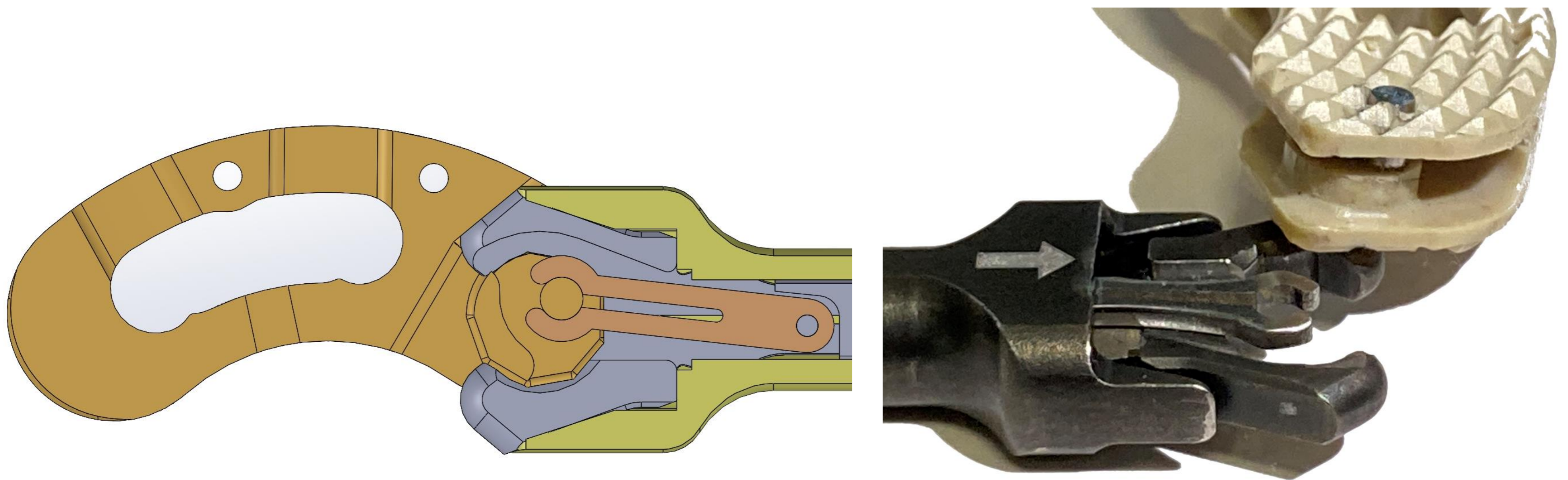


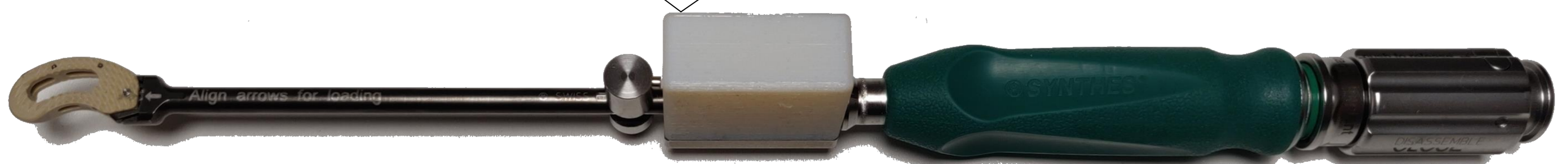
Bachelor-Thesis medical technology

Extension of the T-PAL system with angle measurement

© Translation of the rotational movement into a linear movement



System output: 0°



System output: 80°



© System overview

Problem

To treat degenerative disc disease of the spine, where a degenerated disc becomes painful, a minimally invasive surgery called spinal fusion can be performed to reduce the pain. In a spinal fusion, a so-called cage is inserted between the two vertebral bodies. This stops the movement of an intervertebral disc. The exact positioning of this implant is crucial for a successful spinal fusion. Currently, X-rays are used during this operation to verify the position of the implant. Verifying the position with X-rays involves great effort and risks. Research has shown that information about the angle of the implant in relation to the implant holder could be helpful. If the surgical staff had this information, they would, for example, need to take fewer X-rays.

Solution concept

Based on the problem, the existing product "T-PAL" of the company Johnson & Johnson must be extended and modified so that the new design can show the angle of the implant to the implant holder.

Since T-PAL is an invasive product, it was decided to measure the rotation outside the patient and to minimize external geometry changes to avoid additional risks.

This requires the rotation to be converted into a linear movement, which is then measured by a sensor. The new design should also not differ much from the existing T-PAL system in the invasive area of the implant holder. Due to this, the mechanism for the linear transmission of the rotation is guided internally. To maintain the reprocessing procedure with minimal changes, the additional components were designed to be modular and easily removable.

Results

The new design can be seen in the pictures above. It has been possible to modify the product so that it is now capable of measuring the angle of the implant in relation to the implant holder. The formulated tolerances can be met with the new system.

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