



**3D-SIDE**

L'impression 3D au service du traitement des tumeurs osseuses

Patient Specific Surgical Technology

Planning, Instruments & Implants

# 3D-Side

- ✓ Belgian Start-up (Université Catholique de Louvain) - 2015
- ✓ R&D activity (tumor surgery & neurosurgery) since 2002
- ✓ First cases in 2011
- ✓ Focused on **3D technologies** utilization for complex surgery



Advanced 3D planning  
Anatomical models  
Surgical guides  
Dedicated implants

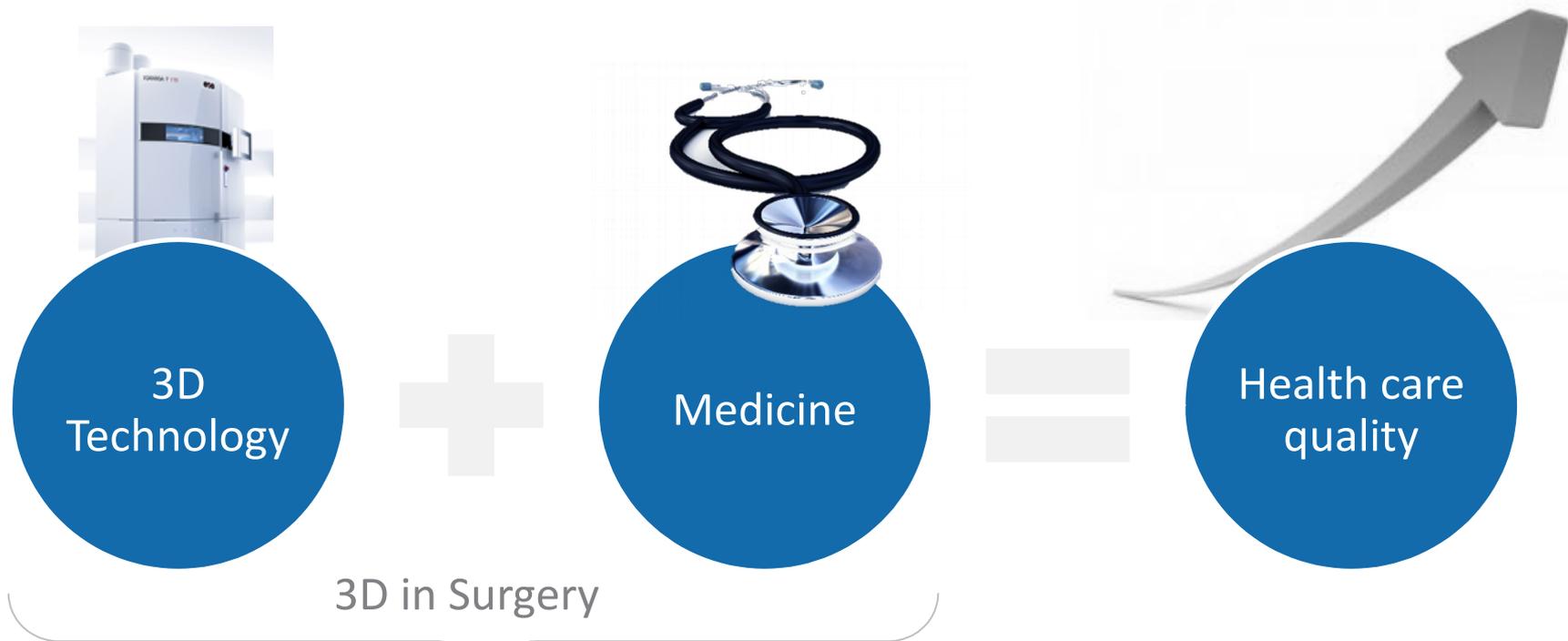
- ✓ Dedicated **software and manufacturing** capabilities
- ✓ Close to **300 cases** commercialized in Belgium, Canada, Denmark, France, Spain & Switzerland



