Marie Skłodowska-Curie Actions (MSCA)
Innovative Training Networks (ITN)
H2020-MSCA-ITN-2017

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SPINe: Numerical and Experimental Repair Strategies
Management Meeting
Friday, 23rd October 2020

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 766012

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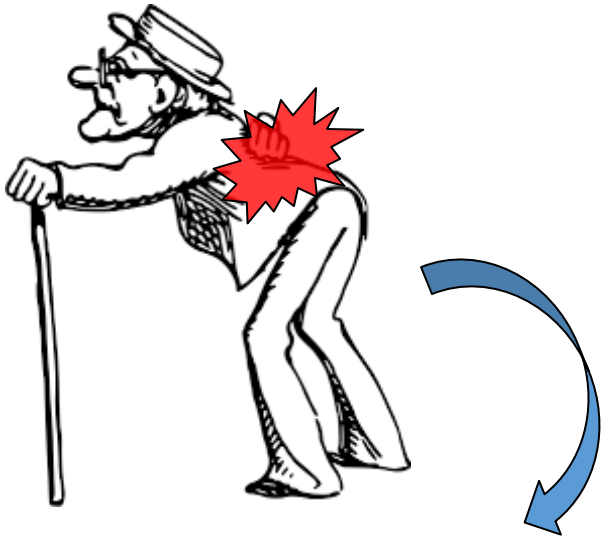
Percutaneous Cement Discoplasty: biomechanical and clinical assessment of an innovative treatment of intervertebral disc disease

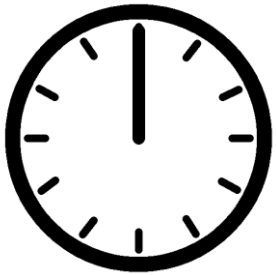
ESR3: Chloe Techens

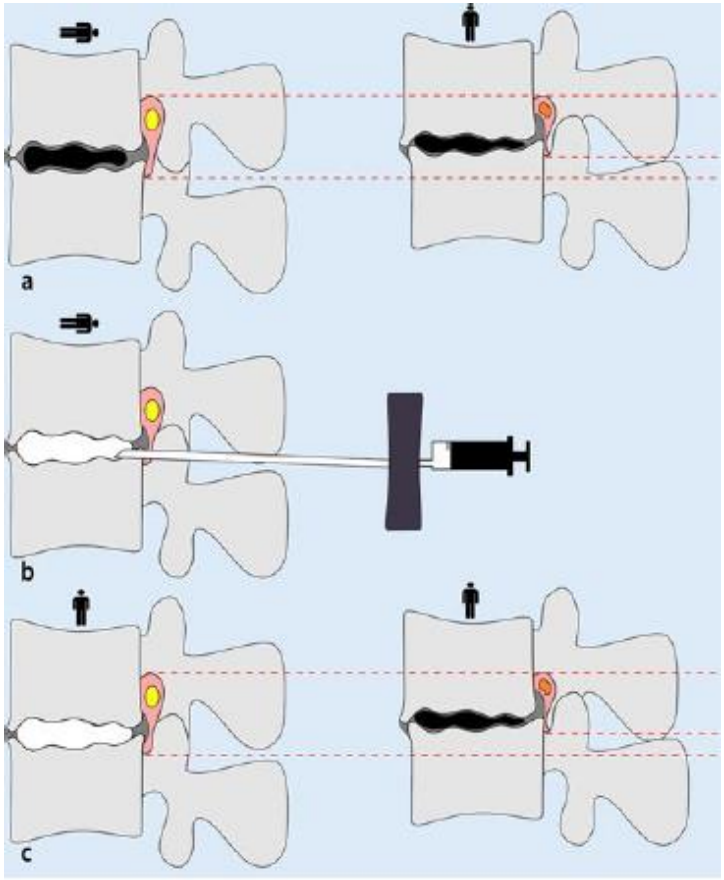
NATIONAL CENTER FOR SPINAL DISORDERS

European Union's Horizon 2020 Marie Skłodowska- Curie ITN grant SPINNER No. 766012.

