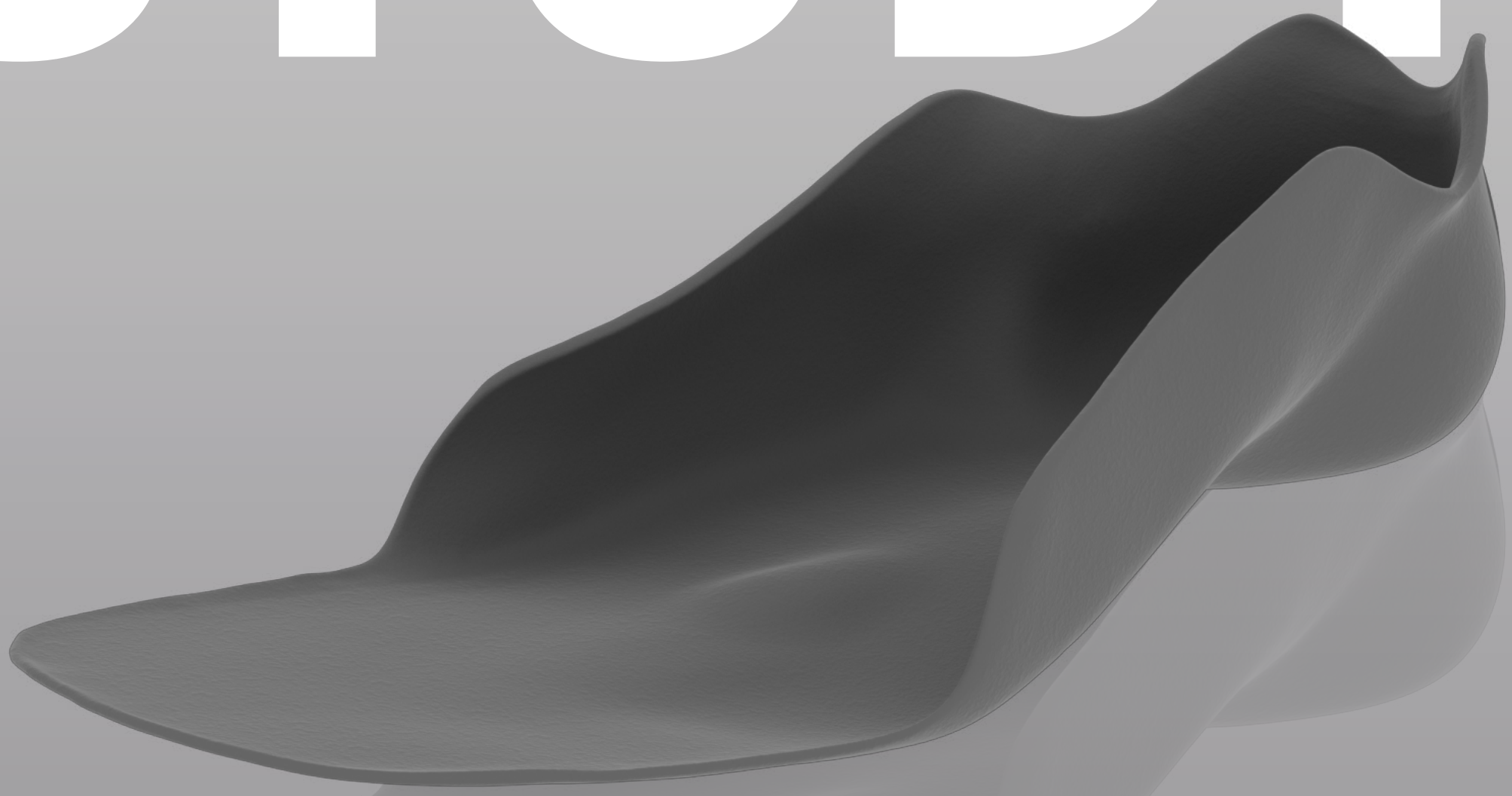
# CASE STUDY

DFO



CREATING INDIVIDUALIZED
AND **CUSTOMIZED MEDICAL AIDS**
WITH 3D PRINTING :
**DYNAMIC FOOT ORTHOSIS** (DFO)

sculpteo x Schlather Orthopädietechnik

## Challenges

• 1 •

The mass-customization of personalized medical aids that are reduced in weight and thickness for a better and more comfortable fit.

• 2 •

Providing patients with high-quality aids on-demand

## Information

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|---|---|
| **Company** | Schlather GmbH |
| **Industry** | Medical O&P |
| **Product** | Dynamic Foot Orthosis (DFO) to correct various deformities such as a clubfoot or extremely high arches |
| **Technology** | HP Multi Jet Fusion |
| **Material** | PP (Polypropylene) |
| **Finishing options** | Raw finish |
| **Challenge** | Produce on-demand individual aids that are personalized to each customer.<br>Enhance comfortability by reducing weight and thickness. |



### ABOUT SCHLATHER :

Schlather was founded in **1955** by **Reinhold Schlather** and provides patients with a full range of orthoses, prostheses, insoles, medical products, orthopedic shoe technology and rehabilitation technology. **Schlather GmbH** specializes in the orthopedic care of **children**.