# Medicine advancement



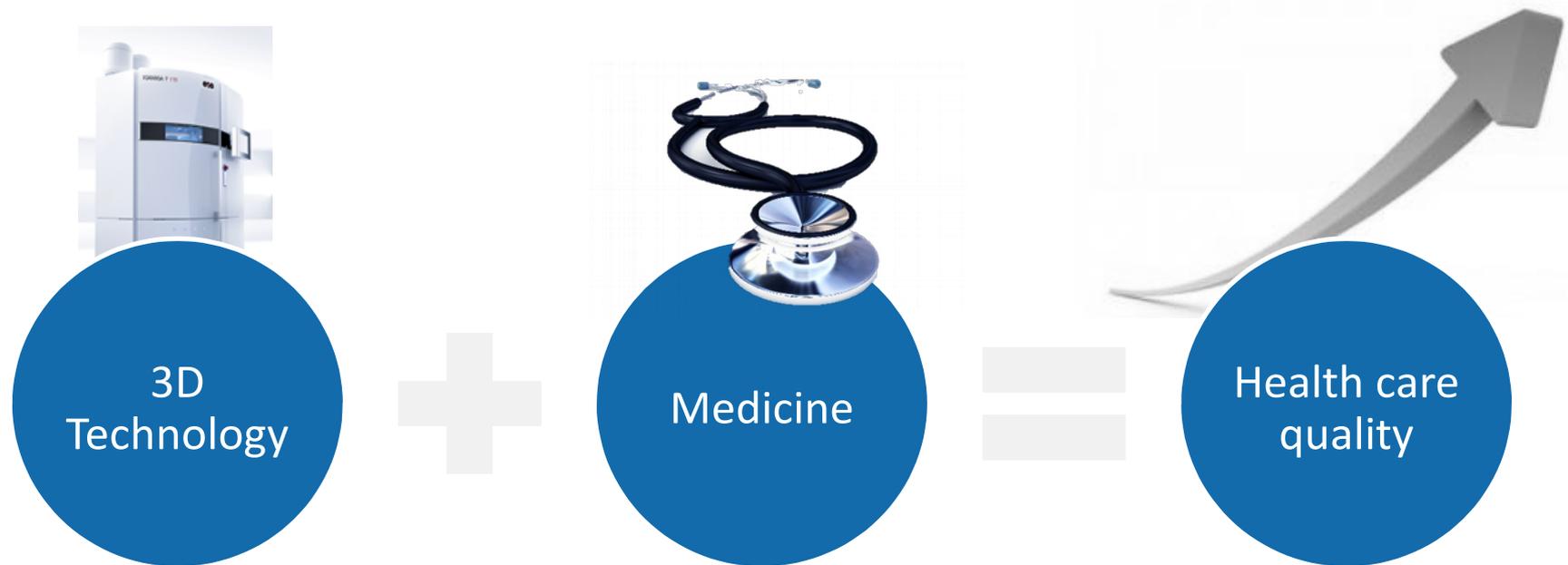
# Medicine advancement



3D-printed custom made instruments & implants



# Medicine advancement



3D in Surgery



3D-printed custom made instruments & implants



Peroperative accuracy  
Operative time



# 3D for complex surgeries

## Patient Specific Implants

### Cranioplasty

SkullPT

Adaptive SkullPT

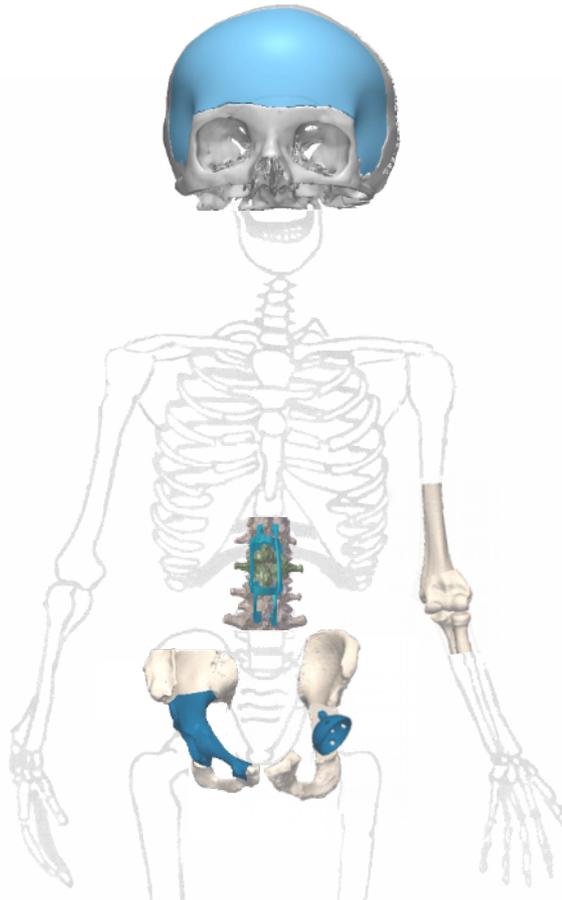
## Surgical Guides

### Bone tumor resection

Pelvis

Femur

Tibia...



### Osteotomies

Cubitus varus

Spine

Tibia...

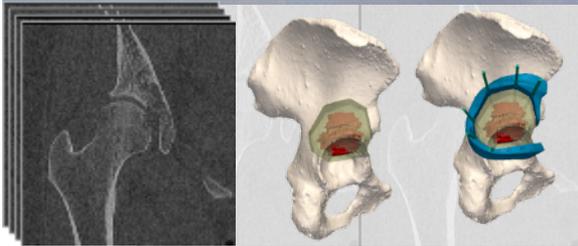
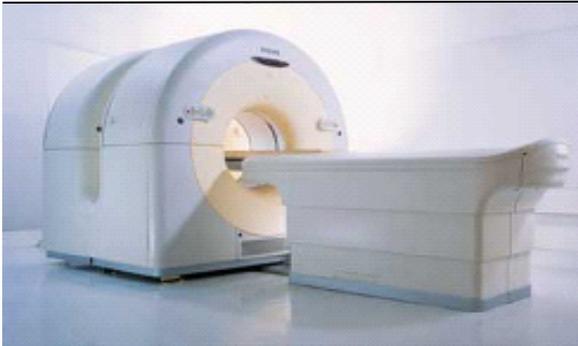


# Dedicated software & manufacturing

Complete workflow  
for patient specific  
surgical devices



WHEN YOU NEED TO BE SURE



*Image transfer*

*Image processing*

*3D Planning*

*Manufacturing*

*Assembling*

*Per-operative assistance*



## Bone tumor resection



*How to resect accurately the bone tumor?*

### Difficult surgery

- \* Complex bone geometry
- \* Limited visibility
- \* Restricted workspace



### Patient specific surgical guides

Medical imaging software + 3D printing technology

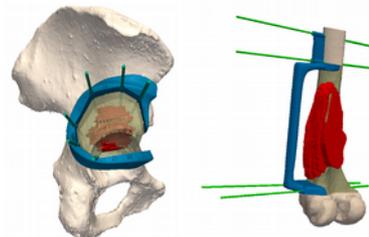


Cutting accuracy



Satisfactory safe margins

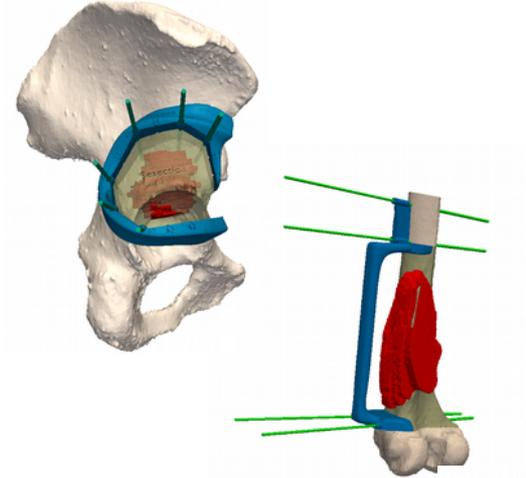
Operative time



# Bone Tumor Surgery - applications

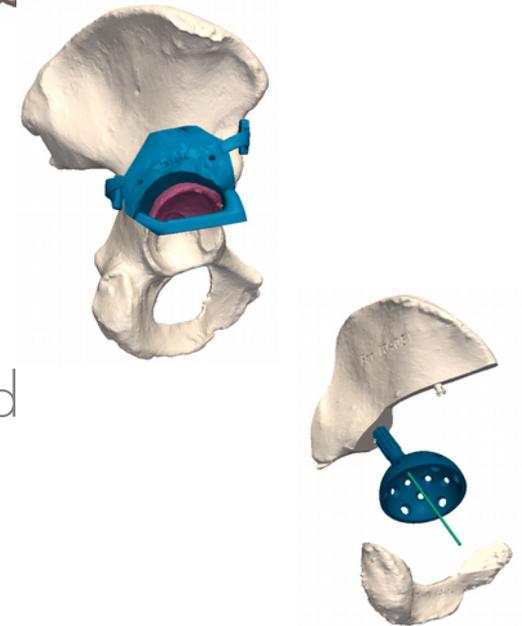
## Bone tumor **resection** guides

- ✓ Hip
- ✓ Femur
- ✓ ...



