BONE TUMOR SURGERY

RO margins, multiple publications, more than 10 years of activity...

Ensuring the best quality
3D-Side is an expert in 3D bone tumor surgery planning.
We develop and use advanced tools to accurately simulate a surgery and optimize its realization in the operating theatre.

**Advanced planning**

- ✓ Multimodality matching to determine tumor location (MRI, CT-scan, ...)
- ✓ 3D simulation to accurately plan the resection

**Resection guides**

- ✓ Accurate patient specific instruments to guide you during the surgery

**All kinds of reconstruction**

- ✓ No reconstruction
- ✓ Modular or standard implant
- ✓ Patient specific implant (partnership)
- ✓ Allograft (pre-shaped)

“Your guides are the best I’ve ever used”

Prof. KC Wong – Hong Kong
WHAT IS A PATIENT SPECIFIC RESECTION GUIDE?

A patient specific resection guide is a custom-made instrument that helps the surgeon to transfer a preoperative planning into the operating room in order to accurately resect a bone tumor.

These guides permit to drastically reduce the risk of local recurrence while sparing nerves, joints and any other important bony structure.

Making use of this time-efficient solution improves the patient’s quality of life and recovery.

WHY USE A PATIENT SPECIFIC RESECTION GUIDE?

Safe margins

R0 rate is outstandingly increased using PSI. In a follow-up study of 30 patients treated for a bone tumor resection, bone margins were rated systematically R0 by pathologist. No local recurrence was observed (mean follow up of 40 months)¹.

Accurate

3D-Side’s guides are more accurate² to resect a bone tumor than navigation systems or freehand surgeries, as shown on cadaver models:

- Freehand: 9.2 mm
  High deviations from the planned resection, removal of too much healthy bone or cuttings in the tumor, probably leading to local recurrence.
- Navigation: 3.6 mm
  Accuracy at the entry point but deviation in the bone, which may result in large posterior resection errors.
- Resection guides: 1.9 mm
  Better control over the safe margin means more conservative treatment, leading to preservation of nerves, muscle insertions and even joints.

Easy

- The pre-operative process is fluent thanks to the close collaboration with surgeons to define a planning that meets their requirements and objectives.
- The extended expertise of 3D-Side in complex tumor cases make the planning step fast and accurate for the surgeon.
- The patient specific guides are highly efficient during the surgery: plug-and-play³!
HOW DOES IT WORK?

1. **Provide images**
   
   Upload a CT-scan and an MRI of the patient on: www.3dside.eu/en/form/upload
   
   Delineate the tumor on the MRI on the personal web tool you will be provided with.

2. **Validate the planning**
   
   A 3D viewer running on your web browser allows a 3D visualization and full interaction with the proposed resection and guide design.

3. **Need for reconstruction?**
   
   3D-Side assists optional reconstruction according to your requirements: modular implant, allograft, patient specific implant or just nothing.

4. **Use during surgery**
   
   Use the provided anatomical models to guide the dissection stage and localize the correct position of the PSI.
   
   Use the resection guide(s): fix the PSI on the bone using K-wires and let the saw blade be driven by the guide.
## COMPLEX CASES

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<th>Surgeon</th>
<th>Dr Raux</th>
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<td>Hospital</td>
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<td>Challenge</td>
<td>Resection of a large femoral tumor while preserving the femoral head and obtaining R0 margins. <strong>Reconstruction</strong> to preserve the limb length and alignment.</td>
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### Lateral resection prior to frontal reconstruction

#### Planning

Beside planning the **bone tumor resection** and designing the associated resection guide, 3D-Side planned the **reconstruction by allograft** and created the adequate guide.

![bone tumor resection (green) reconstruction by allograft (blue)](image)

#### Production

By means of high-tech 3D-printing the **anatomical models** of the patient, the allograft and the **resection guides** were produced.

![tumor cutting guide allograft cutting guide anatomical models](image)

#### Surgery

The **anatomical models** are used to help the surgeon during surgery. The **surgical guides** allowed to accurately resect the bone tumor and to extract a perfectly fitting allograft.
FREQUENTLY ASKED QUESTIONS

How long does it take to receive the patient specific guides?
Four weeks is the usual lead time from images to surgery. However, for urgent cases such as chondrosarcoma (no neoadjuvant therapy), it may be reduced to two weeks provided that the interactions with the surgeon are fluent.

Is there a specific scan protocol for medical images?
No. Usual diagnosis images are sufficient. A minimal resolution is required for the CT-scan to ensure the guide stability. A standard CT-scan protocol can be sent on request.

Do I have to validate the resection planning?
Yes. After thorough image processing and having collected your requirements (surgical approach, safe margins, objectives, ...), 3D-Side will propose a draft planning. You will be able to review it using our smart 3D viewer. The same process applies to the surgical guide. 3D-Side production is made in close collaboration with the surgeon. The surgeon keeps control over the medical decisions.

What are the sterilization recommendations?
Standard autoclave (steam sterilization cycle): 18 minutes - 134°C / 273°F.

Does the guide need a larger surgical approach?
No. 3D-Side resection guides are thin enough to ensure a minimal contact surface (not larger than a manual procedure) while being strong enough to support the blade.

What if the guide is not stable on the patient?
It is not likely to happen since 3D-Side has an extended experience for any location. We avoid cartilage and soft tissues areas or ligament insertions. The guide footprint can be assessed on the anatomical model. It gives useful information about bone exposure or soft tissue removal to ensure a perfect fit of the guide. Moreover, 3D-Side assesses the stability of the guide on the anatomical models before releasing it.

How can I secure the guide on the patient?
The guide can be temporarily fixed using Kirschner wires (20/10e diameter). The drilling depth is indicated on the guide with approximately 2 mm accuracy.
Which type of saw blade should be used with the guides?
You can use your usual saw blade or a chisel. Gigli saw is not compatible with the resection guides.

How do I reconstruct the bone defect?
Several possibilities:
- No reconstruction;
- A reconstruction by custom-made or modular implant (in collaboration with implant manufacturers);
- A reconstruction by allograft (in collaboration with bone banks);
- A combination of implant and allograft.

3D-Side offers a solution for each possibility according to surgeon and patient needs.

Is there any transfer of particles from the guide into the patient during the cuttings?
Residues may arise. Despite the fact that the material has been proved to be biocompatible, there is no information about long term implantation. However, the material has been in use since 2005 in millions arthroplasty procedures without any proven contra-indication.

Do the patient specific guides bear CE marking? Do they have 510 (k) clearance?
CE marking is not required for patient specific devices. For more information, refer to MDD – 93/42/EEC ANNEX VIII – Statement Concerning Devices for Special Purposes. Regarding 510 (k), the procedure is ongoing. A specific 520 (b) procedure can be invoked to assist the US surgeons.

ABOUT 3D-SIDE

3D-Side is a Belgian company which develops, manufactures and markets patient specific products for bone surgery based on 3D technologies. Its mission is to offer patient specific medical devices to allow planning of complex surgeries with incomparable quality. In addition to these products, 3D-Side also provides medical companies with «Customize», a web platform for efficiently marketing custom-made devices.

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