In addition to the head office in **Balingen**, the company operates **four** other subsidiaries in Baden-Württemberg (Horb, Villingen-Schwenningen, Hechingen and Ravensburg). The company attaches great importance to individual patient care.

The integration of **3D construction** has opened up completely **new possibilities** for the production of orthopedic aids for Schlather GmbH.

### GOALS :

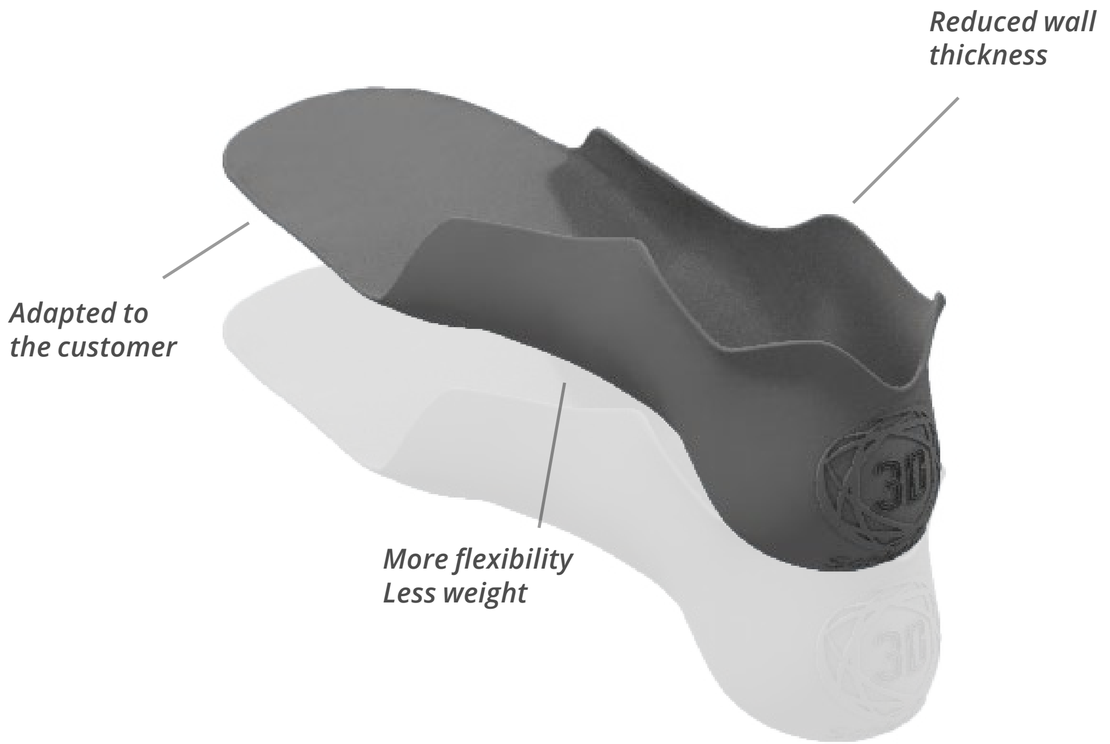
Schlather's aim is to create **medical aids** that are **individualized** and **customized** which was made easier with 3D printing's innovative technology.

One **project** for which **additive manufacturing** is particularly suitable is **dynamic foot orthosis** (DFO).

## ABOUT DFO :

A DFO is an **orthosis** that corrects various deformities such as a clubfoot or extremely high arches.
These ortheses help to **correct the deformity** by anatomically creating a specific shape to support each individual's foot. Helping to prevent a progression of deformity or, possibly, fixing it.

In order to meet each **individual's needs** and find **innovative solutions** to the current problems in producing DFO, Schlather turned to **additive manufacturing** technology and **3D printing** service provider Sculpteo to meet their objectives.




## COLLABORATION :

Additive manufacturing allows Schlather to get an optimized product thanks to **function integration**, **weight reduction** and **design freedom.**
Sculpteo's online 3D printing service also give them access to 3D printing technologies and materials **adapted to their needs**.





*Truss pads made for children by our jet fusion PP 3D printing technology*

## DESIGN SOLUTION :

To meet their objective to provide individualized DFOs to patients, Schlather turned to additive manufacturing for its **freedom of design** and **customization possibilities**. With 3D printing, DFOs can be designed to be equivalent in stability with **reduced wall thickness** than what traditional manufacturing could otherwise produce.

Also, **reducing weight** and **increasing flexibility** can be integrated effortlessly allowing for a more natural and comfortable fit for a patient.
Schlather's **healthcare professionals** can now easily create customized medical aids and DFOs that are perfectly adapted to a patient's anatomy and **combine** the strengths of **craftsmanship** and **digital manufacturing.**

## SOLUTION EXAMPLE:

**Truss pads** for correcting **foot deformities** do not have to be glued which can be very time consuming, instead these pads can be integrated directly in the design and printed together.

