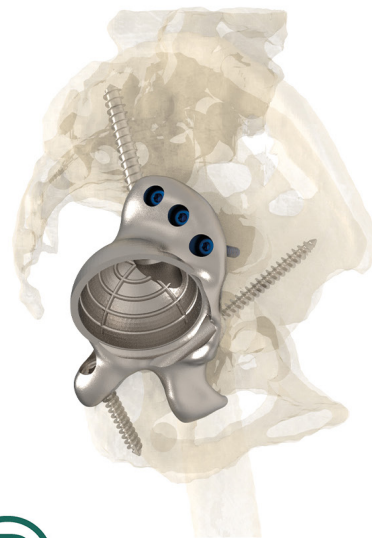
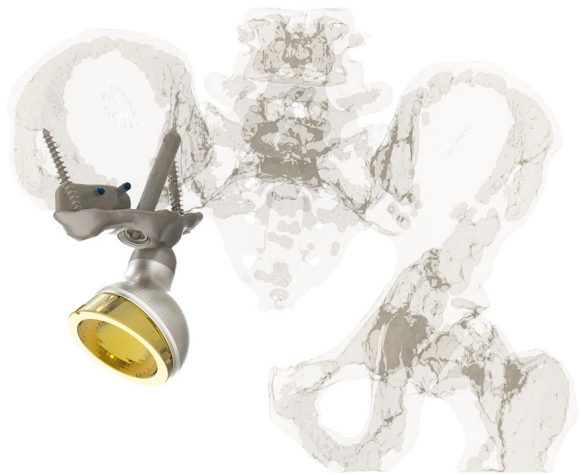
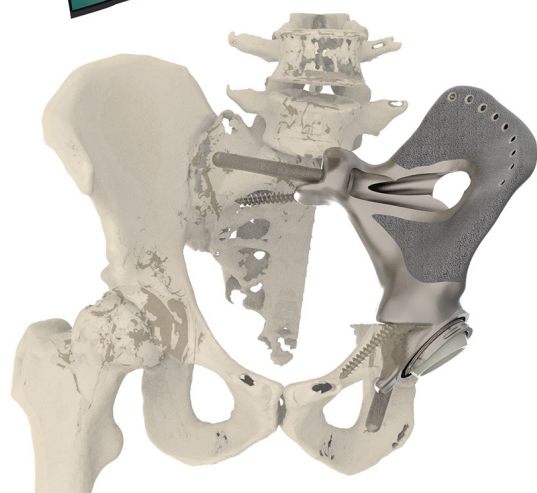




C-Fit 3F[®]

customized planning & production



individual partial pelvic reconstructions

tumors - revisions - defects - infections - anatomical anomalies



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The demand for custom-made implant components increases continuously in revision and tumor endoprosthetics. Complicated bone defects after single or multiple revision, deep infection, or large tumor resections often do not tolerate treatment with standard implant components.

implantcast has been planning, constructing and manufacturing individual implants in Germany for more than 20 years for customers worldwide. Since 2014 the additive manufacturing, or 3D printing, is used to create implants which match the patients anatomy to fill defects as good as possible. A dedicated software enables us to generate a 3D model of the bone or joint to be reconstructed from high-resolution CT or MRI data. That 3D model is the basis for the custom-made implant.

Individual implants and patient specific instruments - really necessary?

A custom-made, well fitting implant incl. the corresponding **patient specific instrumentation (PSIs)** can allow for a quick and safer positioning of the implant and therefore potentially reduces the time in the operating theatre drastically. As a consequence, the risk for an infection may decrease. The extensive planning and 3D analysis minimizes potential error sources. The resection is planned in a way to reduce bone loss and to preserve the surrounding soft tissue as much as possible. This can ease later revisions and keep the natural anatomy of the patient mostly intact. Patient specific instruments are planned and manufactured accordingly. As coatings, **hydroxylapatite (HA)**, **silver and titanium nitride (TiN)** are available.

EPORE[®]

EPORE[®] is a porous structure that mimics the abilities of cancellous bone. It is intended to support bone ingrowth and thus may speed up the recovery of the patient, especially in combination with a well fitting custom-made implant.



introduction

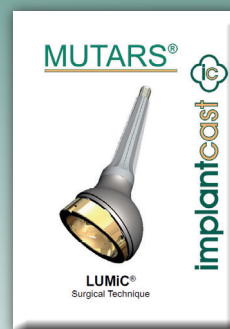
Individual partial pelvic reconstructions - an overview of the possibilities

The engineering team of the C-Fit 3D® department (department for individual endoprosthetics) plans individual partial pelvic reconstructions in many different forms and shapes. In the following you will get an overview through ten different design variants and their respective Paprosky or Enneking classification.

The shown design variants are supposed to demonstrate the general build-up of those types of prostheses. After taking the defect and soft tissue situation into account, as well as the surgical approach, the patients needs and the wishes of the surgeon, the individual prosthesis will be adapted and optimized to the anatomy of the patient. Hence reconstruction of the rotational centre of the hip joint, the metal augmentation (filling up the defect), a very stable anchorage with optimized weight load distribution, optimal soft tissue coverage or a good-looking cosmetic outcome („normal“ gait) can be of priority. Advantages and disadvantages have to be discussed and balanced carefully during the planning phase to reach the optimal outcome for each individual patient.

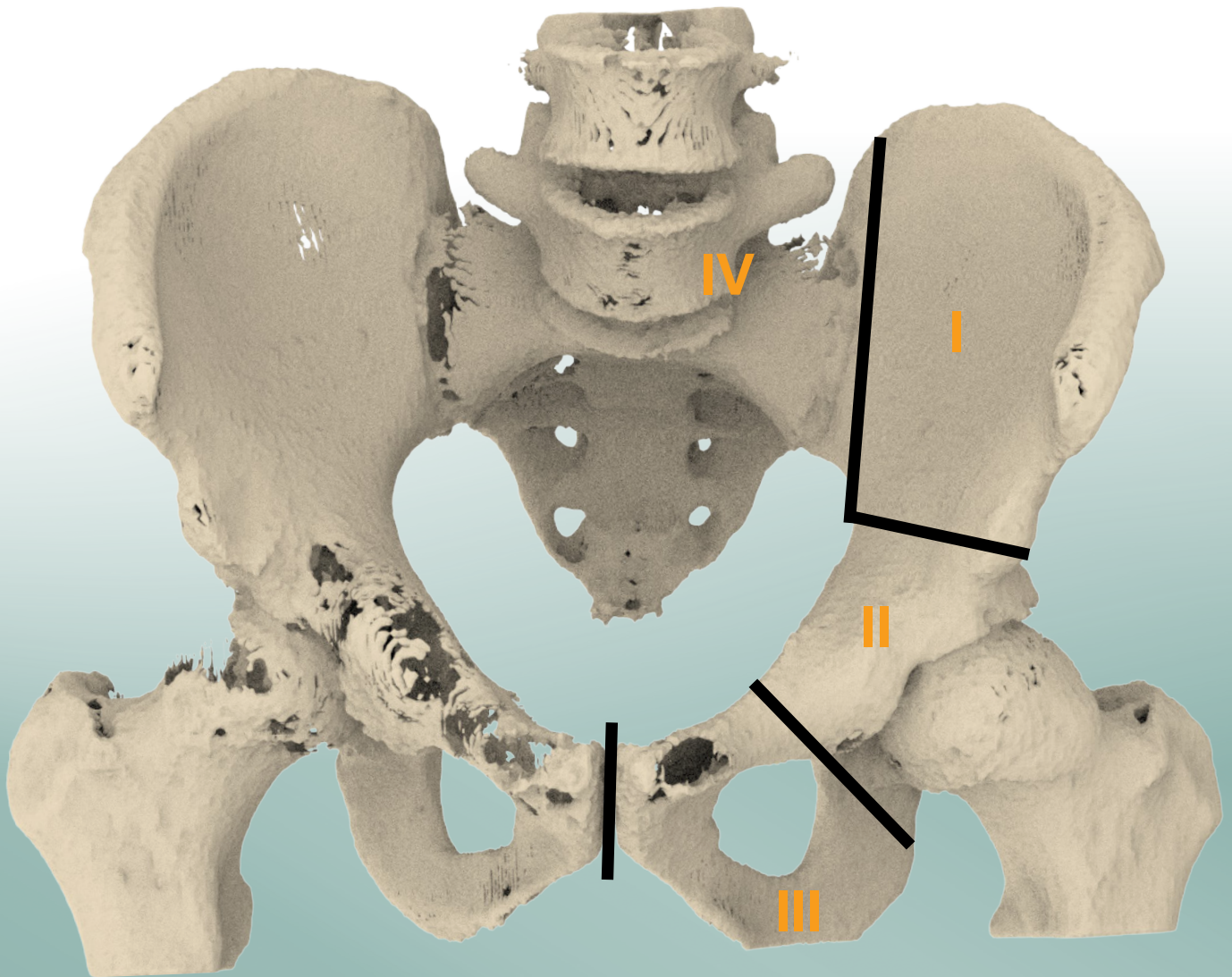
The combination of individual endoprotheses with standard products

Individual partial pelvic reconstructions are often designed to be combinable with standard products from implantcast. The modular build-up and the wide range of possible sizes allows to intraoperatively adapt to e.g. the soft tissue situation or in case planning discrepancies occur. The EcoFit® 2M tripolar system and the modular MUTARS® LUMiC partial pelvic reconstruction system are used in most of these cases.



If you have any questions or a potential case, please don't hesitate to contact our team of engineers via email: cfit3d@implantcast.de For general information about implantcast or our standard products, please take a look at our homepage: www.implantcast.de

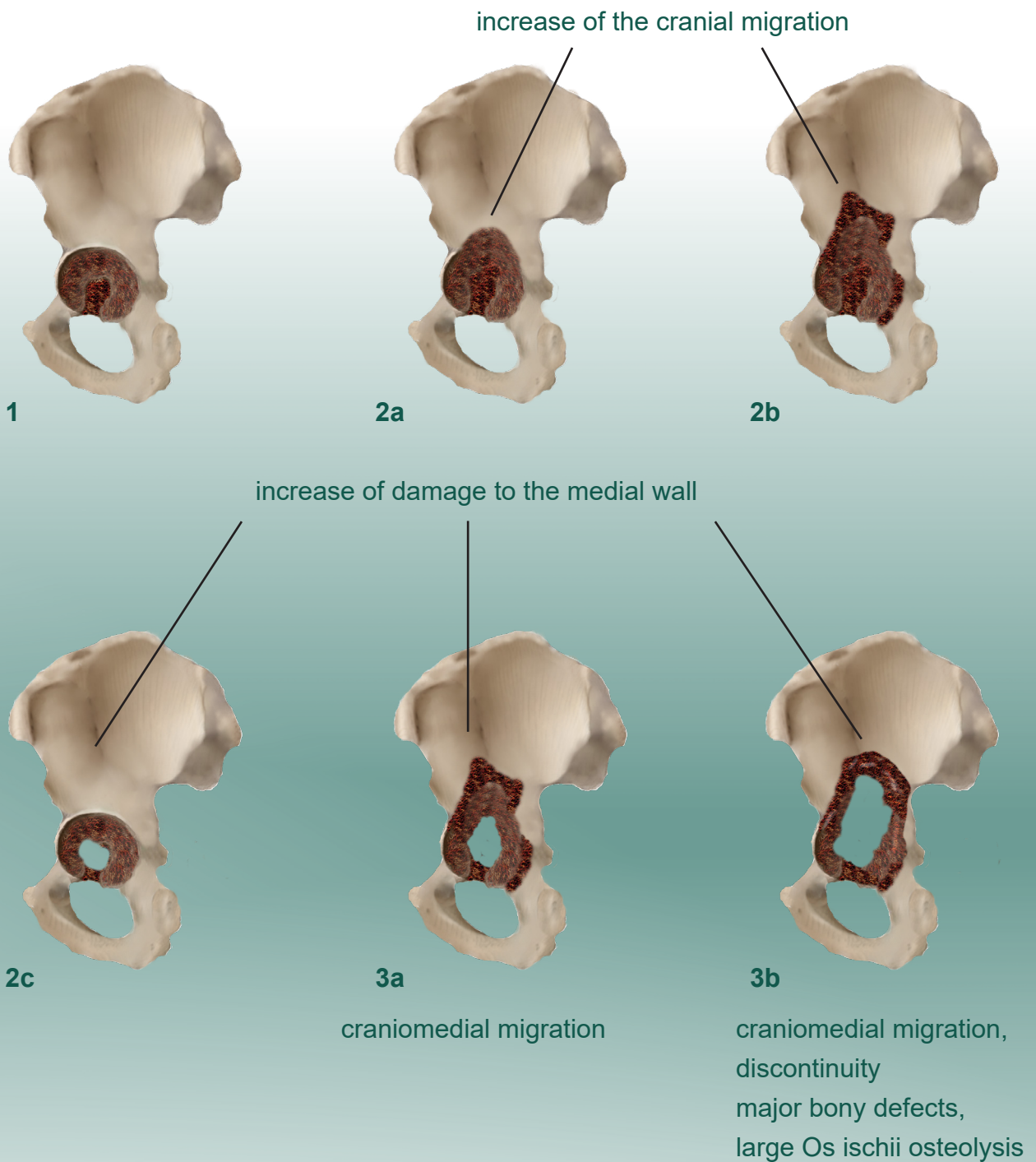
Enneking resections



typ I resection	removal of the Os ilium from the sacroiliac joint up to slightly above the acetabulum
typ Ia resection	- without section of the bony continuity of the pelvis
typ Ic resection	- with section of the bony continuity of the pelvis
typ II resection	resection of the acetabulum (intra- or extracapsular)
typ III resection	removal of the Os pubis from the symphysis up to the acetabulum
typ IV resection	Massa lateralis of the Os sacrum is resected as well

Dependent on the proliferation of the tumor, a typ I-IV resection for example is the removal of the whole half of the pelvis from the symphysis up to the Os sacrum.

