

H Hand trainer for upper limb rehabilitation

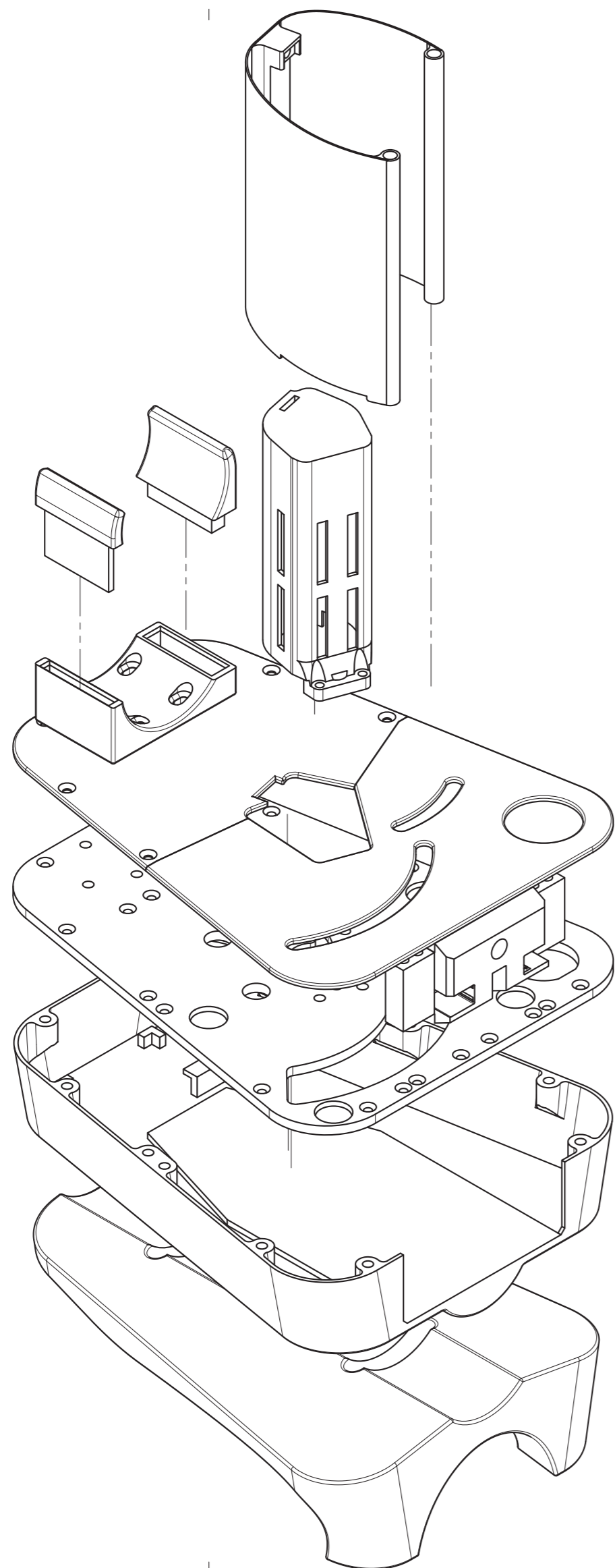
Redesign of a minimally-supervised portable hand trainer for upper limb rehabilitation after stroke

People that are recovering from a stroke **need frequent and high-intensity training to regain their upper-limb capacity**. Robotic devices are often used to assist stroke patients in rehabilitation. The minimally-supervised portable hand trainer, currently developed at the MLN Lab at the TU Delft, specifically focuses on hand and forearm rehabilitation. Haptic feedback is used in a virtual game to train patients' **finger flexion and extension and forearm pronosupination**.

A feasibility and usability study has been performed with the second iteration of the hand trainer in collaboration with therapists from Rijndam and healthy participants, showing room for improvement.

In this graduation project, **the portable hand trainer is redesigned to develop an improved product design in comparison to the second iteration that enables more functional, ergonomic and motivating rehabilitation training**.

The result is **a hardware-ready 3D prototype that demonstrates improvement in the pronosupination movement (1), the donning/doffing of the device (2) and the wrist support (3)**.



The **two-part base** under an angle of 12 degrees ensures a more pure and isolated 10-degree pronosupination movement.



The **wrist support** is improved on easy of use, ergonomics and donning from the top with a three-part design with two flexible bands and one rigid bottom



The **cone** on top of the shell enables patients with spasticity to don from the top. The cutout at the bottom ec placement:

