Thumb Splint with Compliant Hinge

Personalized orthosis that **blocks hyper-extension** of the MCP thumb joint, while **facilitatating all other thumb movements.**

Why?

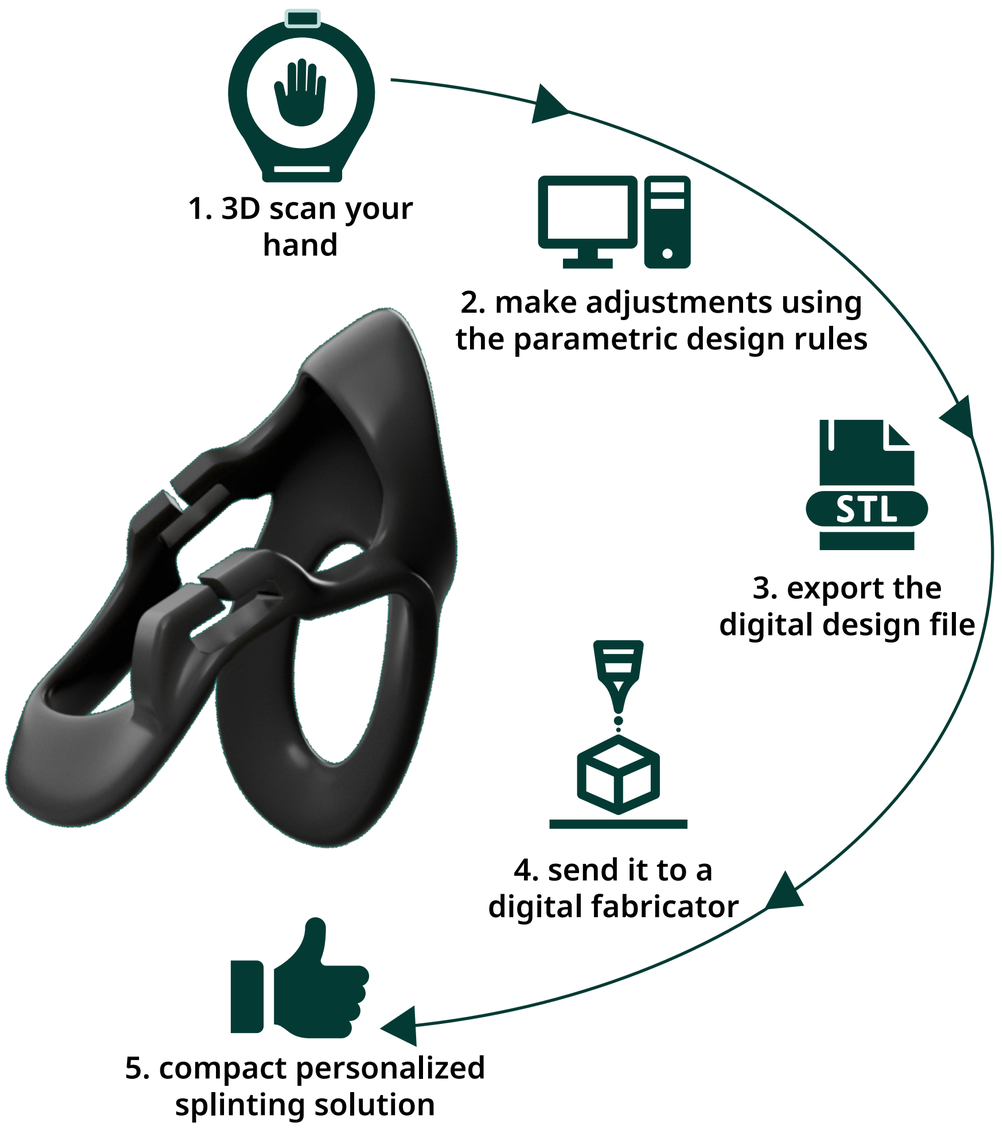
Millions of people suffer joint problems at the thumb, due to **Arthritis, Hypermobility or injuries.** This can lead to a considerably reduced **quality of life**, as normal daily activities become painful or even impossible. People with early and mild **joint laxity symptoms**, often accidentally overextend their thumb. For them, an orthosis can support the **stability** of the thumb, which helps to **minimize pain**, **improve the hand function** and even **slow the development** of the disorder. They want a **compact, discreet** solution that supports them in avoiding **hyper-extension**, without feeling limited in their **mobility**.

How?

In orthopeadics, **ultra personalized** products have been the standard for centuries. To ensure the **correct function** and **optimal fit** of an orthosis, anthropometric data of the patient is used to design and develop the orthosis. In this **modern approach**, a **photogrammetric 3D scan** in an **optimized scanning position** is made of the hand, and a **parametric design model** is used to digitally generate the personalized product and then use **additive manufacturing** to fabricate it. The parametric **'template'** was developed such that it accomodates most **anatomical variations**, allowing the viable production of a well-performing **personalized thumb splint.**

What?

The thumb splint is made up of an **angled ring** around the thumb, a **'tab'** over the soft-tissue palmar base of the thumb and a **'loop'** around the back side of the thumb. Together, they are **squeezed onto the soft-tissue part** of the thumb, to keep it in place. The hinge is designed to allow complete flexion of the thumb and **block extension only at a specified angle.** The splint is a **one-material PA12** (Nylon) solution printed using the new **Multi Jet Fusion printing** method. Thanks to the relatively **isotropic and resillient** results of this method, the hinge offers enough **flexibility and durability** to be effective, despite it being 3D printed.



Puck Rosa Gerritse
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Committee Dr. Huysmans, T.
Dr. ir. Elkhuizen, W.S.
Company mentor: Vincent Laagland

TU Delft

Faculty of Industrial Design Engineering

Delft University of Technology