## **Reconstruction** solutions

- ✓ Guide to resect the best matching allograft
- ✓ Guide to position an Ice-cream cone
- ✓ Partnership for a reconstruction with a dedicated implant



Tumor

1

Planning

2

Instruments

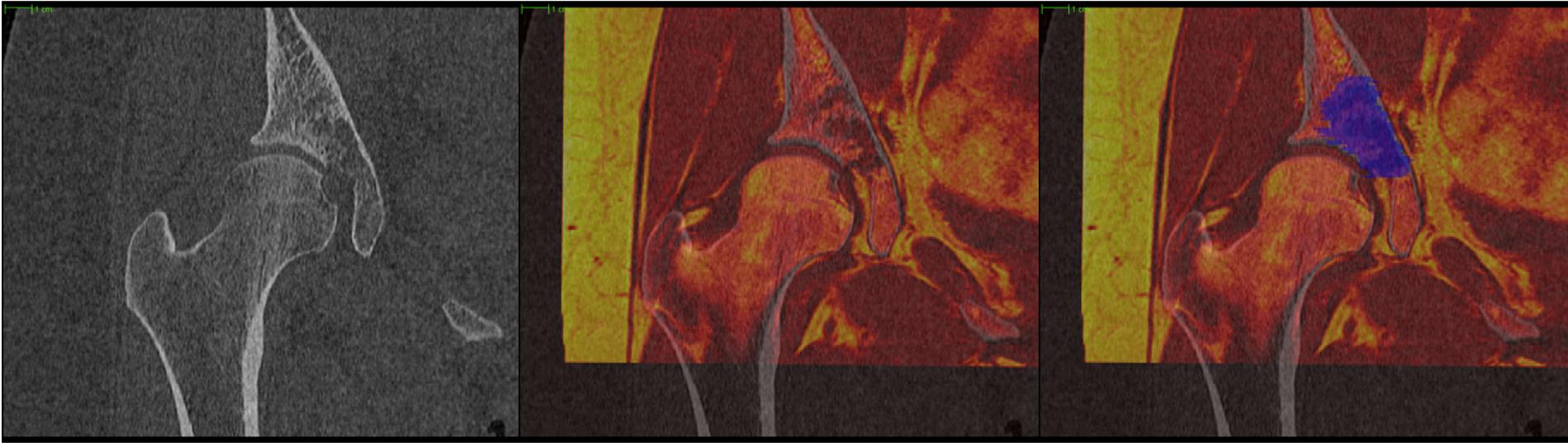
3

Surgery

4

Post-operative results

5



Tumor

1

Planning

2

Instruments

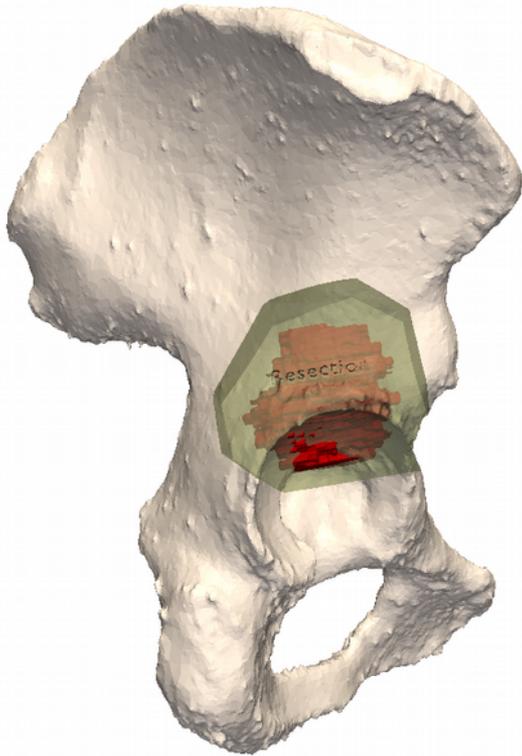
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Surgery

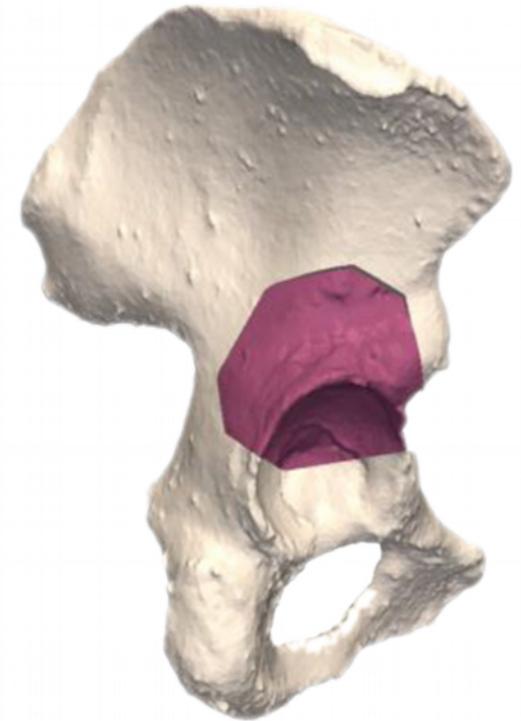
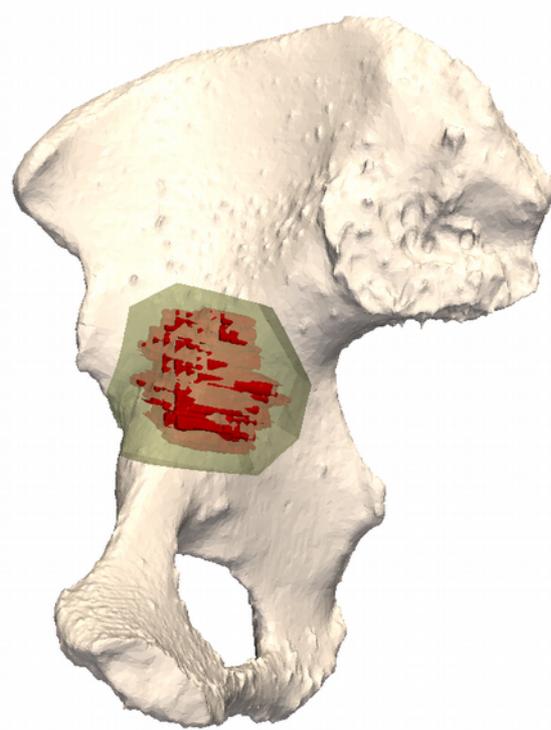
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Post-operative results