Percutaneous Cement Discoplasty







Varga PP and al, Experiences with PMMA cement as a stand-alone intervertebral spacer, Orthopade. 2015 Nov;44 Suppl 1:S1-7.
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Aim

- Understanding the biomechanics of the segment following discoplasty
- Exploring the impact of surgery on patients to predict surgical outcome
- Preventing surgery complications and spine failure

1st year

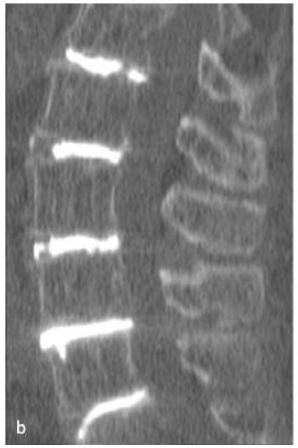
- Development of the methodology *(Bologna)*

2nd year

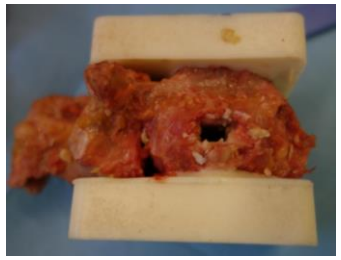
- Measuring of *in vitro* human spine behaviour *(Bologna)*

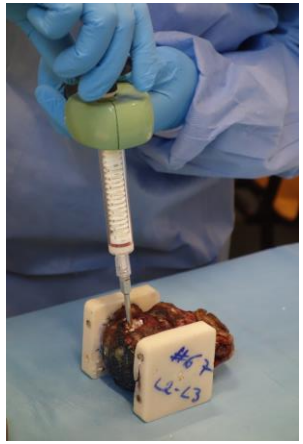
Summary 1st year activities

In vivo

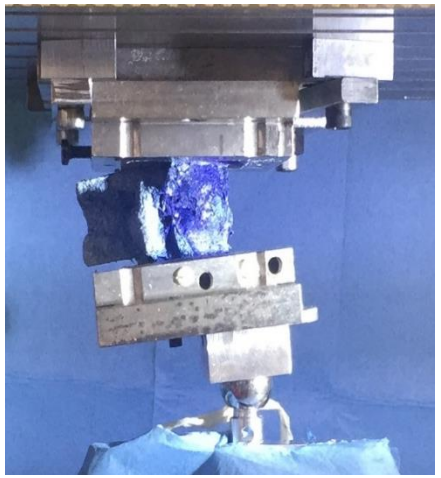


In vitro





- Establish an *in vitro* model of degenerated discs
- Establish an *in vitro* model of discoplasty
- Run a preliminary study to validate the models and the testing protocol on porcine spines



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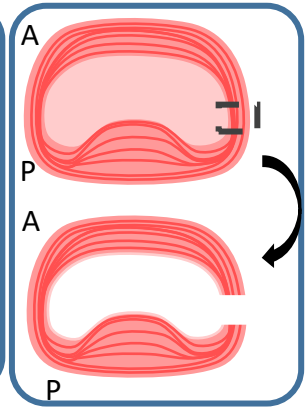
2nd year activities

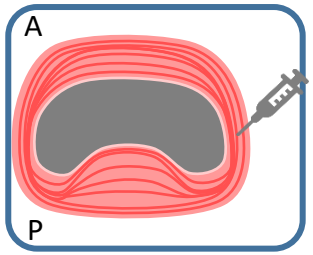
Human study → Protocol definition → Testing

