OTO *twin*

Bimaterial 3D ear surgery education

OTO *twin*: HIGH-FIDELITY SYNTHETIC TEMPORAL BONE FOR SIMULATION TRAINING IN OTOLOGIC SURGERY AND OTONEUROSURGERY

- Anatomical high-fidelity
- Coexistence of hard resin reproducing bone and soft resin reproducing soft tissue
- Simulation of middle ear surgery, cochlear implantation, otoneurosurgery
- Adult and pediatric versions, available in different levels of difficulty

OTO *twin*: the digital twin of human temporal bone, the 4.0 response to HAS recommendations

" Never the first time on the patient "

OTO *twin*: BI-MATERIAL 3D-PRINTING INNOVATION FOR PRACTICAL TRAINING

OTO *twin* is manufactured using a bi-material high-resolution 3D printing process from real human temporal bone, combining high anatomical fidelity and innovative assembly of soft tissue and bone structures.

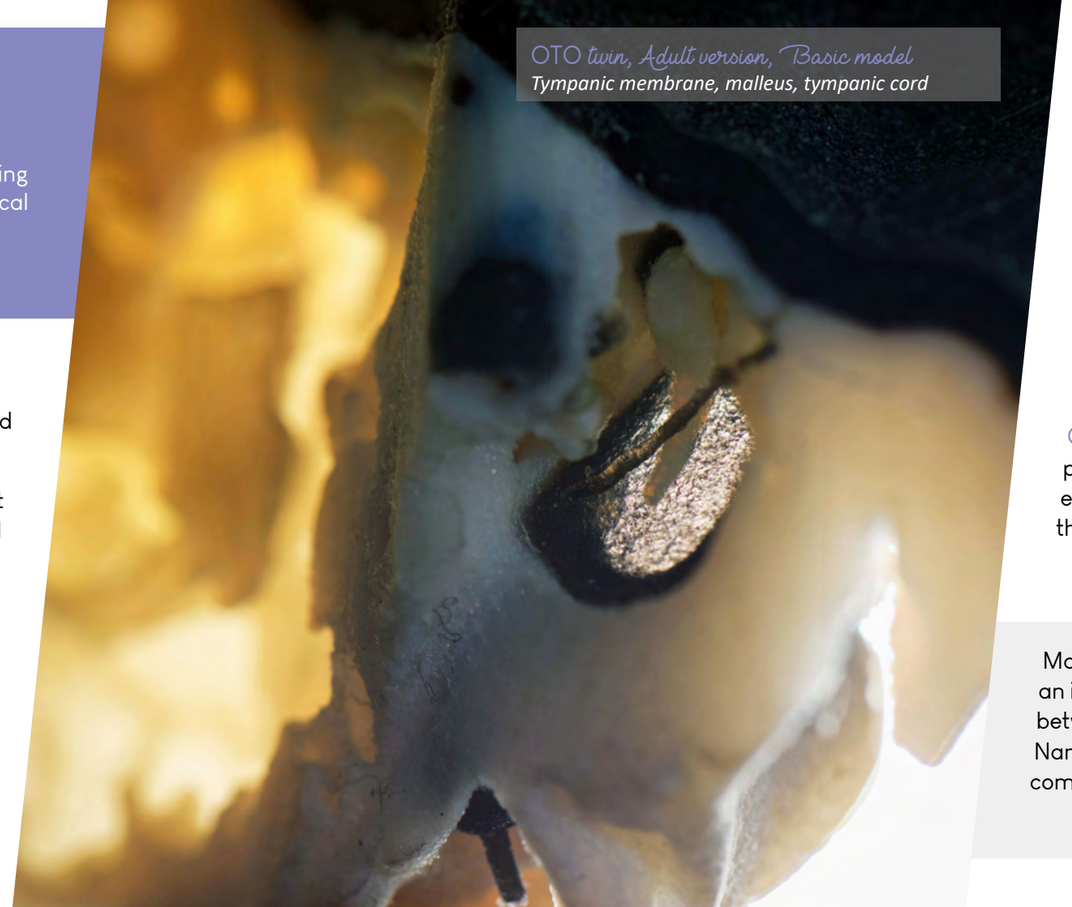
ANATOMICAL HIGH-FIDELITY

OTO *twin* has been morphologically evaluated with an innovative and OBJECTIVE method derived from engineering sciences (1)(2).

OTO *twin* reproduces the anatomy of a real normal temporal bone (adult and child) with an accuracy of a tenth of a millimeter for all anatomical structures, and even a hundredth of a millimeter for certain key structures in ear surgery, such as the facial nerve (1)(2).