5



*Patient*



*Allograft*



Tumor

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Planning

2

Instruments

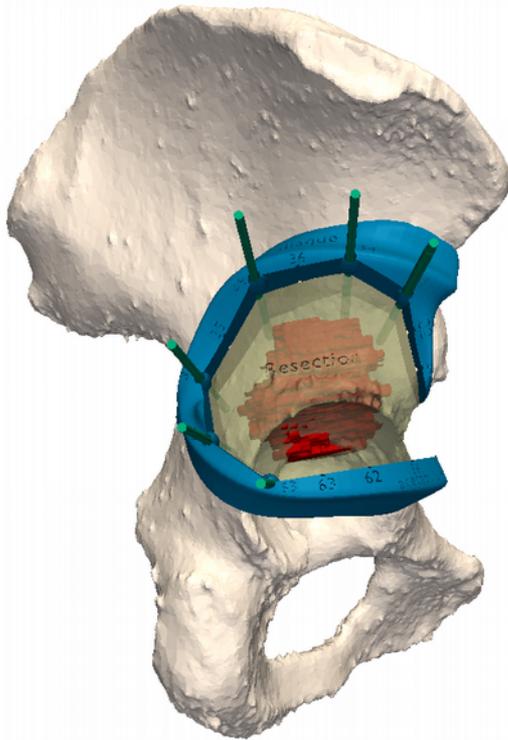
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Surgery

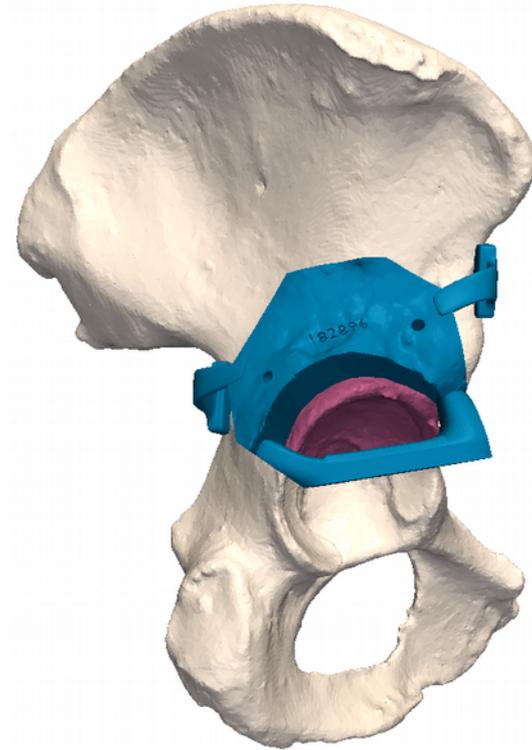
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Post-operative results