defect classification acc. to Paprosky

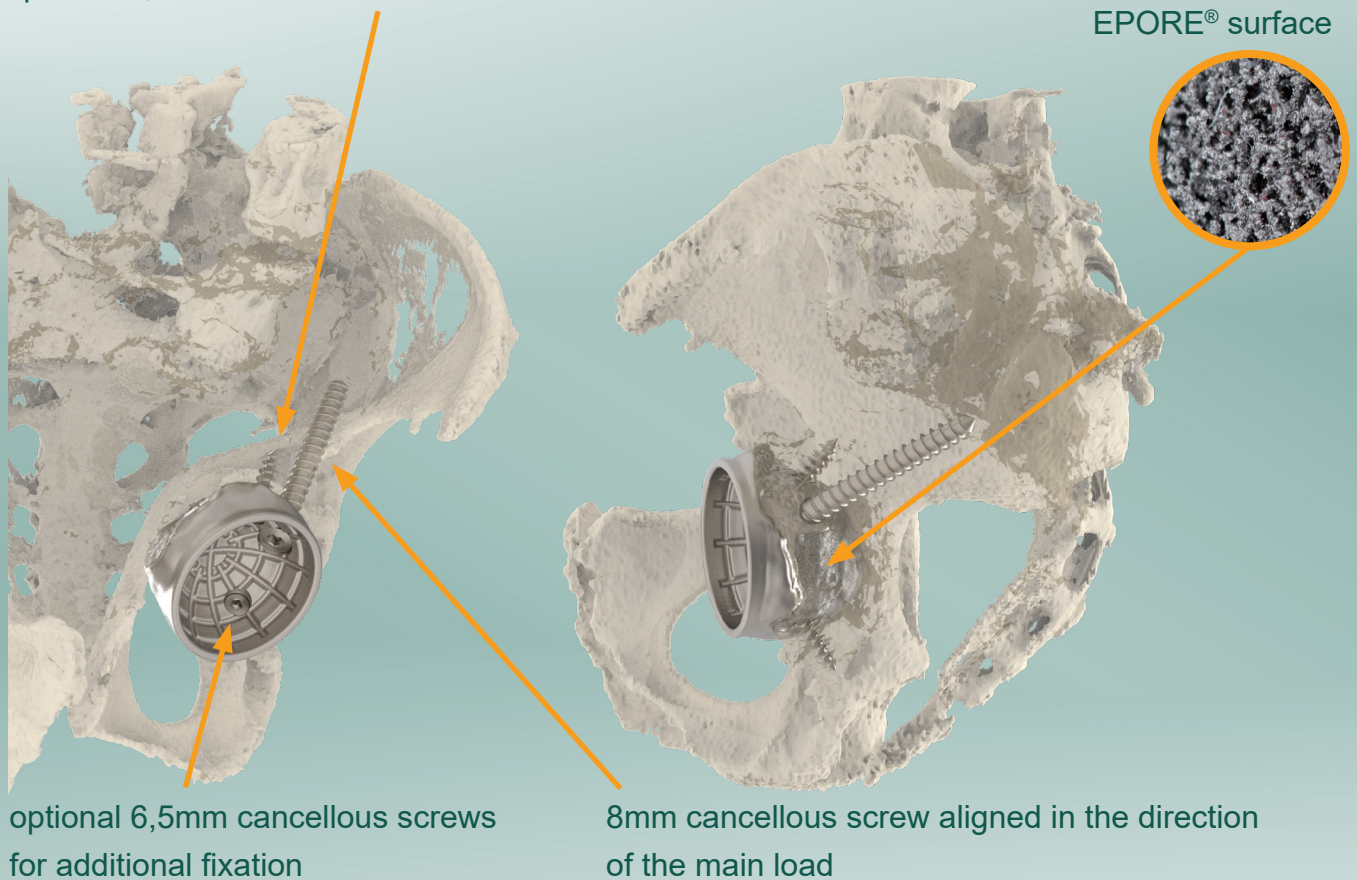


design variant 1 - Paprosky type 2C

- acetabulum replacement with small augmentation
- no flaps or hooks
- combined with EcoFit® 2M standard treatment (cemented cup with tripolar inlay)
- patient specific drill guide

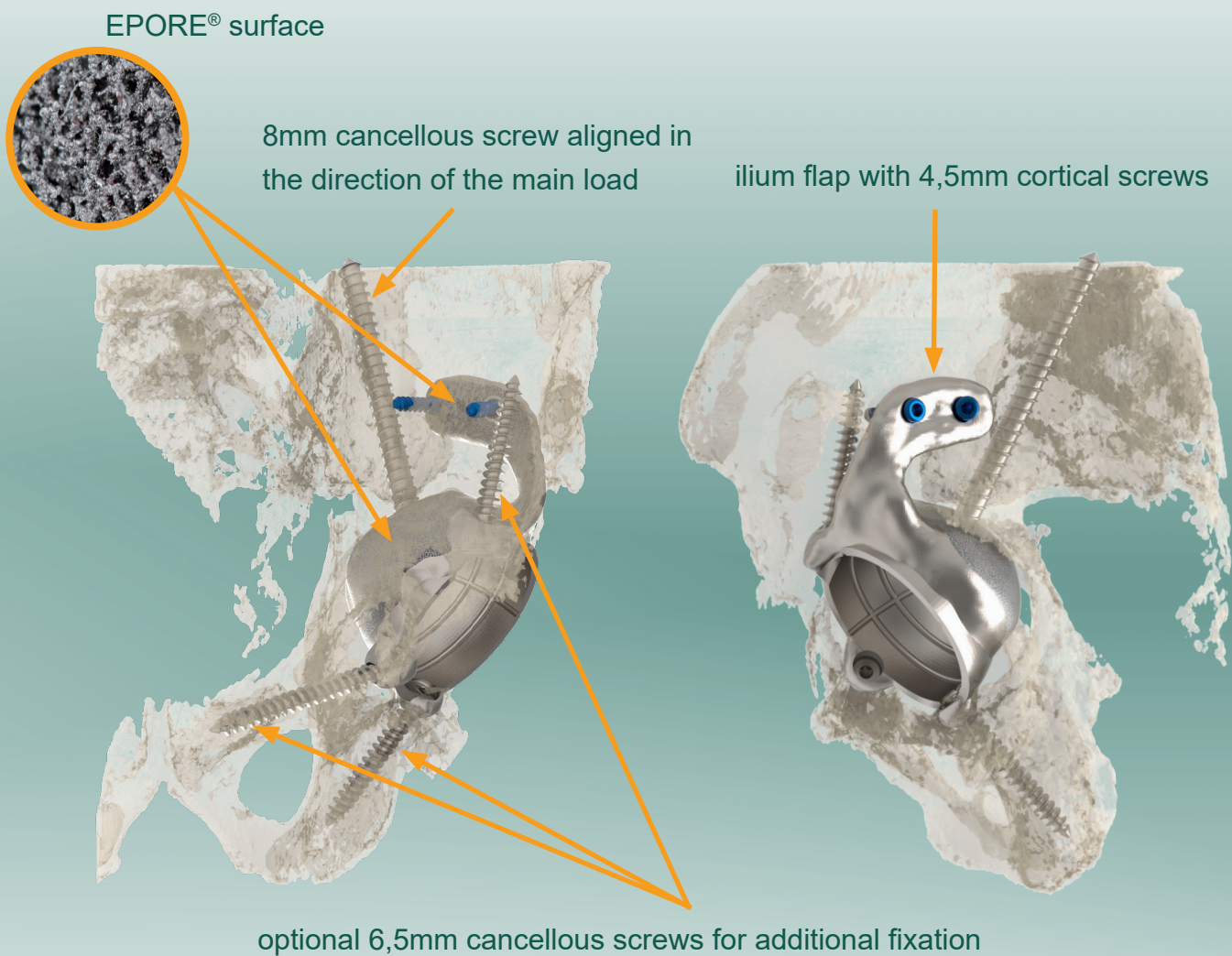
optional 6,5mm cancellous screws for additional fixation