Cleaning and Alignment

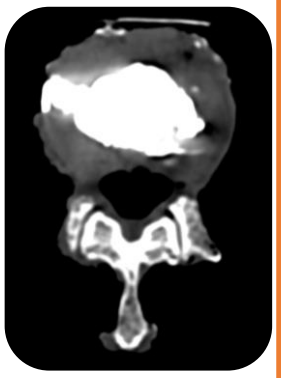


Nucleotomy

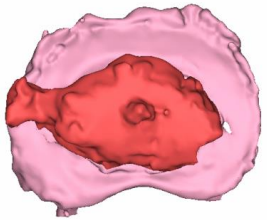
Speckle Pattern



Discoplasty



Imaging - CT



Segmentation

Testing

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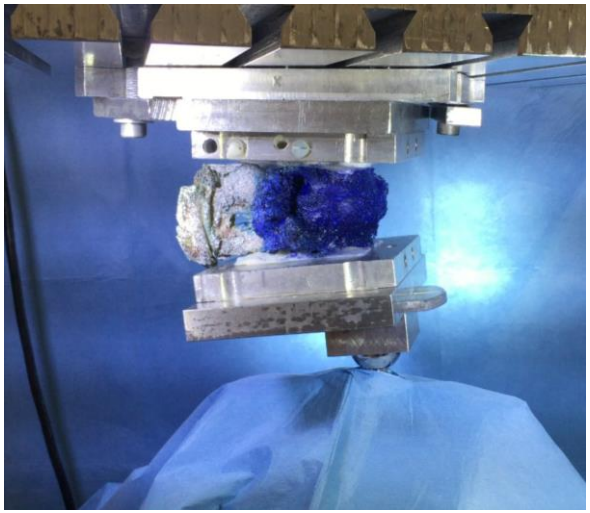
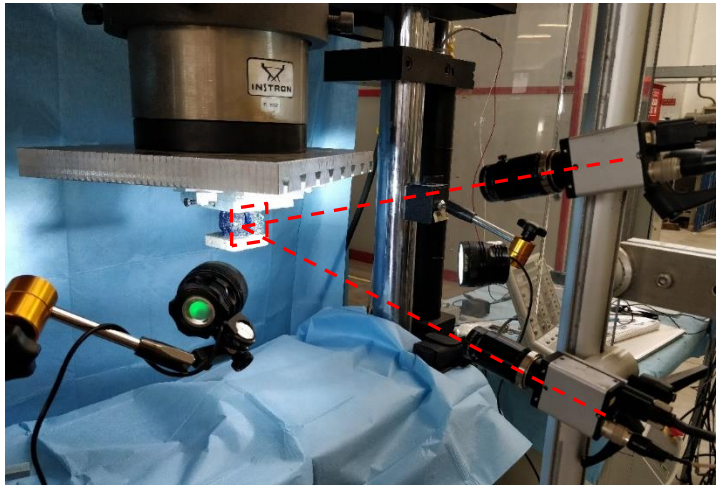
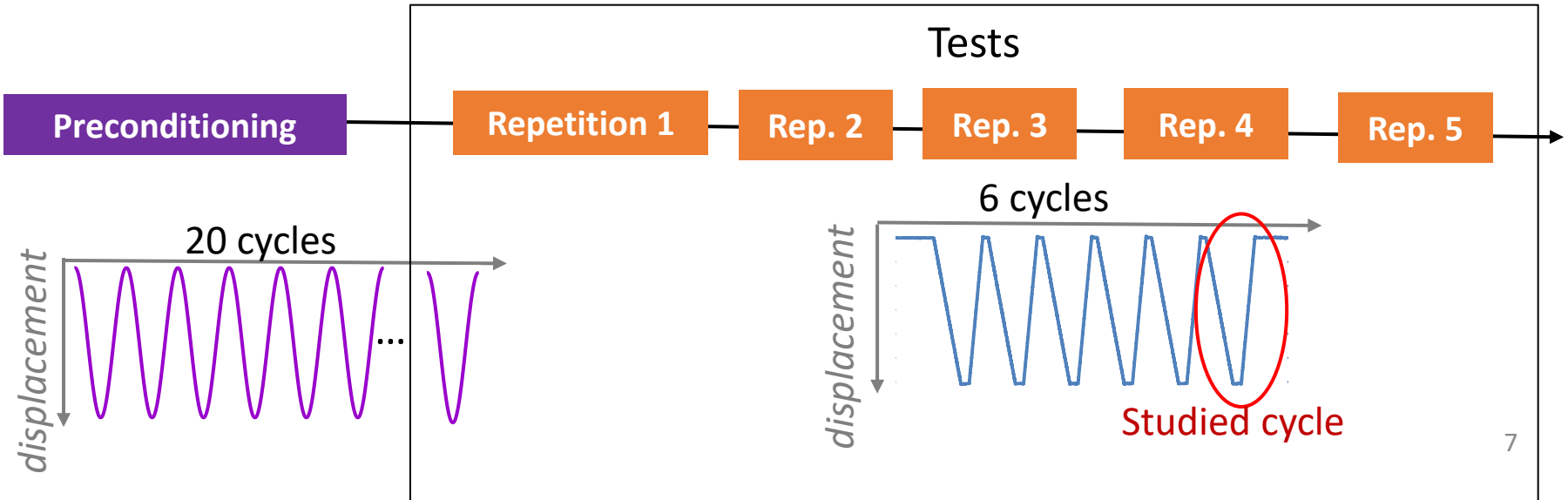
Experiment