Its anatomical validity makes OTO *twin* a pedagogical tool that can be used for training in ear surgery, cochlear implantation and otoneurosurgery, both for initial training, continuing education, evaluation and certification.

1. J. Chauvelot et al., Annals of Translational Medecine, 2020 Mar; 8(6): 304.
2. J. Chauvelot et al., Computer Methods in Biomechanic and biomedical engineering, 2020, VOL. 23, NO. 51, 563-565



OTO *twin, Adult version, Basic model*
Tympanic membrane, malleus, tympanic cord

AN ASSEMBLY OF BONE STRUCTURES AND SOFT TISSUE STRUCTURES

The coexistence of hard resin, reproducing the bone, and soft resin, reproducing the soft tissues (facial nerve, tympanic cord, ossicular joints, dura mater, round window, anterior and posterior labyrinth), makes OTO *twin* a unique pedagogical tool, with a mobile ossicular chain, a secondary tympanic membrane closing the round window, as well as a faithful reproduction of the consistency of the ear canal skin and the tympanum.

OTO *twin* allows to simulate middle ear surgery (mastoidectomy, pitympanotomy, posterior tympanotomy, canal approach etc.) but also cochlear implantation (cochleostomy, insertion of the electrode holder) and the approaches in otoneurosurgery.

Manufactured with PolyJet technology, OTO *twin* is the result of an interdisciplinary collaboration within the University of Lorraine between Pr. C. Parietti-Winkler (ENT Service and CCF, CHU de Nancy, EA 3450 DevAH) and Pr. A.S. Bonnet (LEM3 laboratory), combining the expertise of health sector and engineering sciences.

OTO *twin*: KEY POINTS

ENT *simulation tool*

Simulation of middle ear surgery, cochlear implantation, otoneurosurgery (surgery of the postero-lateral skull base)

High resolution bi-material 3D printing

Based on the CT-scanned image of a real human temporal bone, OTO *twin* combines high-fidelity anatomy with an innovative assembly of soft tissue and bone structures

2 versions

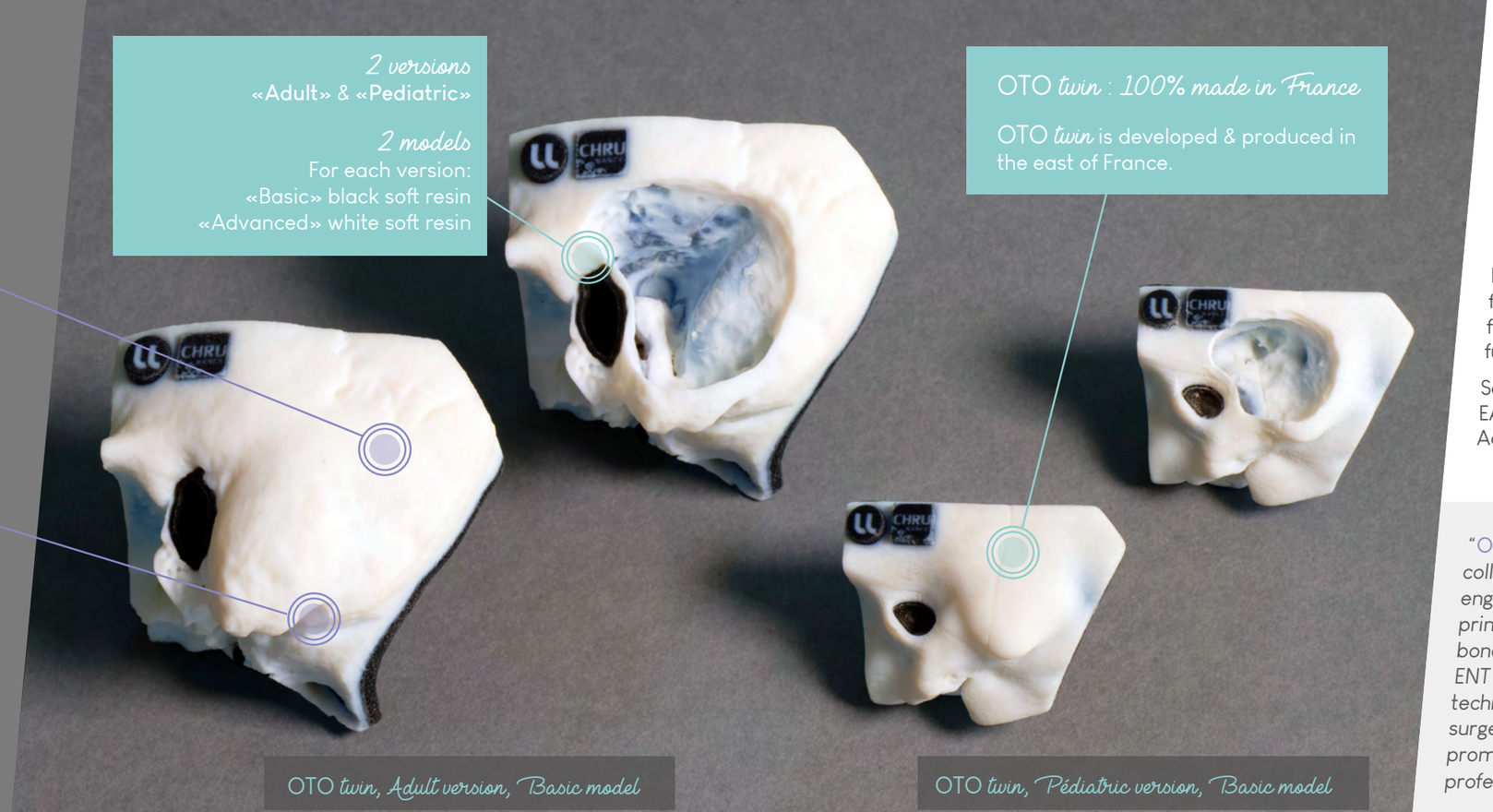
«Adult» & «Pediatric»

2 models

For each version:
«Basic» black soft resin
«Advanced» white soft resin

OTO *twin* : *100% made in France*

OTO *twin* is developed & produced in the east of France.



OTO *twin*, *Adult version*, *Basic model*

OTO *twin*, *Pédiatric version*, *Basic model*

AT THE ORIGIN OF THIS PROJECT

Pr. Cécile Parietti - Winkler

Professor of ENT and cervico-facial surgery at the University of Lorraine, surgeon in the ENT and CCF department of the Nancy University Hospital.

Medical and surgical referent for ear pathologies, responsible for the cochleo-vestibular functional explorations sector.

Senior researcher, laboratory EA 3450 DevAH (Development, Adaptation, Handicap).

"OTO twin is the result of a transdisciplinary collaboration between the health sector, the engineering sciences and the multi-material 3D printing industry. This digital twin of human temporal bone allows the progressive acquisition by future ENT specialists of the anatomical knowledge and technical skills necessary for the practice of ear surgery, cochlear implantation and otoneurosurgery, promoting the development of qualitative and safe professional practices."

OTO *twin*: SEVERAL TYPES OF PRODUCT FOR A STEP-BY-STEP LEARNING OF OTOLOGIC SURGERY AND OTONEUROSURGERY

2 VERSIONS FOR THE SAFETY OF ADULT AND PEDIATRIC PATIENTS

OTO *twin* is available in *Adult* and in *Pédiatric* versions.

These 2 versions ensure, before performing real surgeries, the safe acquisition of procedural skills though simulation for adults and children, for whom cadaveric anatomical parts are non-existent.

OTO *twin, Adult version, Basic model*
Macro view, stapes and tympanic cord

2 MODELS FOR A WELL-STRUCTURED TEACHING PROGRAM

Each version is available in *Basic* (black soft resin) and *Advanced* (white soft resin) models, depending on the color of the soft resin.

With the beginner model, the high contrast between white hard resin and black soft resin allows the trainee to easily visualize noble structures (facial nerve, dura mater, secondary tympanum) and facilitates their localization.

With the expert model, the low contrast between the hard and soft resins in same color, makes the localization of noble structures more complex and closer to reality.

Due to the diversity of models and versions, OTO *twin* is the only educational device that allows the construction of a teaching program in otologic surgery and otoneurosurgery, with a progressive complexity of the learning objectives.

OTO *twin, Adulte version, Advanced model*

OTO *twin*

Bimaterial 3D ear surgery education

TALENTS DE LA E-SANTÉ CONTEST 2022 - «Coup de Coeur du Jury» Award
TREMPLINS DE LA E-SANTÉ - INNOVATION CONTEST 2022 - «Région Grand-Est» Award
CONTEST OF THE SOCIÉTÉ FRANÇAISE D'ORL – SFORL CONFERENCE - «Innovation Médicale Audition 2023» Award

AVAILABILITY & PRICES*

OTO *twin* is distributed by UL Propuls
For any question or order please contact ototwin@ul-propuls.fr
Find more information and visuals on ototwin.com

	Basic		*Advanced*	
	Adult	Pediatric	Adult	Pediatric
Unit cost	239 €	235 €	259 €	255 €

*Prices are effective on June 1st, 2025, please contact us for a quote.
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LEM3 LABORATOIRE D'ÉTUDE DES MICROSTRUCTURES ET DE MÉCANIQUE DES MATÉRIAUX
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