EPORE® surface



design variant 1 - Paprosky type 3A

- acetabulum replacement with small augmentation
- ilium flap, no hooks
- combined with EcoFit® 2M standard treatment (cemented cup with tripolar inlay)
- patient specific drill guide

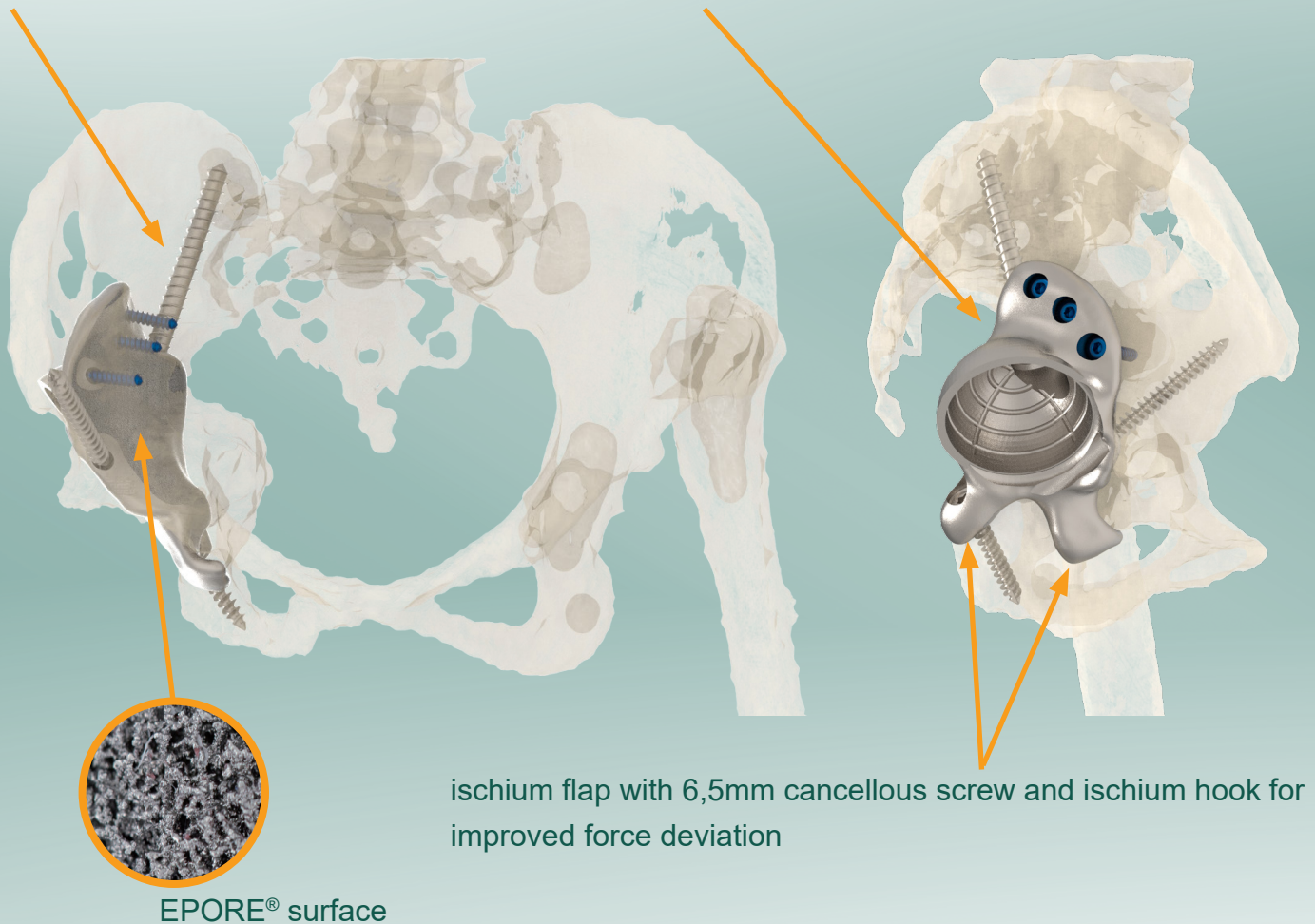


design variant 3 - Paprosky type 3B

- acetabulum replacement with small / extended augmentation
- full reconstruction of the dorsal wall
- ilium flap, ischium hook
- combined with EcoFit® 2M standard treatment (cemented cup with tripolar inlay)
- patient specific drill guide

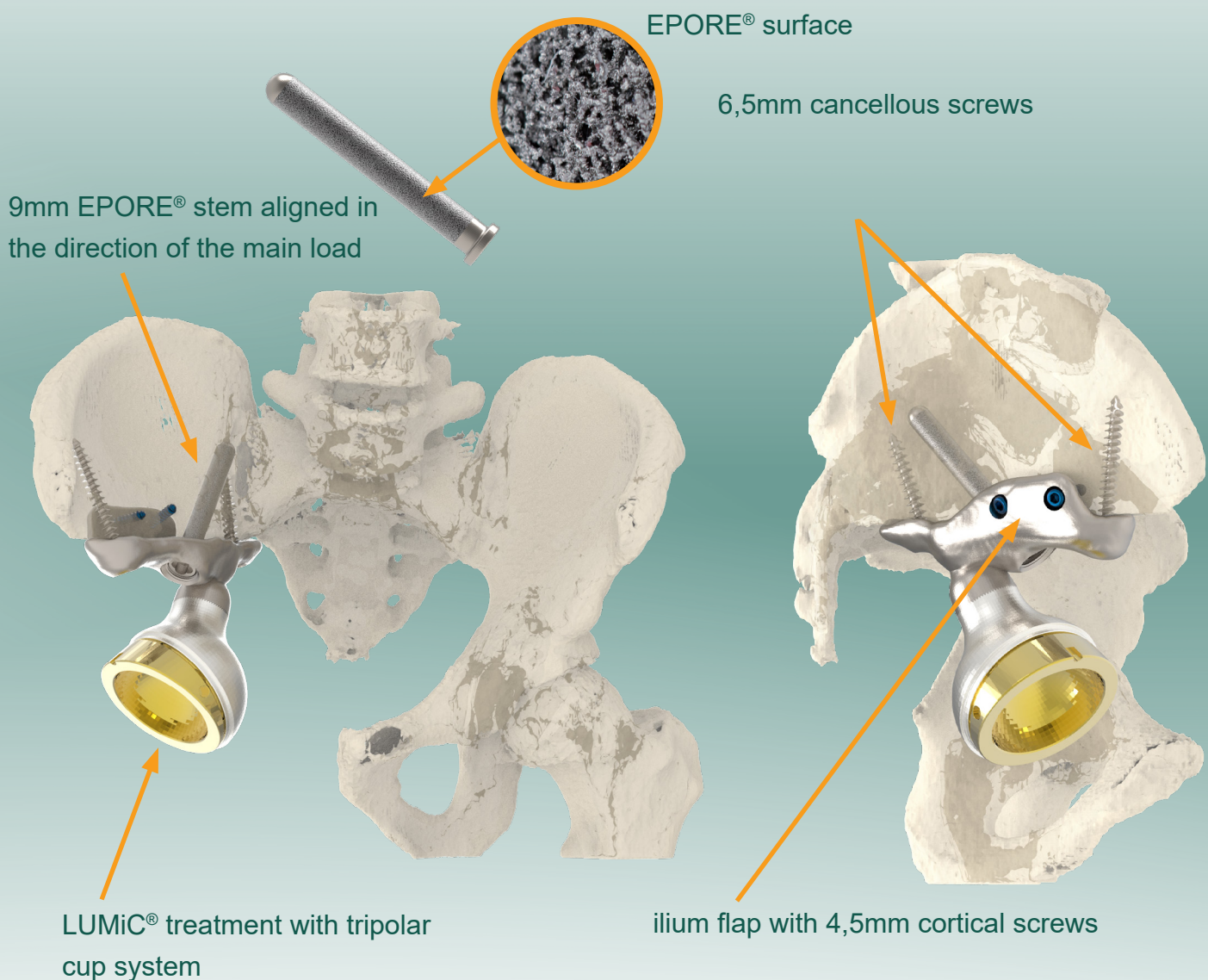
8mm cancellous screw aligned in the direction of the main load direction

ilium flap with 4,5mm cortical screws



design variant 4 - Enneking type I-III resection

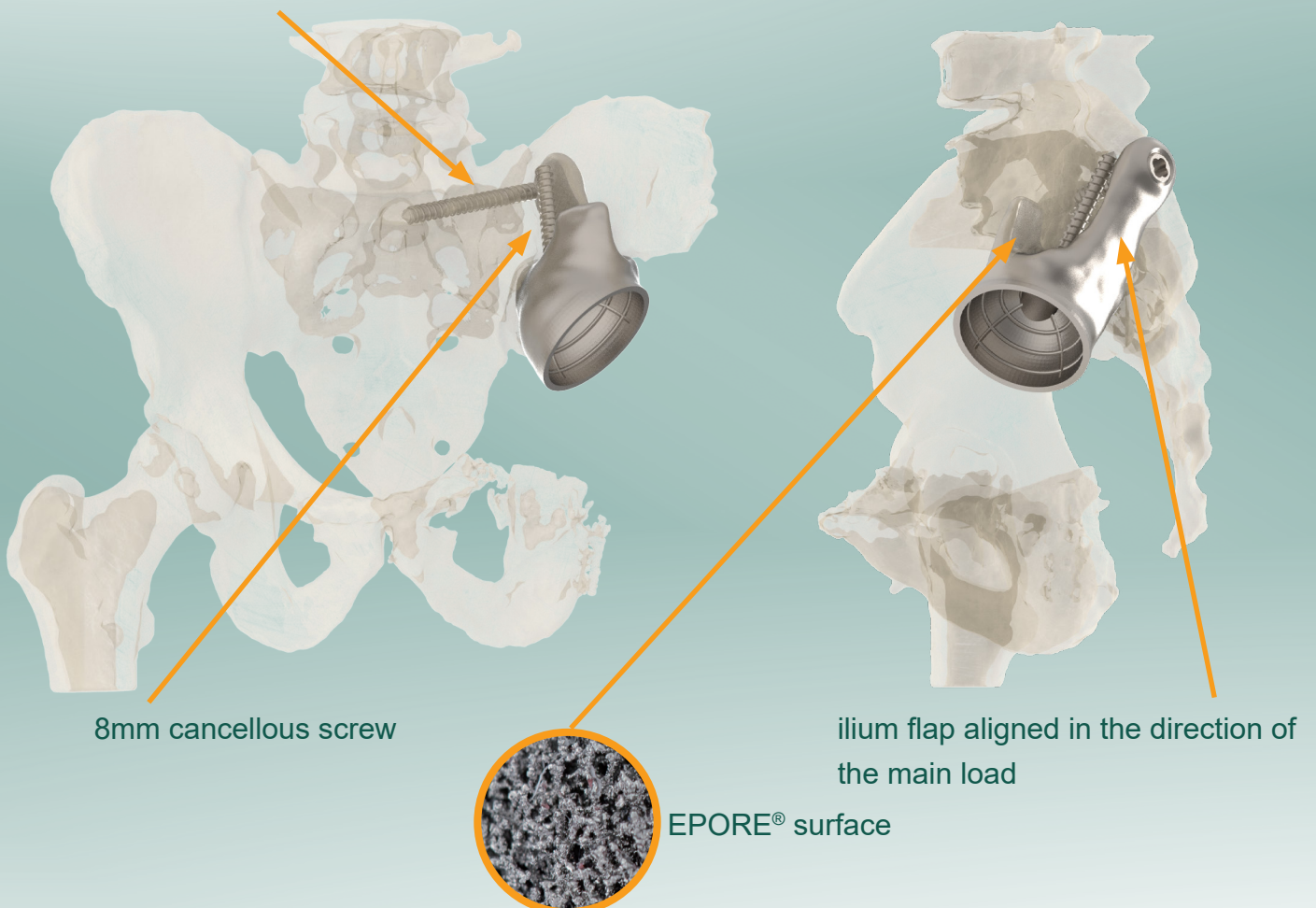
- partial resection of the ilium, with/without augmentation
- ilium flap
- reconstruction of the natural centre of rotation / the anatomical axes
- combined with LUMiC® standard treatment (partial pelvic replacement with tripolar cup system)
- patient specific resection- and drill guide
- 9mm modular EPORE® stem + counter screw / alternatively: 8mm cancellous screw