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*Patient*



*Allograft*



Tumor

1

Planning

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Instruments

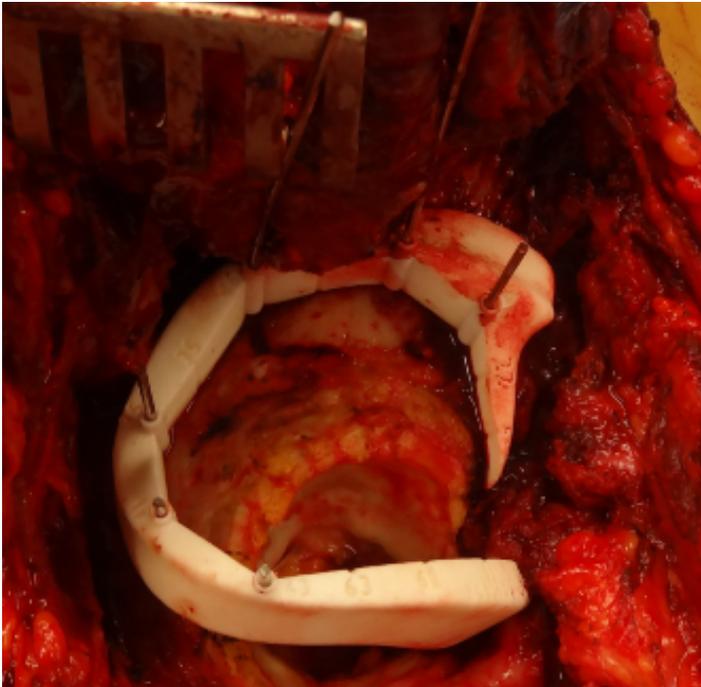
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Surgery

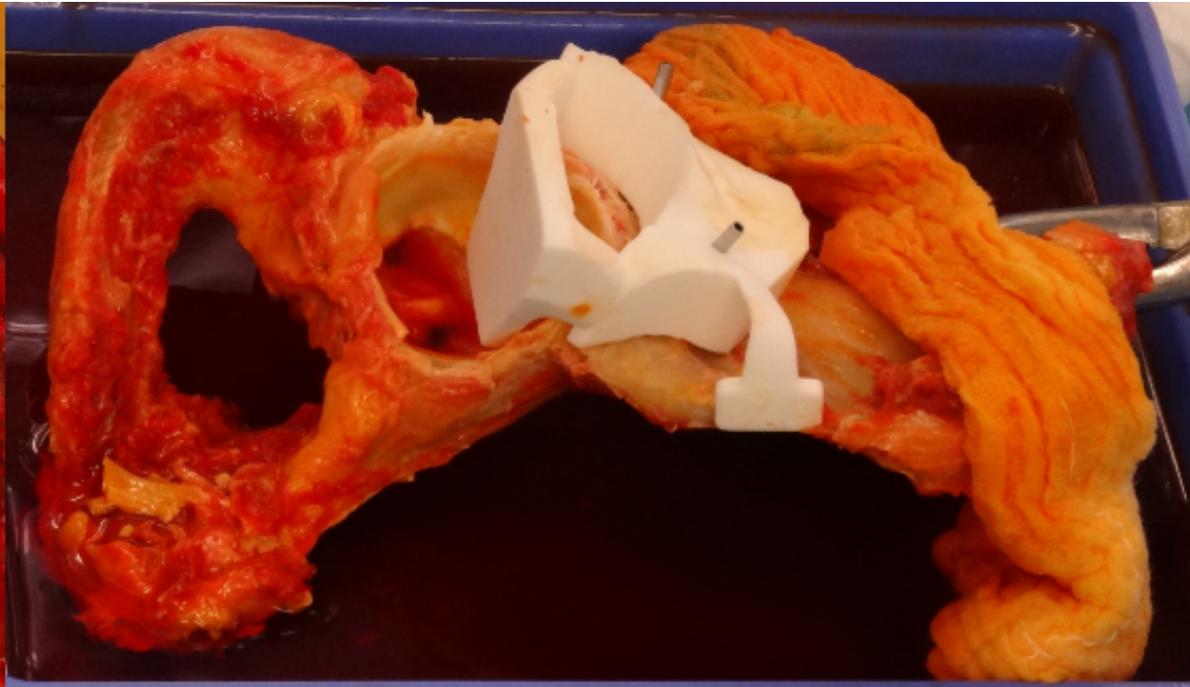
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Post-operative results