## DESIGN POSSIBILITIES :

With 3D printing it is also possible to integrate patient-specific design wishes like **color**, **patterns** and **shapes** and not lose the integrity of the function of a medical aid/DFO.
Additive manufacturing makes it possible to effortlessly **combine functionality** and **aesthetics** in one printing process.

## PRODUCTION ADVANTAGES :

**• Color choice •**

**• Patterns •**

**• Shape variety •**

A further advantage of 3D printing is the **reproducibility of aids**/DFOs. Especially for follow-up restorations which can be produced more quickly than with traditional manufacturing methods.
Once developed, the DFO can be produced again at any time since it is stored digitally and **can be re-configured** as the patient's needs **evolve** or **improve**.

When compared with the traditional process of foot orthoses manufacturing, additive manufacturing offered Schlather an easier design and manufacturing process.





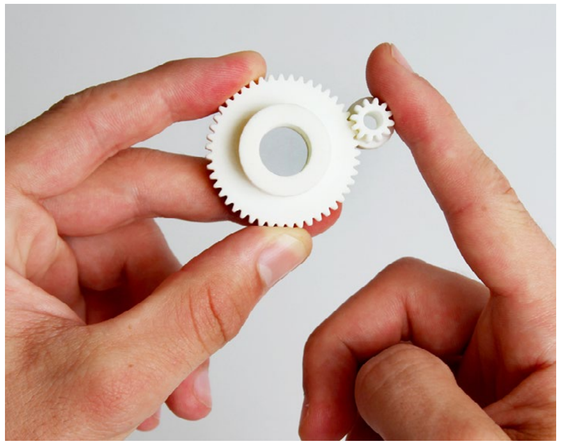
## DFO PROJECT :

Unlike common desktop printers which can only print parts on a 2D build plate, powder bed industrial 3D printing allows for parts to be stacked in a **3D build volume**; meaning more parts can be manufactured at the same time and complex designs can be easily created. Schlather chose the **Multi Jet Fusion technology** and **PP** (Polypropylene) material to produce their **individualized** DFO **medical aids**.

This allows DFOs to be printed without support structures and with an optimized, lightweight design. Making it comfortable for the wearer and optimizing its functionality. The **main benefits** of powder based technologies over traditional manufacturing are the surface quality, breathability, lightweightness and accuracy.

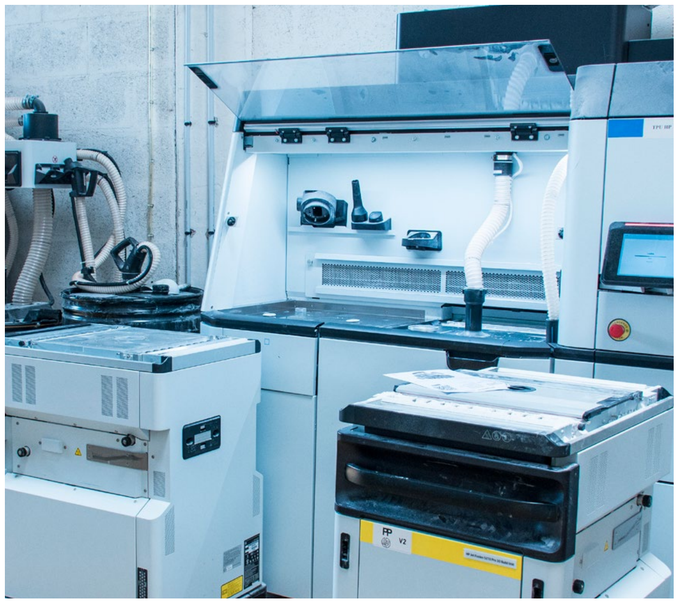
## OUR PLATFORM :

With Sculpteo's **online 3D printing platform**, the 3D file of the DFO aid is then custom fabricated for the patient from a common polymer, that is 100% recyclable, with an extended and structured recycling industry. This 3D printing material is suitable for medical devices and skin contact aids since Jet Fusion PP boasts excellent plasticity, higher elongation, durability, and low moisture absorption.



Providing patients with high-quality aids is Schlather's top priority and Sculpteo proved to be the best 3D printing service partner for providing high quality materials and top notch technology coupled with the corresponding experience to make Schlather's DFO possible.

*PP materials or Jet Fusion PP is developed by BASF*



## JET FUSION PP :

This 3D printing material is an industrial-grade polypropylene that provides high reusability ratio, producing functional parts batch after batch. Making this material **sustainable** and able to produce at higher volumes.

As a powder bed technology, the surface finish is **uniform** and **smooth** to the touch without visible layers. PP can be used by designers, engineers, and businesses to produce advanced 3D printed prototypes, but also final parts.

**CLIENT QUOTE ABOUT US :**

*“ Sculpteo, gives us access to various technologies, materials with corresponding experiences and knowledge “*

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