design variant 5 - Enneking type I-II resection

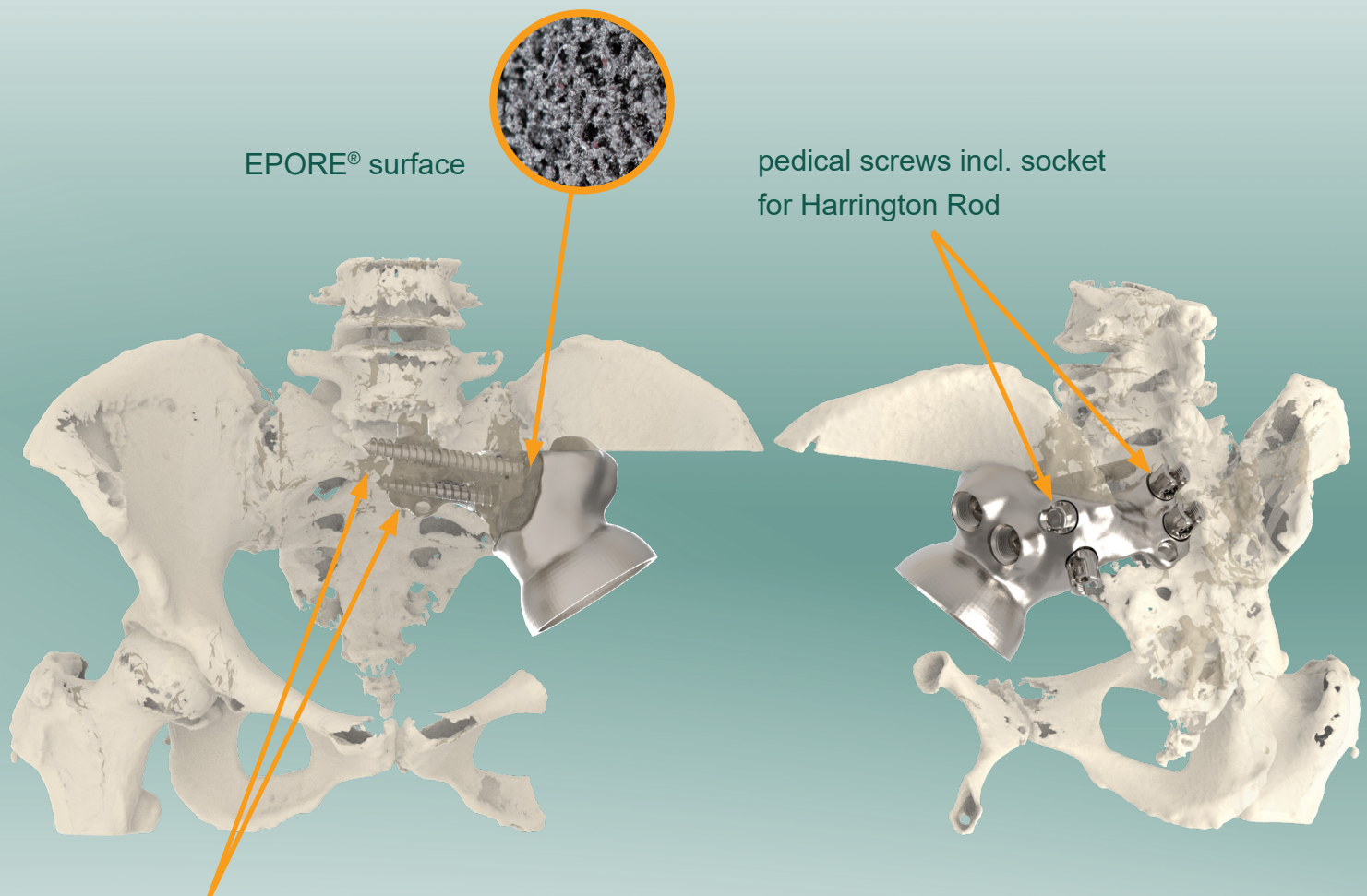
- partial resection of the ilium with/without augmentation
- ilium flap with cortical screws
- additional anchorage in the sacrum
- cranialisation of the centre of rotation to reduce the mechanical leverage
- combined with EcoFit® 2M standard treatment (cemented cup with tripolar inlay)
- patient specific resection- and drill guide

8mm cancellous screw for anchorage in the sacrum with insufficient options for anchorage / bone substance in the ilium



design variant 6 - Enneking type I-III resection

- partial resection of the ilium with/without augmentation
- anchorage in the sacrum with cancellous screws
- cranialisation of the centre of rotation to reduce the mechanical leverage
- pedical screws for application of a Harrington Rod
- combined with EcoFit® 2M standard treatment (cemented cup with tripolar inlay)
- patient specific resection- and drill guide



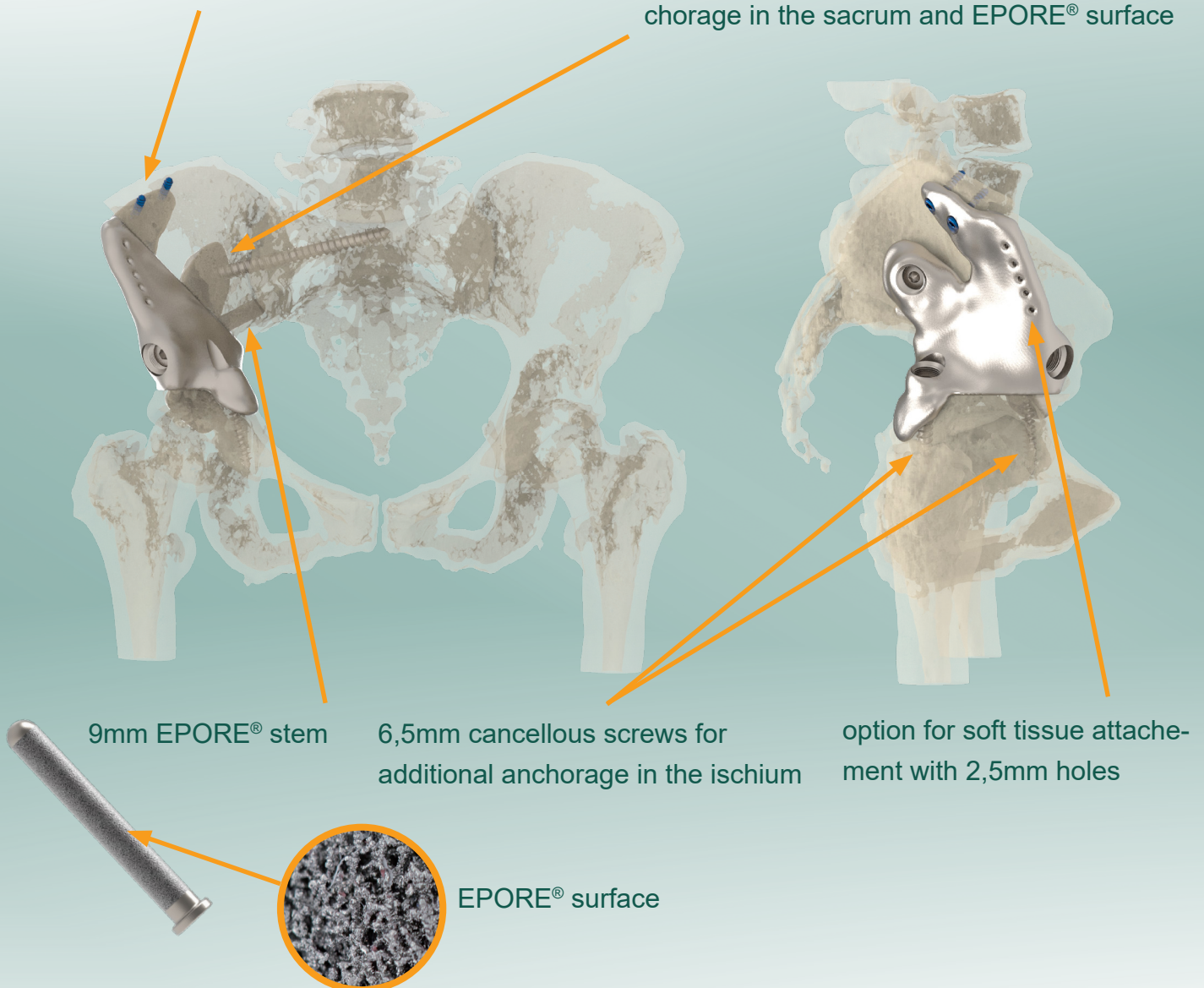
8mm cancellous screws for anchorage in the sacrum with insufficient options for anchorage / bone substance in the ilium