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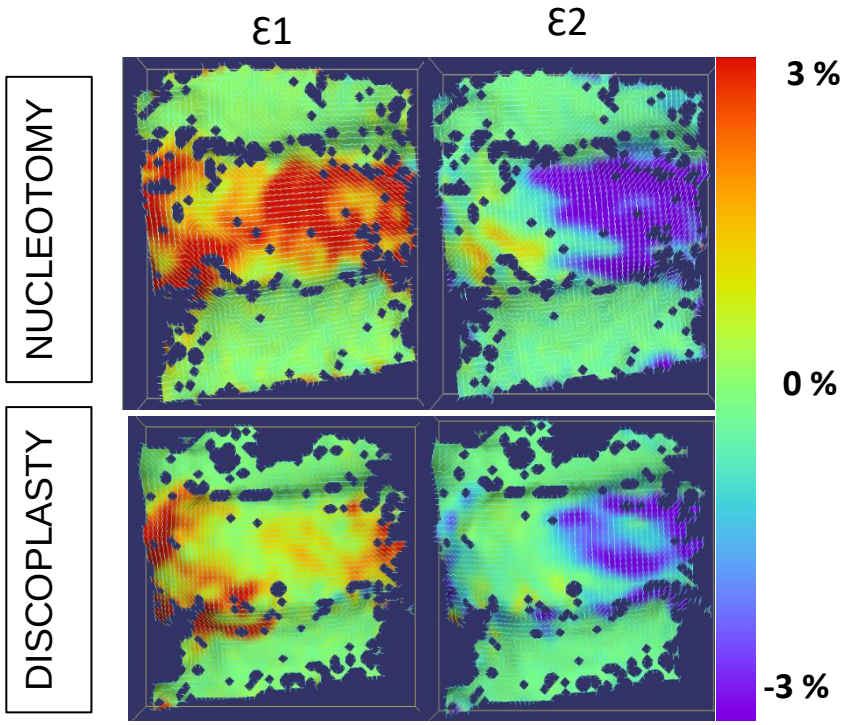
2nd year activities

Human study → Protocol definition → Testing → Data processing



Principal strains in Flexion

Height recovered
Stability increased in flexion
Strain trends smoothing
Strain peaks reduction

