Stroke Rehabilitation Device

In consequence of a stroke, damage to certain brain areas can lead to partial paralysis. Even though this so-called stroke paralysis is a severe condition, patients can relearn the ability to move by undergoing long and tedious therapy. Besides regular guided therapy sessions, exercises must be performed as often as possible to regain muscle control. Especially in the beginning of the recovery, the training progress is not immediately visible. This lack of perceived success leads to many patients being frustrated, and some even give up on their therapy.

However, even when the muscle signals are too weak to trigger actual movement, they are measurable. A training device can register these so-called EMG signals, amplify them, and give feedback on the user's progress. Depending on the targeted age group, gamification concepts may lead to a significantly larger motivation to pull through the therapy. Additionally, the training data can be used by the physician or therapist to track progress and adapt the therapy accordingly.

The user group for such a product is large and diverse. However, since most stroke patients are over 60 years old, we decided to target this age group first. In the long term, the user group can be expanded to younger people with a modified product that meets their requirements. Besides stroke paralysis, there are more medical conditions that make muscle therapy necessary, e.g. the training process for wearers of EMG-controlled prostheses. Market analysis and expert interviews indicated that there is a high level of interest in the product among patients, physicians, and medical insurance providers.

The prototype we built is able to measure a healthy person's EMG signals and visualize them on a display. With this prototype, a user can experience the idea and understand the need for such a device.