design variant 7 - Enneking type I resection

- partial resection of the ilium with intact acetabulum
- full bony reconstruction
- ilium flaps with cortical screws and 2,5mm holes for soft tissue attachment
- patient specific resection- and drill guide

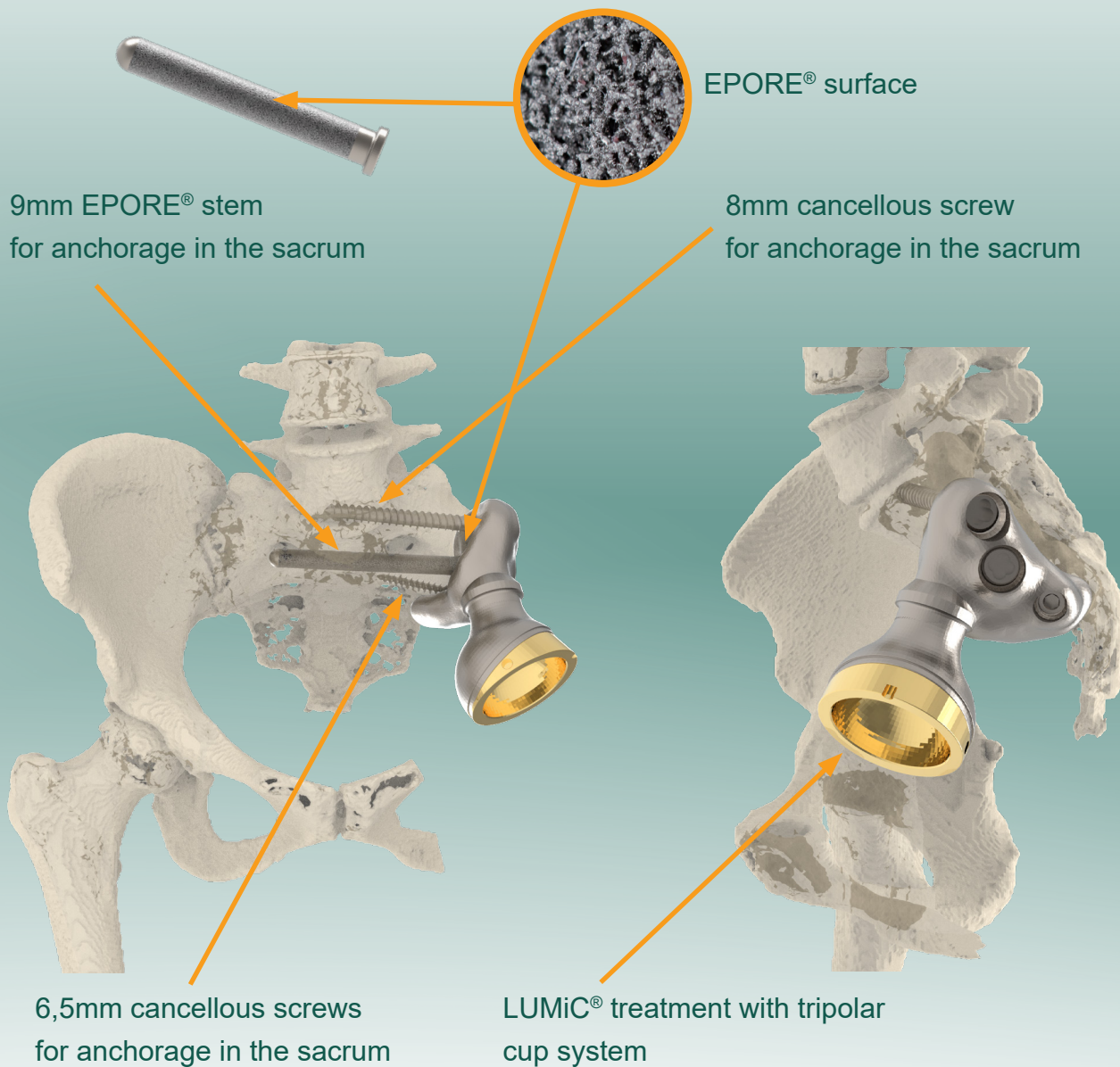
ilium flap with 4,5mm cortical screws and EPORE[®] surface

ilium flap with 8mm cancellous screw for anchorage in the sacrum and EPORE[®] surface



