

Technology Opportunity, Ref. No. IS-17/121

## Faster, cheaper and more effective mandible reconstruction

A novel workflow involving exact, patient specific cutting guides allows for very precise cutting of fibula flaps in the event of reconstruction need for a mandible that needs to be resected, mostly due to cancer. This new method consisting of virtual modelling of the needed bone geometry followed by 3D-printing allows for the generation of fibula flap cutting templates with unprecedented accuracy. Thanks to the accuracy of the technique the risk for complications is decreased and patient recovery is faster. Further, this procedure is much faster and less manpower intensive compared to current state of the art surgical techniques which results in substantial cost reductions.

**Keywords** Maxillo-facial surgery, oncology, tumor, jaw, bone reconstruction, virtual surgery

**Inventor** Matthias Mottini

**Reference** Mottini et al: Oral Oncology 59 (2016), e6-e9.

**Background** Maxillofacial reconstruction is a major challenge for surgeons because of the anatomical complexity of the skull, the sensitivity of the concerned region and the wish to maintain a pleasing appearance. Preoperative 3D virtual modelling of a patient's skull and simulations created from preoperative computed tomography scans allows precise planning and virtual reconstruction in mandibular reconstruction. However, to date most planning solutions are created by external engineers and require teleconferencing with surgeons in an expensive and time-consuming manner.

**Invention** The invention consists of a new method for surgery and reconstruction of segmental defects of the mandible through the use of truly patient specific and very accurate fibula flap cutting templates. Pre-operative modelling allows for perfect anatomical adaption of the cutting guides to the fibula flap to be resected. The cutting guide itself is fabricated through 3D-printing. In contrast to other current techniques, the cutting guide according to the invention is adapted to the de-periosted fibula which is essential for the accuracy and the fast healing process.

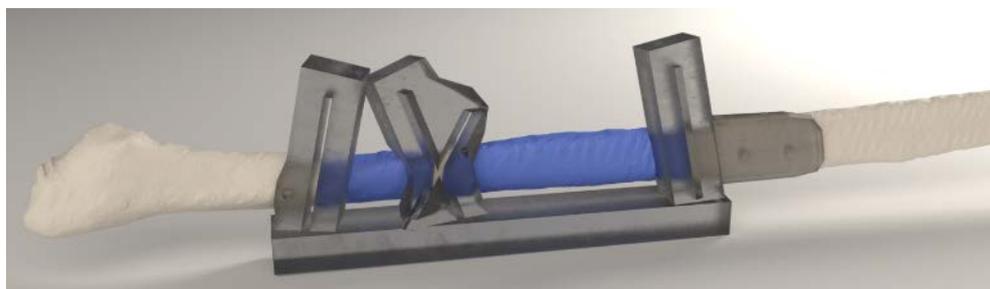


Figure: The novel cutting guide for the Fibula, here for the simultaneous, patient-specific cutting of two bone segments for reconstruction of the mandible.

**Fields of Use** Mandible reconstruction with Fibula flaps

**Patent Status** International Patent Application No. WO 2017/162444

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