

Nura

Collaborative Project 2023-2024

**A Functional Electrical Stimulation Sleeve for
Upper Limb Stroke Rehabilitation**

Clinical Lead

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The Challenge

Strokes are one of the leading cause of disability worldwide, with over 100,000 people affected each year in the UK. 80% of stroke survivors suffer from hemiparesis (weakness on one side of the body). Repetition is crucial in rebuilding mobility in the affected limbs, but unfortunately, the current rehabilitation pathway in the UK lacks adequate support for upper limb rehabilitation.

In the most recent National Institute of Care and Health Excellence (NICE) guidelines for stroke rehabilitation, needs-based rehabilitation should be offered for at least 3 hours a day, on at least 5 days of the week, however in hospitals, this amount of support is not achievable, and adjuncts are needed to close this gap.

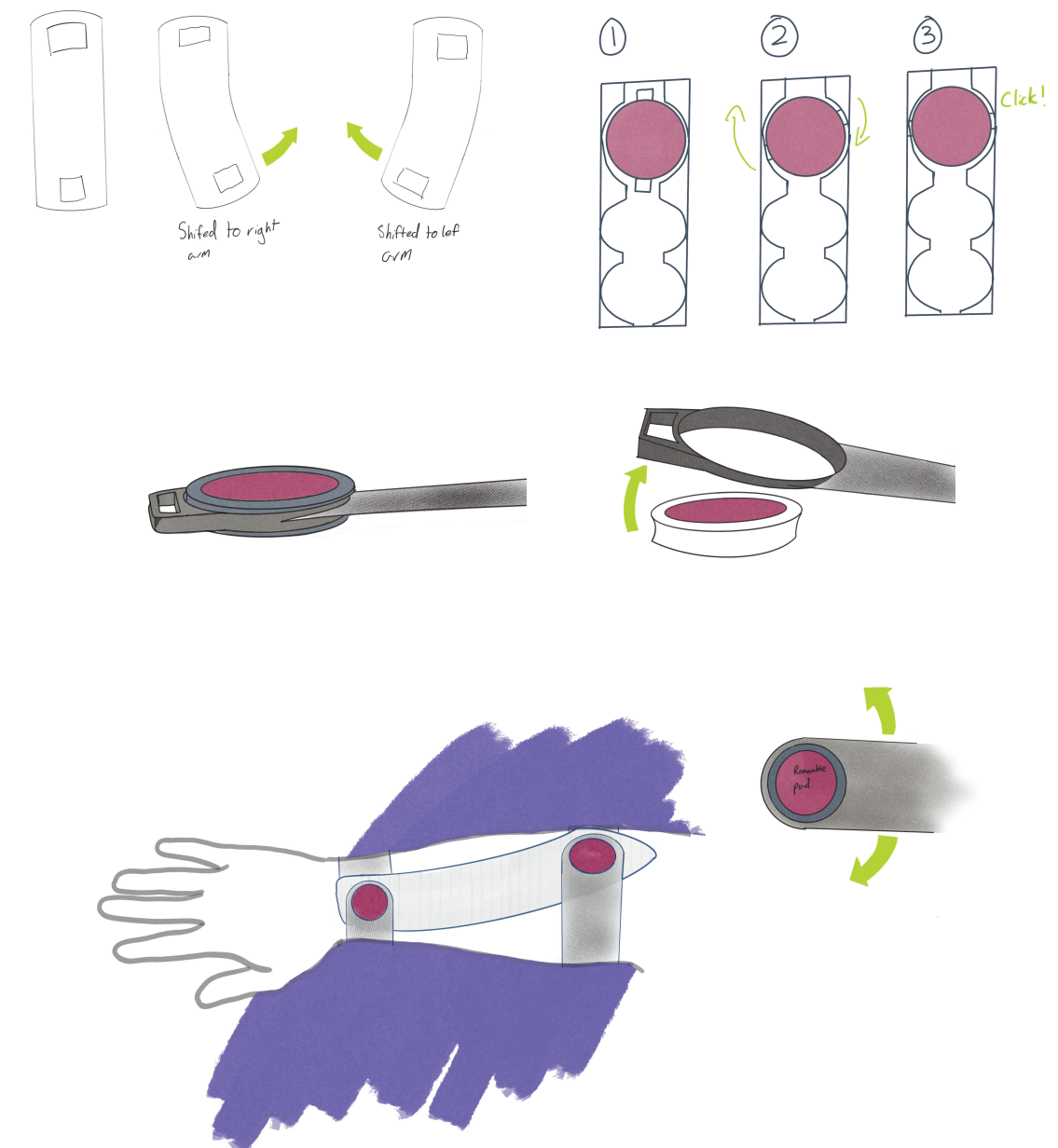
Functional electrical stimulation (FES), which stimulates muscles to generate movement, is an effective technology , but existing devices are cumbersome and impractical for hospital use due to lengthy setup times. Therefore a solution to provide FES whilst being user friendly and intuitive is imperative.

Product Requirements

- The product must be able to provide FES to produce wrist extension, ulnar and radial deviation.
- The product must be able to be put on by a stroke survivor with hemiparesis and limited arm mobility
- The product must improve exercise adherence in the home
- It should increase the amount of upper limb rehabilitation taken by the user
- The product should support therapies that incorporate movements of everyday life

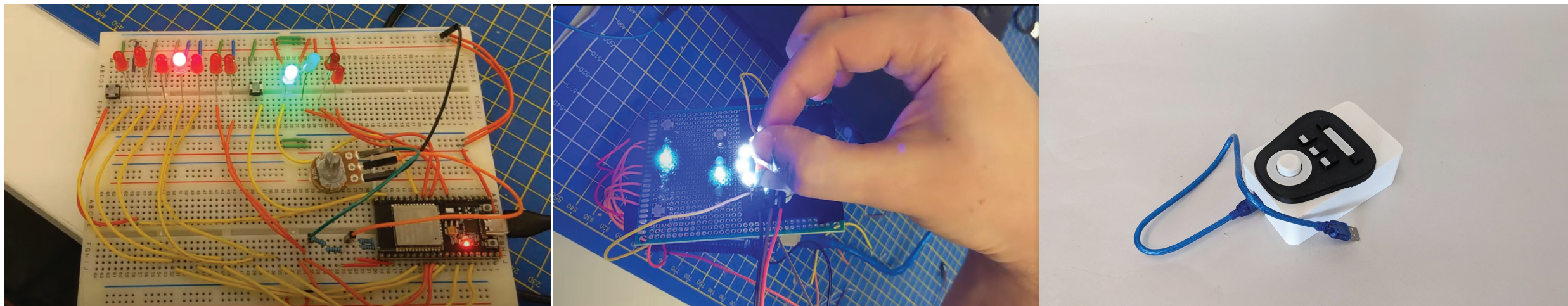
Ideation and Development

Initial ideation on attachment mechanism for electrode pads on arm



Ideation and Development Cont.

Electronic Development of User Experience Demonstration Model



Autoethnographic Testing of FES Devices to Ensure Product Feasibility



3D Form Development and Modeling for User Testing



Final Prototype



Nura features a multipad electrode to stimulate the muscles in the arm for wrist extension, ulnar and radial deviation. This sleeve works alongside a tablet or Virtual Reality Application to gamify rehabilitation in the hospital and at home.

42%

**Faster at being
worn compared to
typical FES device**

**Technology
currently under
patent application**

Final Prototype Cont.



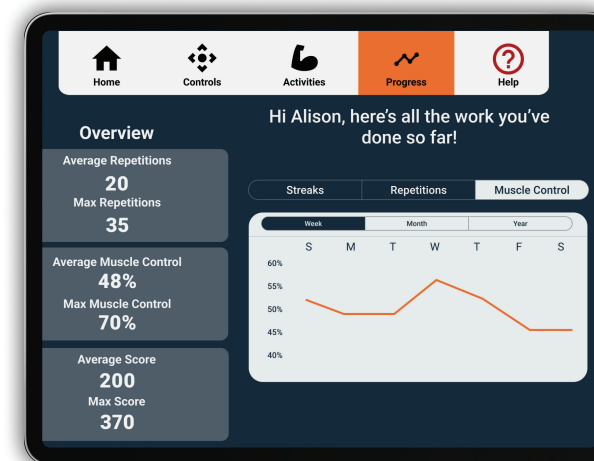
User can
adjust FES
intensity



One touch
adjustment of
muscle activation
under patent
application



Detachable
electronic
puck



Companion
tablet app helps
motivate users