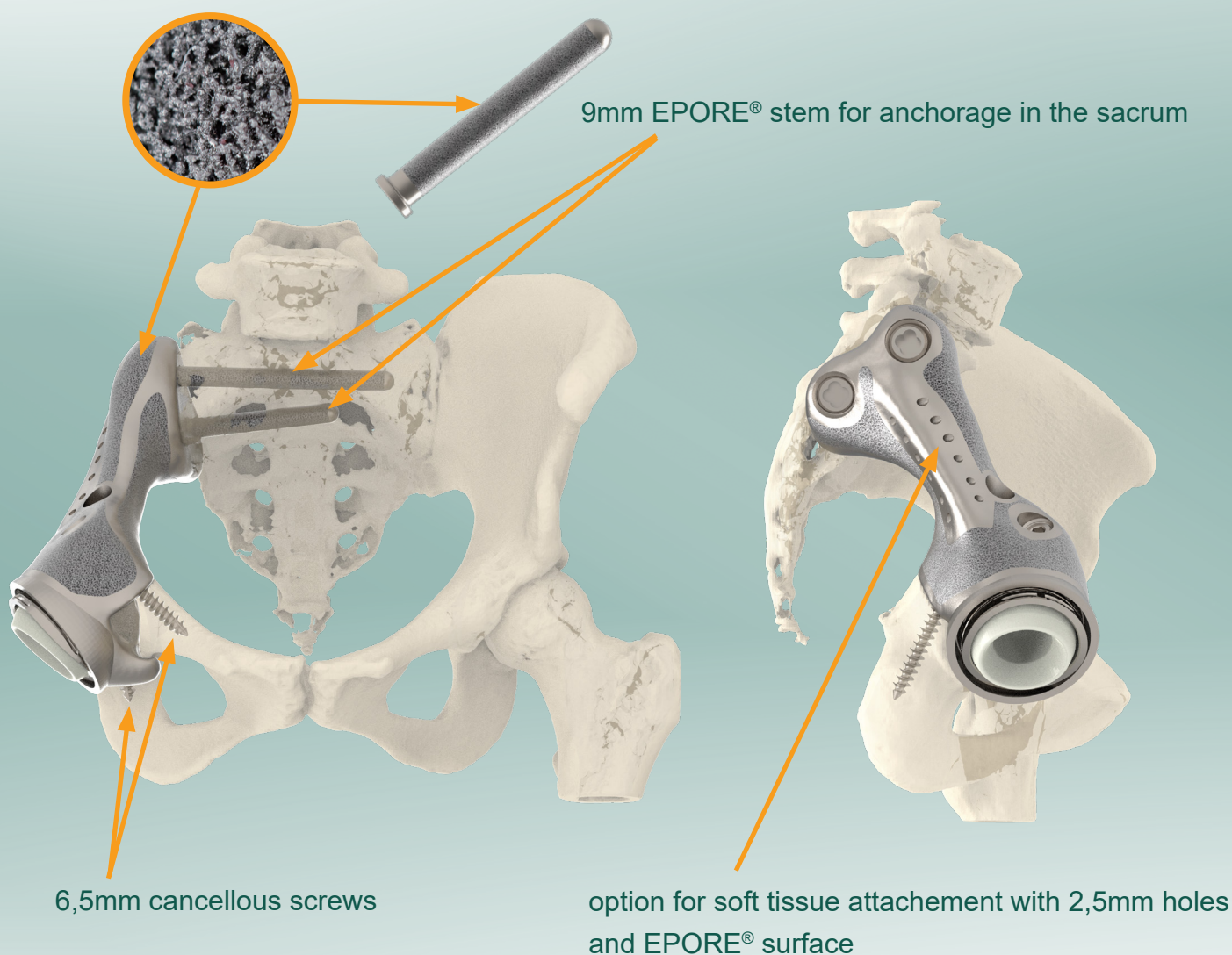
design variant 8 - Enneking type I-III resection

- complete resection of the ilium with small augmentation
- anchorage in the sacrum with cancellous screws and modular EPORE® stem
- cranialisation of the centre of rotation to decrease mechanical leverage
- combined with LUMiC® standard treatment
- patient specific drill guide



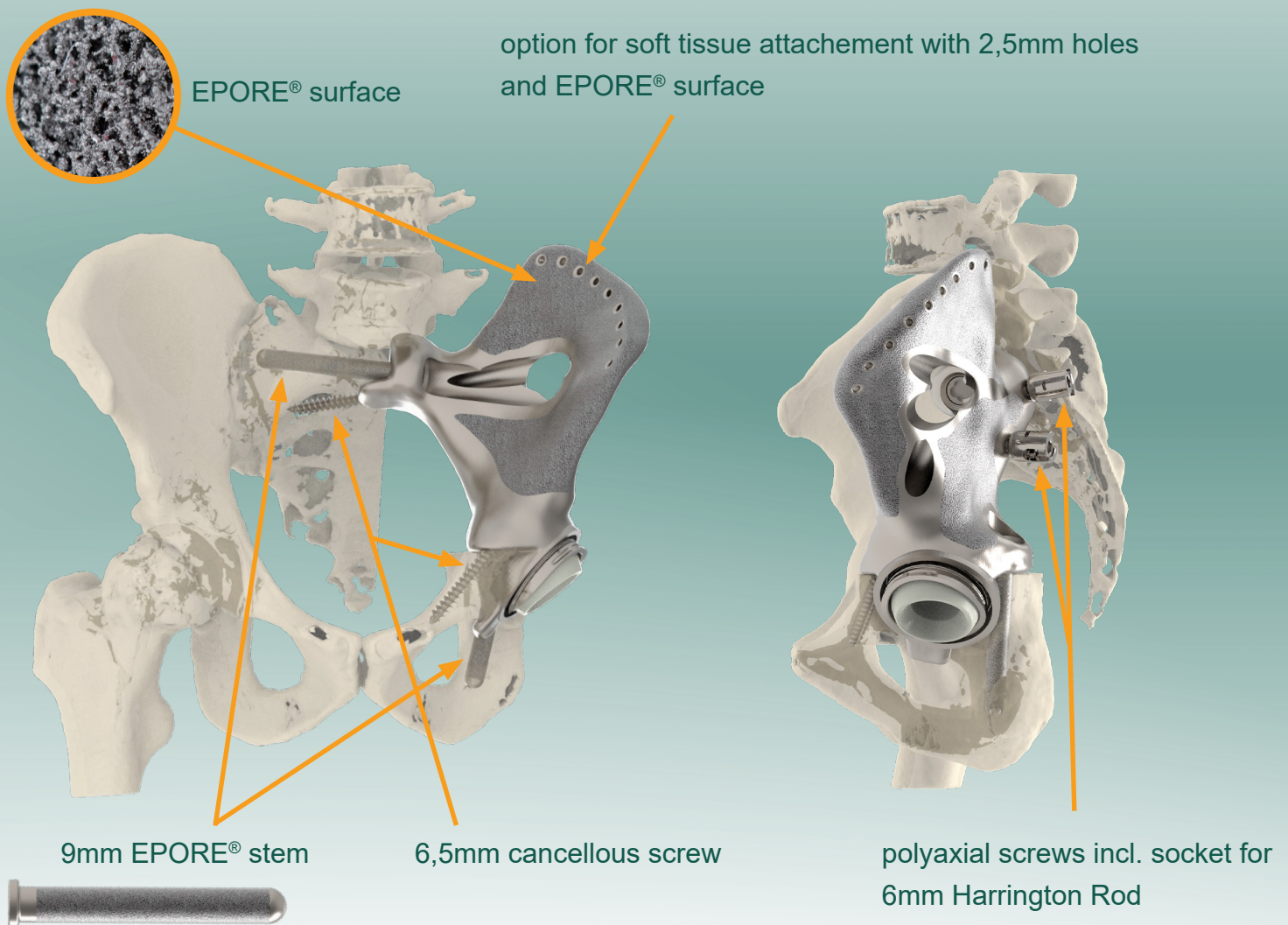
design variant 9 - Enneking type I-II-IV resection

- total resection of the ilium
- anchorage in the sacrum with two EPORE® stems
- reconstruction of the natural centre of rotation / anatomical axis
- closing of the pelvic girdle
- large-area EPORE® surface and 2,5mm holes for soft tissue attachment
- combined with EcoFit® 2M standard treatment (cemented cup with tripolar inlay)
- patient specific drill guide



design variant 10 - Enneking type I-II-IV resection

- total resection of the ilium
- anchorage in the sacrum, ischium and pubis with cancellous screws and modular EPORE® stem
- reconstruction of the whole bone structure to optimize the cosmetic outcome (good soft tissue coverage provided)
- reconstruction of the natural centre of rotation / anatomical axis
- closing of the pelvic girdle
- large-area EPORE® surface and 2,5mm holes for soft tissue attachment
- combined with EcoFit® 2M standard treatment (cemented cup with tripolar inlay)
- patient specific drill guide



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