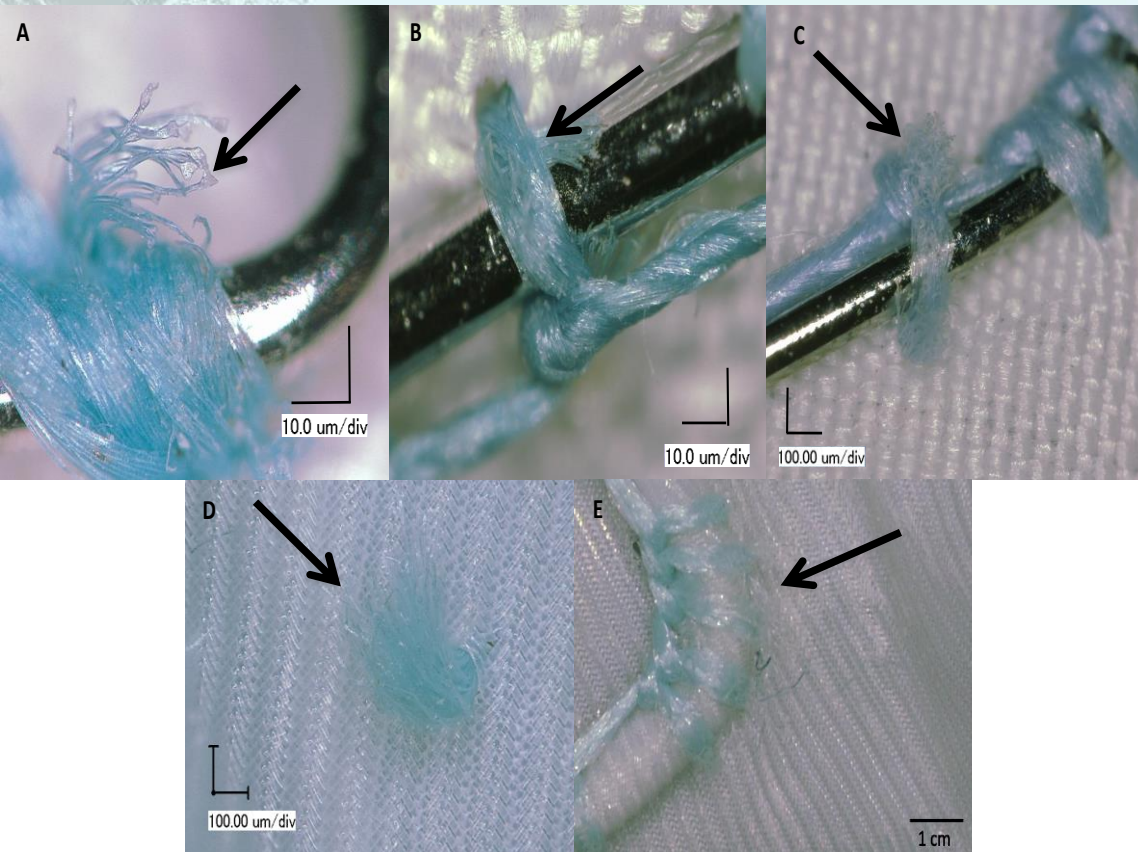
TEXTILE ENDOPROSTHESES



Endografts structural characteristics:

Classification of stitches degradation:

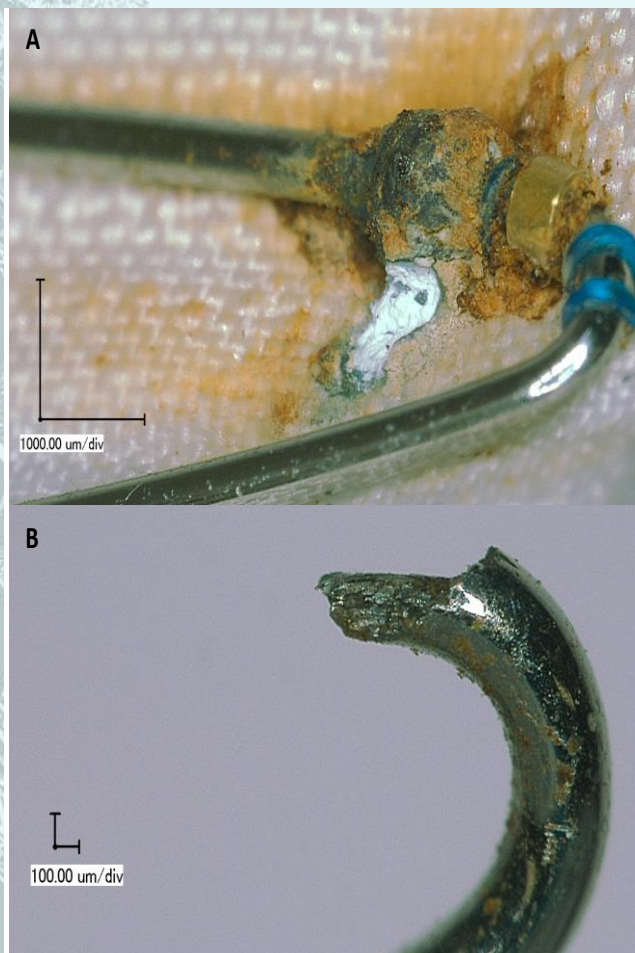
- **POK**, Pinching of a Knot (A)
- **ASM**, Abrasion Stiches Metal (B)
- **ASS**, Abrasion Stitching filaments (C)
- **FOF**, Fatigue of the Fabric (D)
- **ASF**, Abrasion Fabric Stitches (E)



TEXTILE ENDOPROSTHESES



Endografts structural characteristics:



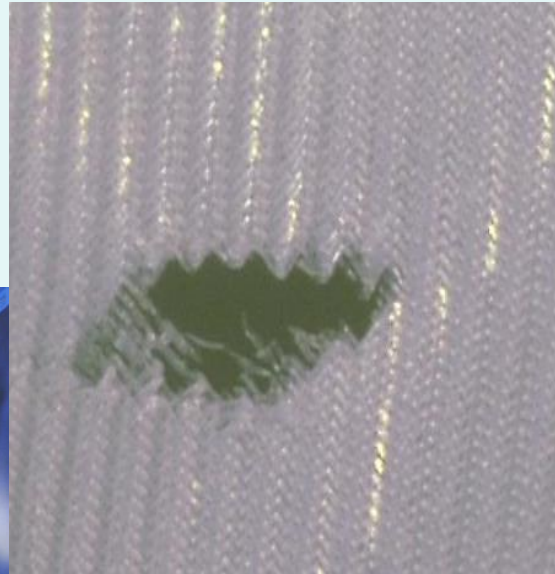
Classification of stents degradation:

- COR, Corrosion (A)
- RUP, Rupture (B)

TEXTILE ENDOPROSTHESES



Overall loss of fabric:
- Surface calculation



No.	Area	Perimeter
1	123.52 um2	25.67 um
2	276447.24 um2	4320.51 um
3	782.32 um2	161.29 um
4	247.05 um2	47.58 um
5	817.05 um2	10.00 um
6	110.00 um2	10.00 um
7	110.00 um2	10.00 um
8	110.00 um2	10.00 um
9	110.00 um2	10.00 um
10	110.00 um2	10.00 um

Area ratio	Total area
0.40 %	317210.23 um2
Count	Full area
12	79055509.88 um2

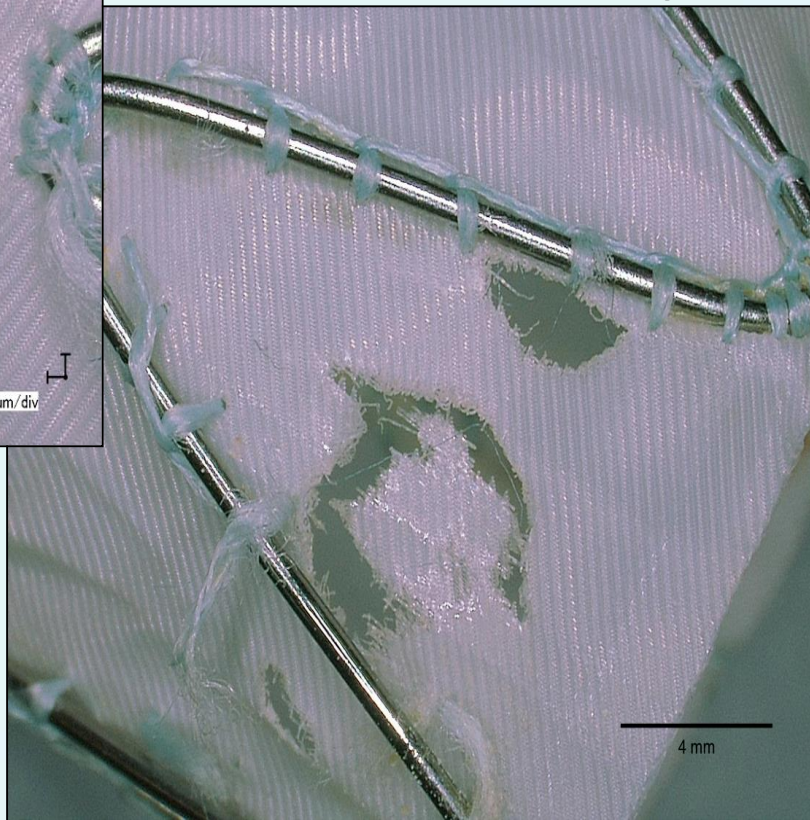
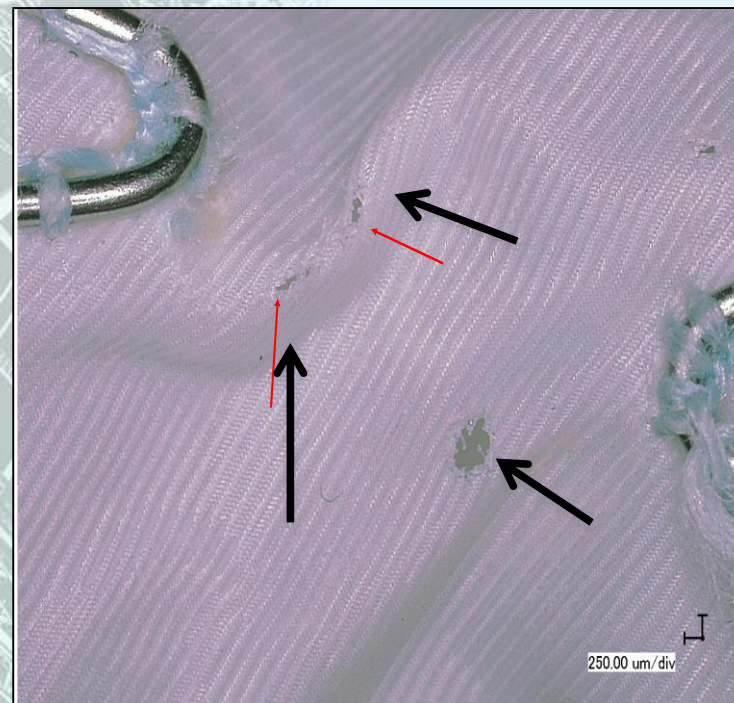


TEXTILE ENDOPROSTHESES



Endografts overall structural damages:

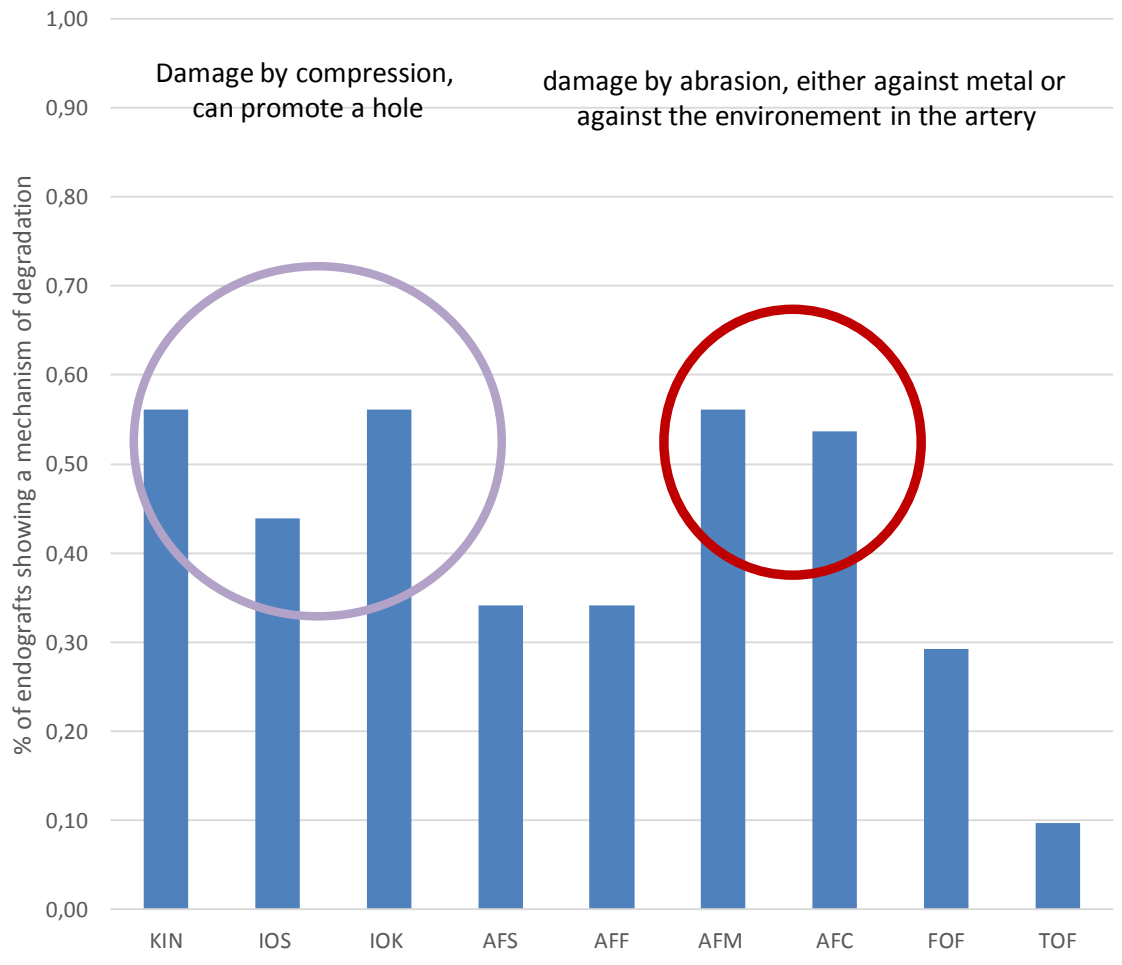
Out of the 41 samples, 23 showed kinking. On this 23 grafts a total of 142 tears and holes were observed mainly located either on a kink or on a stent, promoting tears.



TEXTILE ENDOPROSTHESES



Endografts structural damages:



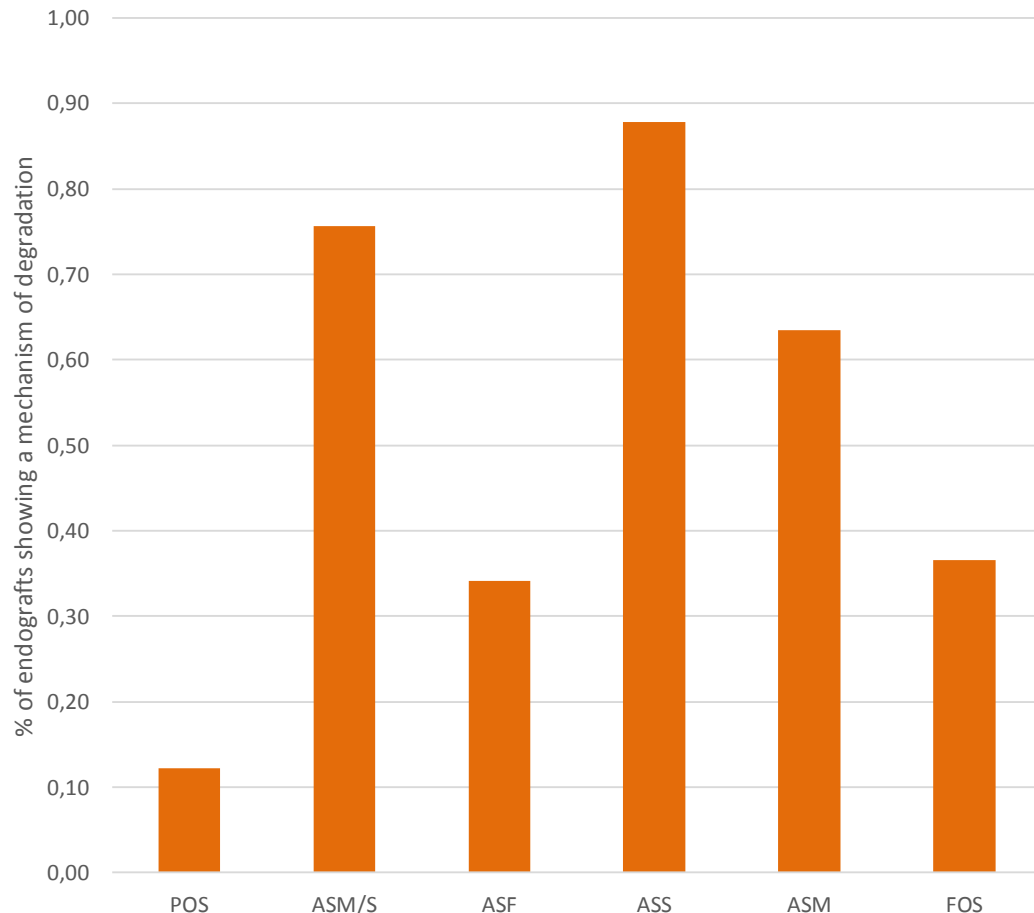
Most observed damages on the fabric:

- **Compression**, that can promote holes
- **Abrasion**, against stents or arterial environment

TEXTILE ENDOPROSTHESES



Endografts structural damages:



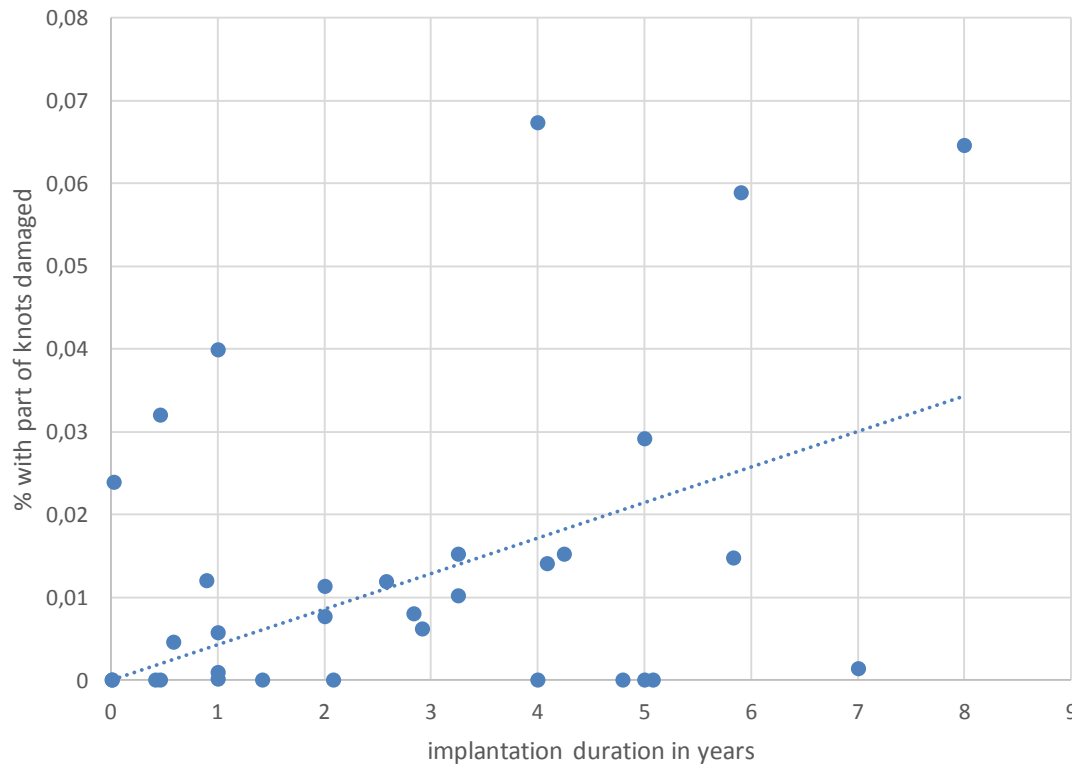
Most observed damages on the stitches:

- **95%** of the grafts showed damaged stitches by at least one type of abrasion.

TEXTILE ENDOPROSTHESES



Endografts structural damages:



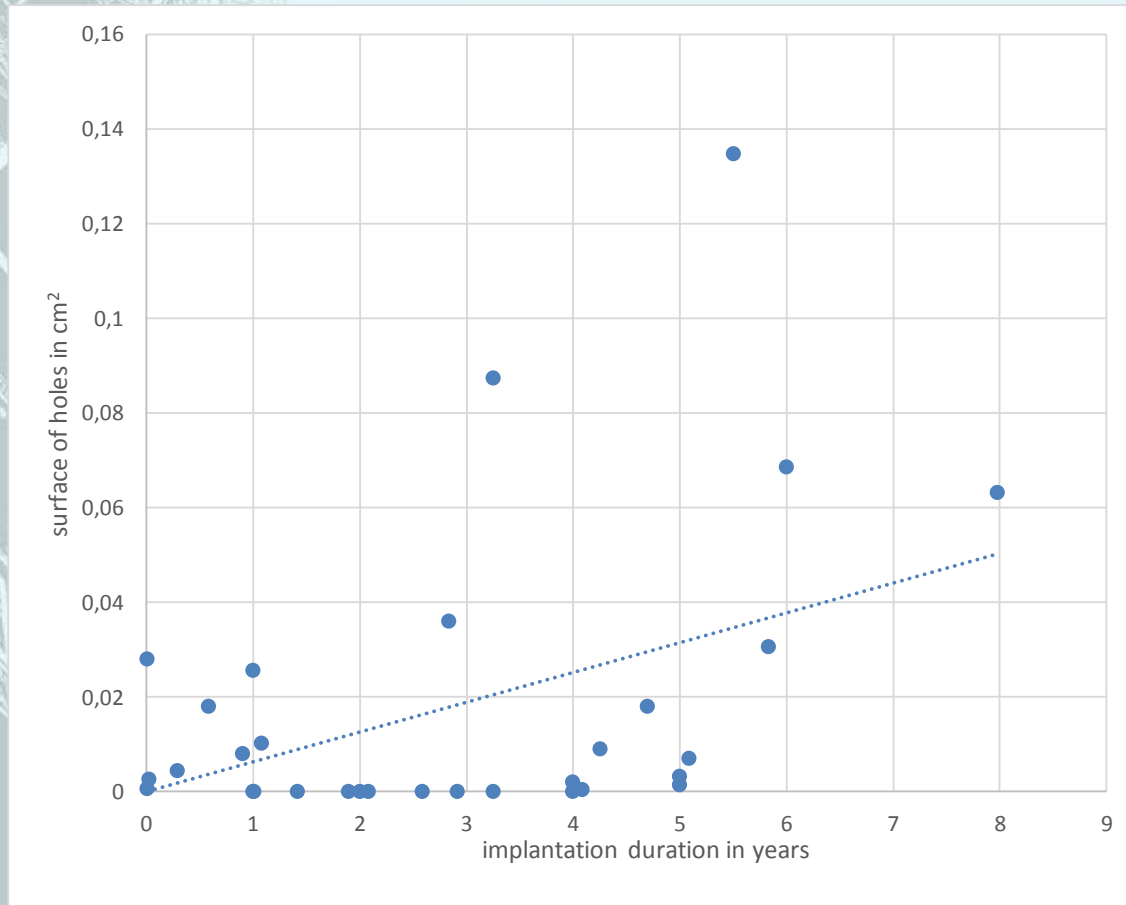
Time-related stitches degradation:

- A tendency for increase of structural degradation with time.

TEXTILE ENDOPROSTHESES

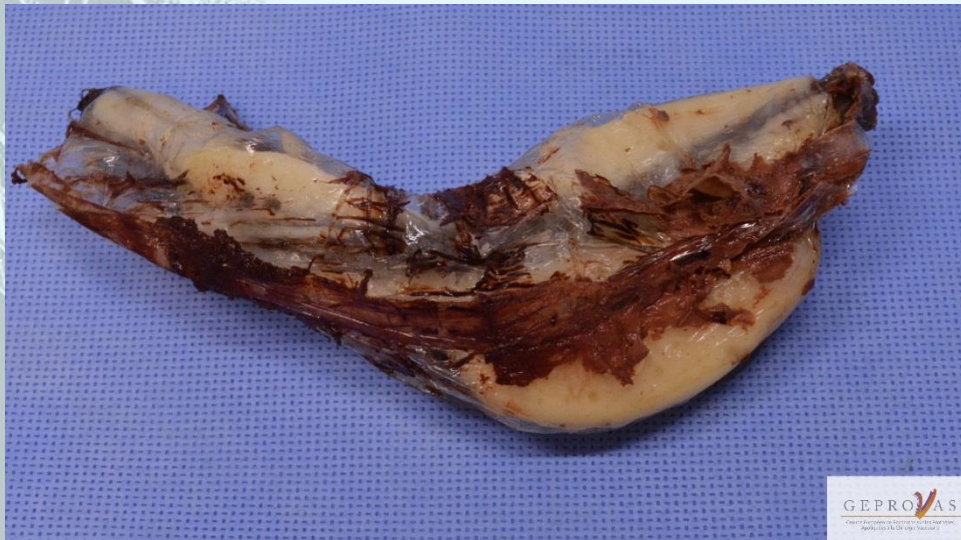


Overall loss of fabric:



**Time-related
increases of overall
surface holes within
the fabric:**

OTHER DESIGNS OF ENDOPROSTHESES



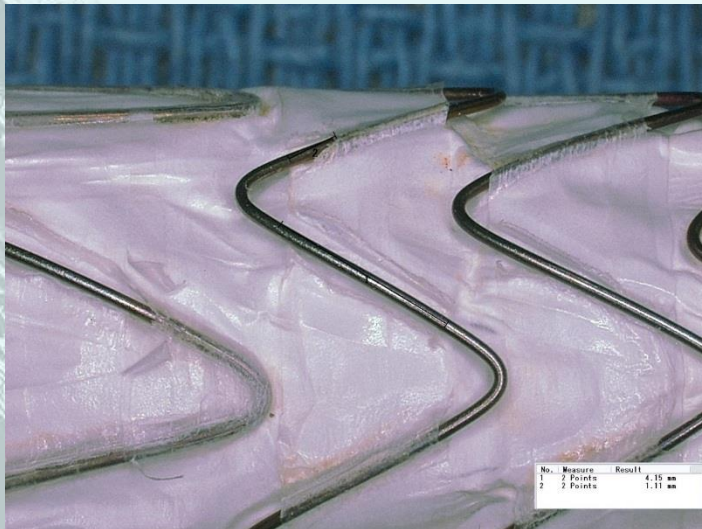
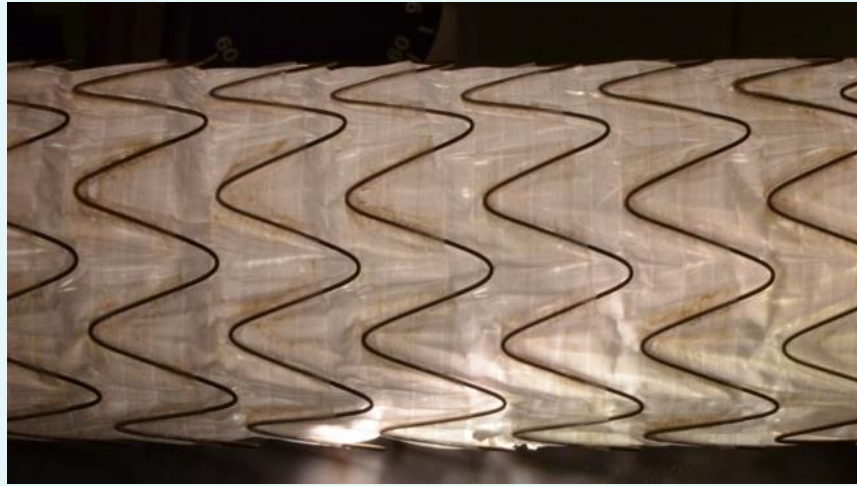
ePTFE ENDOPROSTHESES

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CONCLUSIONS



Textile classification of structural degradation of endografts:

- Coming from an experienced group associating vascular surgeons and textile engineers
- Reproducible
- Helps in improving knowledge on long-term *in vivo* behavior of vascular devices
- **Allows objective data** and not feelings
- Allows proposal of ***in vitro* tests to confirm**

CONCLUSIONS



Durability of second generation of endografts:

- Obviously more stable than first generations
- BUT there is **an obligatory ageing that must not be**

underestimated

- Main risks are: **stitches stability** and **abrasion of the**

fabric

CONCLUSIONS



Is there here a result that can explain endotension?



Not fully leak-proof
fabric?

THANKS FOR PARTICIPATING CENTERS

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SAVE THE DATE

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10th
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v
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b
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NEW ENDOVASCULAR TECHNOLOGIES | FROM BENCH TEST TO CLINICAL PRACTICE

esvb 2017

SPECIAL EDITION | 10TH ANNIVERSARY

3-days congress: Simulation bootcamp, Satellite symposium, Experts conferences

2017 topics:

- Durability of vascular and endovascular devices
- Latest trends in per-operative imaging technologies
- Tissue, plaque and vessel wall properties and endovascular technologies
- Expert updates on latest endovascular technologies