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*Patient*



*Allograft*



Tumor

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Planning

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Instruments

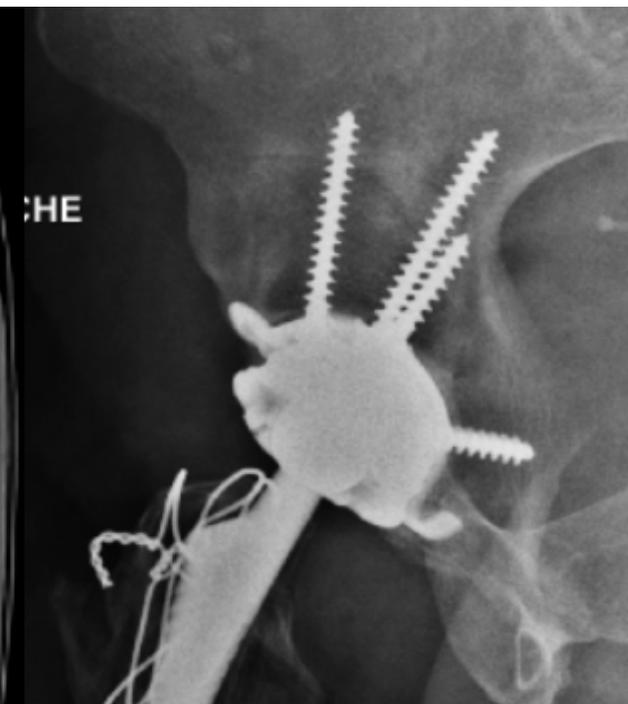
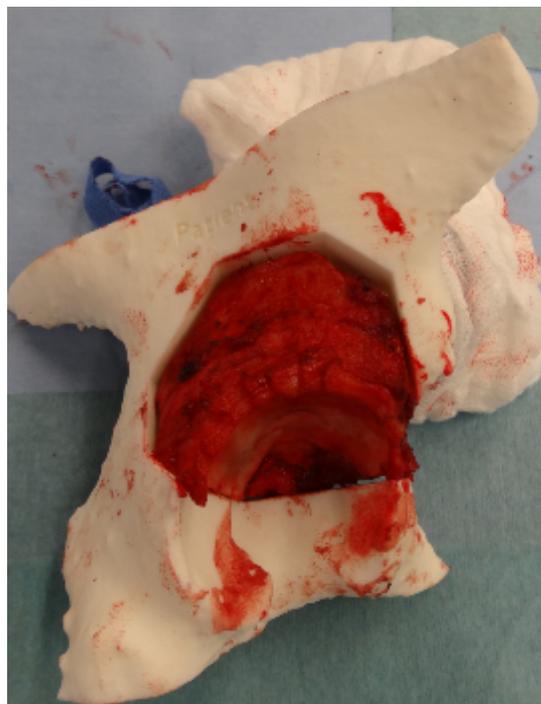
3

Surgery

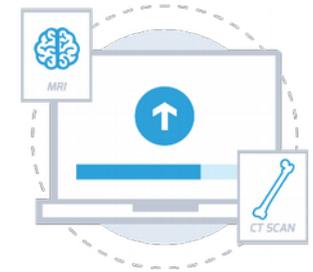
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Post-operative result

5



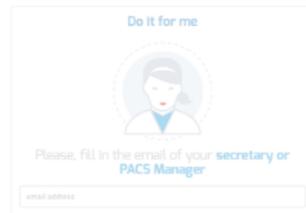
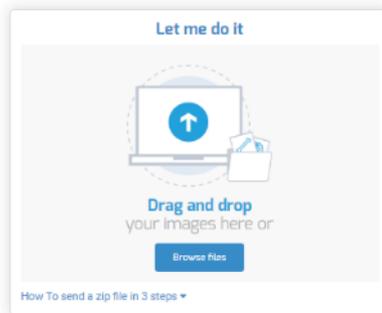
# Dedicated tools – Web upload



## Surgeon & Surgery Data

|   |  |   |
|---|--|---|
| Lastname *<br><input type="text" value="Surgeon Lastname"/>                                 | Firstname *<br><input type="text" value="Surgeon Firstname"/>  | Email *<br><input type="text" value="Email"/>             |
| Hospital *<br><input type="text" value="Your institution"/>                                 | Pathology *<br><input type="text" value="Choose a pathology"/> | Surgery Date *<br><input type="text" value="2017-02-20"/> |
| Patient identification *<br><input type="text" value="Lastname/Firstname, initials or ID"/> |  |   |
| Comments *<br><input type="text" value="Enter any useful information here"/>                |  |   |

