Rapid prototyping produced patient mask for precise positioning in radiotherapy (P-806)

Key Facts

- **Mask for patient fixation in radiotherapy of brain tumors**
- **Software reprinting automated contour of head from CT/MRI**
- **Manufacturing of masks by rapid prototyping**

Background

Radiotherapy is a well-established method to treat certain tumor types in particular brain tumors. In order to direct the beam at the correct spot of the lesion it is necessary during treatment to keep the head of the patient positioned exactly at the same position. For fixation a “mask” is used, with is connected to the plate where the patient is located on. To manufacture the mask the patient has to be involved in a procedure for the plaster cast, which is uncomfortable and painful.

The Technology

The novel technology describes a non-invasive procedure, where the patient mask is produced by rapid prototyping based on data derived from previous digital imaging data from computer tomography (CT) or magnetic resonance imaging (MRI), positron emission tomography (PET) as well as optical, ultrasound (US) or laser-based scanners.
First the reproduction of individual head surface from CT/MRI images is obtained. Subsequently the reprint of anatomical structures has to established. Here it is important to eliminate all possible artifacts in order to create a proper surface contour of the head. The imaging data is transmitted to a rapid prototyping apparatus as readable data. With this readable data the rapid prototyping apparatus establishes a surface model, which can be used as a patient fixation device (mask).

Advantages

- Less manpower required due to automatic software producing the mask
- Mask can be produced in advance to the radiotherapy treatment
- No direct involvement of the patient required

Commercial Opportunity

Development of a software suitable for reproduction of CT/MRI images, establish contour of the head as well as transmitting data to a rapid prototyping printer to manufacture the patient’s mask.

Development Stage

A prototype has been tested successfully with patients. For market launch the software has to get certificate.

Applications

Software can be used for automated manufacturing of fixation device of pa-

tients head for radiotherapy of brain tumours.

Inventors
The invention was jointly conceived by Frederic Giesel, Hendrik von Tengg-Kobligk, Christian Zechmann, Marc Münter, Jürgen Debus, Rainer Neumann.

Intellectual Property
US Provisional (US 08154476.9) "Method to Derive Anatomical and/or Pathological Structures from Data of Imaging Technologies" has been filed April 14th in 2008. A subsequent PCT application was published as WO 2009127389, which was nationalized in Europe (EP2273923) and USA (US 8369925 - granted).

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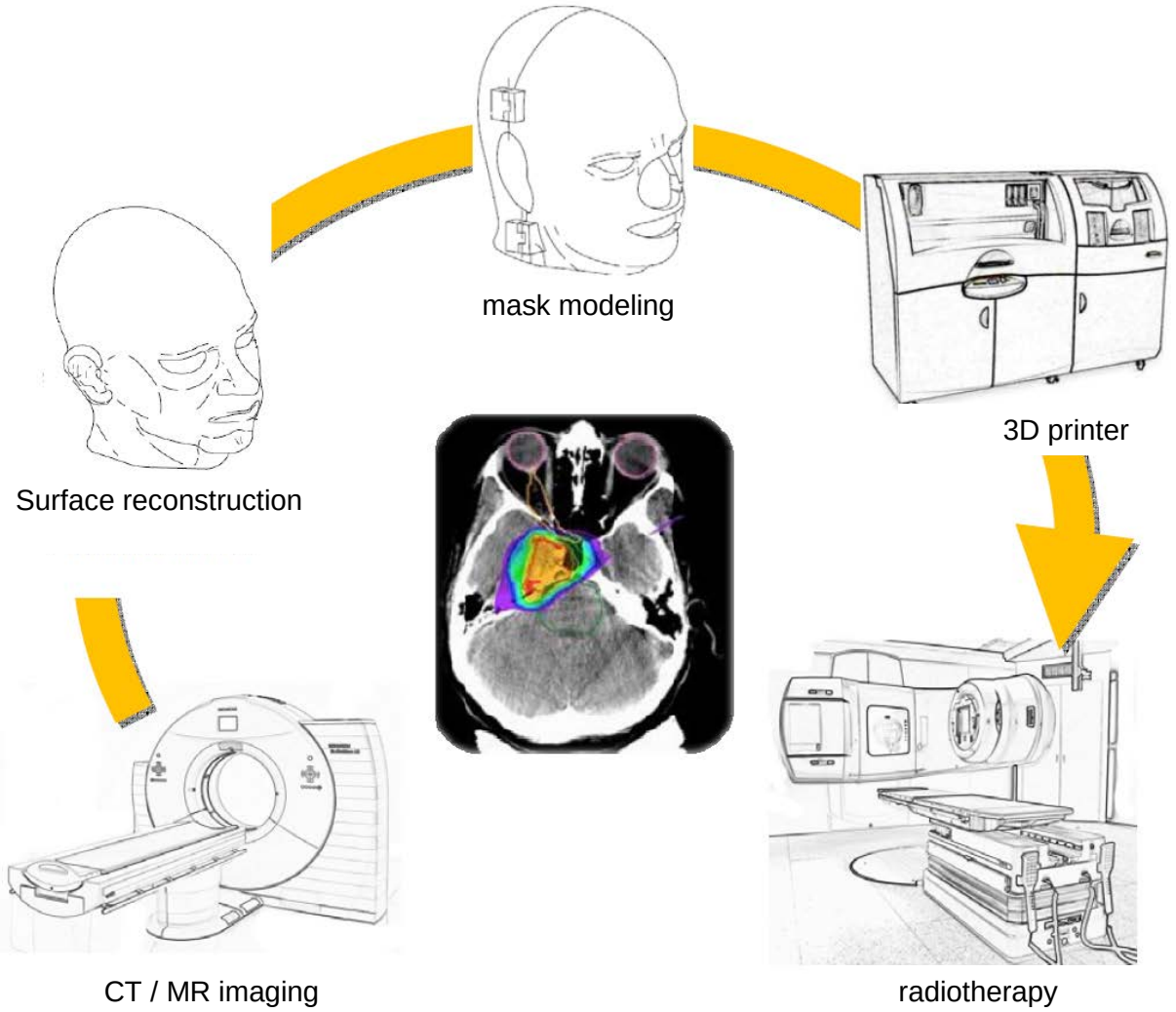

Figure 1. Schematic scheme of work flow of mask manufacturing.