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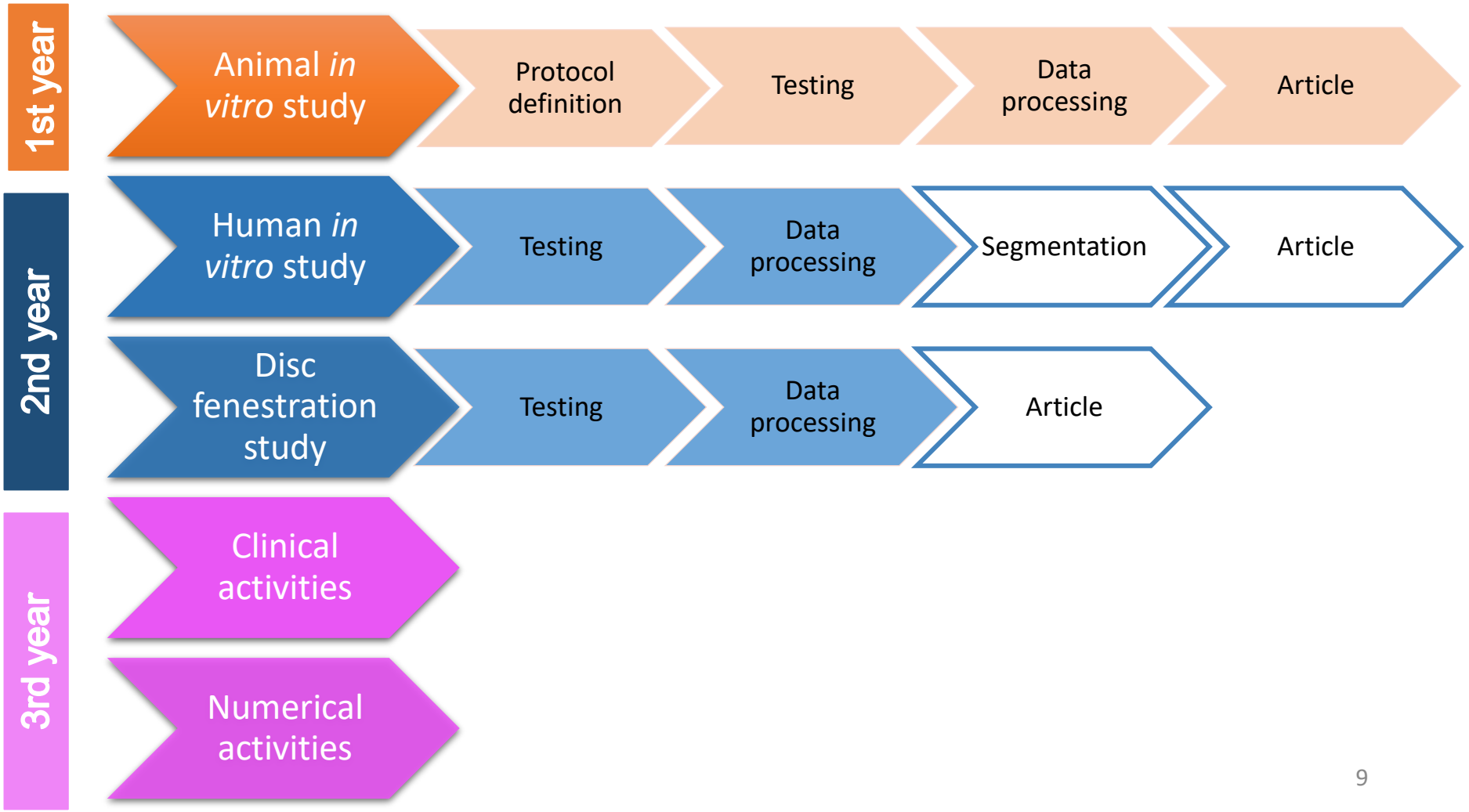
PhD activities summary



Training and Dissemination

Attended courses/conferences:

- Possible role of metal-based antimicrobials in the Antimicrobial Resistance Era, Raymond J. Turner
- Exploration of small bodies of the Solar System: focus on comets", Dr. Maria Cristina De Sanctis

Training event Public engagement - Sheffield

Teaching activities:

Seminar on spine surgeries + discoplasty

Supervision Master student project about the effect of annulus fenestration on disc biomechanics

Publications of 2nd year:

C. Techens, M. Palanca, P. E. Eltes, A. Lazary, et L. Cristofolini, « Testing the impact of discoplasty on the biomechanics of the intervertebral disc with simulated degeneration: an in vitro porcine study », Med. Eng. Phys., juill. 2020, doi: 10.1016/j.medengphy.2020.07.024.

Thank you for your attention !

Questions?

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