## Image transfer

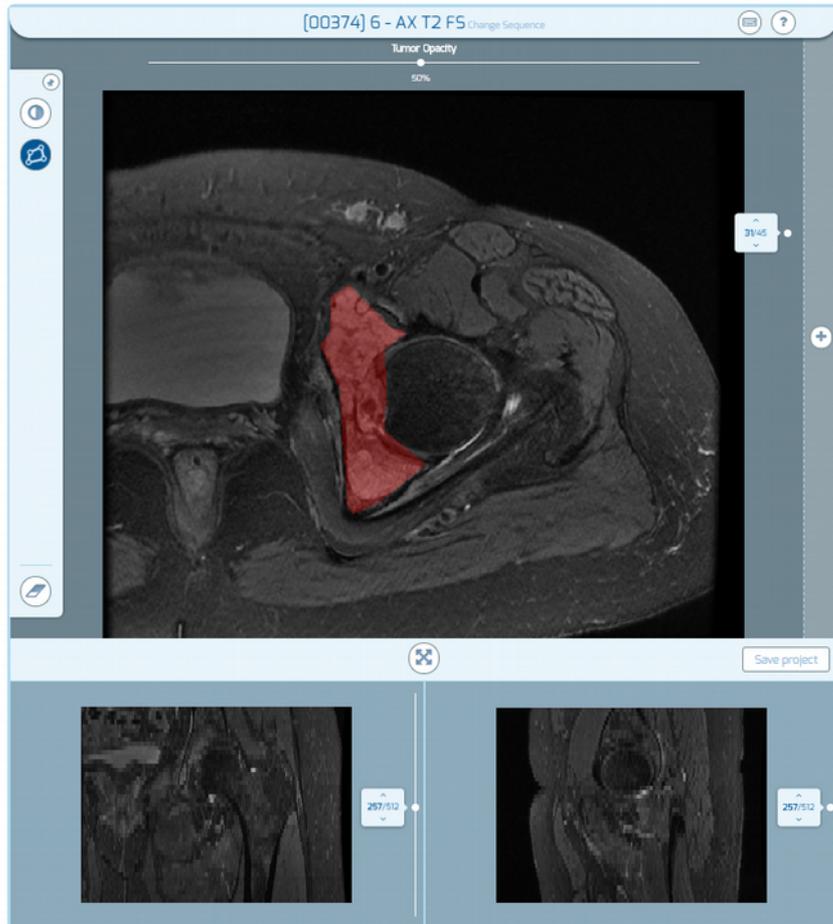


*Local Contact:  
Find an easy way to receive the  
images*

<https://www.3dside.eu/en/form/upload/>



# Dedicated tools – 2D Design



Communicate easily!

Surgeon receives a link via e-mail to directly access a **2D** view of the patient.

Permits to : **delineate, indicate ...**

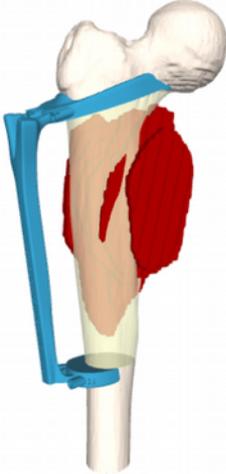
<https://www.3dside.eu/draw/?case=374>



# Dedicated tools – 3D Design



*3D VIEW*



00297\_TUMEUR.stl  
00297\_Guide\_Resection.stl  
00297\_Patient.stl  
00297\_Resection.stl  
00297\_Guide\_Allogrefte.stl  
00297\_Allogrefte.stl

*MESSAGES*

No messages

*WRITE A MESSAGE*

Your name

E-mail address

Message

Send

The image shows a web interface for a 3D medical design tool. On the left, under the heading '3D VIEW', there is a 3D model of a patient's shoulder and arm. The model is semi-transparent, revealing internal structures. A blue surgical guide is attached to the arm. To the right of the model is a list of files with eye icons, indicating they are visible. The files are: 00297\_TUMEUR.stl, 00297\_Guide\_Resection.stl, 00297\_Patient.stl, 00297\_Resection.stl, 00297\_Guide\_Allogrefte.stl, and 00297\_Allogrefte.stl. On the right side of the interface, under the heading 'MESSAGES', there is a message box that says 'No messages'. Below that is a section titled 'WRITE A MESSAGE' with a form containing fields for 'Your name', 'E-mail address', and a large text area for 'Message'. A 'Send' button is at the bottom of the form.

Communicate easily!

Surgeon receives a link via e-mail to directly access a **3D** view of the patient.

Permits to : **check, validate, communicate, share with colleagues ...**



# Belgian paradox

Product developed in Belgium:

- Research funded by **public donations** (Télévie, Fondation contre le cancer)
- Valorization funded by **Walloon Region** (DGO6)
- Company founded using **public financing** (Novallia)

But product **not used** in Belgium

Despite a partial reimbursement (25%) by INAMI

Main activities:

France, Switzerland, Spain, Denmark, Canada,...



# Take home messages

## 1. **Personalized Medicine is now!**

Imaging, DNA, tracking devices,...

## 2. **3D printing is actually a revolution in Medicine**

Implant, Instrument, living structures,...

## 3. **Challenges to bring innovations to clinical routine**

Help innovative companies (regulatories)

Support the innovation costs



Thank you for your attention !



**3D-SIDE**

PATIENT SPECIFIC  
SURGICAL TECHNOLOGY