



High-Quality and Cost-Effective Custom Orthoses Through 3D Printing

AM Technologies Allow for Customization, Lightweight Design, and Speed of Production

OVERVIEW

Supra malleolar orthosis (SMO) is a type of ankle foot orthosis (AFO) that is used to provide support. Traditionally, SMOs have been manufactured using methods such as CNC machining, casting, and hand fabrication, though these methods often come with significant challenges that can affect the quality, functionality, and accessibility.

Additive manufacturing has revolutionized the production of SMOs through the utilization of advanced materials such as [Ultrasint® TPU01](#) making it easier, faster, and more cost-effective than ever before. This has enabled healthcare professionals such as Bahr Innovations to create custom-made SMOs that perfectly fit the unique needs and preferences of patients.

QUICK FACTS

Materials:

- Ultrasint® TPU01

Technology:

- MJF

Partner:



In 2015, Bahr Innovation was founded by CPO (certified prosthetists and orthotists) Adrian Bahr. He had the vision to use 3D technology within the orthopedic industry. Today, Bahr Innovation is the first company to 3D print prostheses and orthoses in larger volumes.

Their mission and vision is the pursuit for optimal fit every time, for the satisfaction of patient and clinician utilizing holistic processes that lead to optimal operations, low costs, high quality and happy customers. With 3D technology, Bahr is changing the orthopedic industry through innovation.

BAHRINNOVATION.COM



50% Reduction
in Costs



3x Increased
Production
Capacity



200% Longer
Product Life

Challenge: Implement a faster and more cost-efficient solution to produce high-quality SMOs

The traditional concept for producing SMOs was based on manual production using textile leathers making it very labor intensive resulting in a limited production capacity and high costs. Through the utilization of 3D printing with [Ultrasint® TPU01](#), SMO production is greatly improved by digitizing the design process. This not only increases the quality of fit and comfort but also reduces costs and removes the variables found in traditional production methods.

The application of Additive Manufacturing solutions along with Ultrasint® TPU01 has been a game-changer for orthotics. These innovative technologies offer a combination of flexibility, durability, shock-absorption, and customization options.



“The potential of 3D printing to transform manufacturing into a more flexible, efficient, and customizable process was too compelling. We saw an opportunity to not just participate in this revolution but to lead it.”
– Stijn Paridaens, CEO at ZiggZagg

Solution: Create an SMO designed for increased comfort and wearability to better fit patients

By utilizing Design for Additive Manufacturing (DfAM) and [Ultrasint® TPU01](#), Bahr Innovations and ZiggZagg were able to produce an SMO that offered a combination of flexibility, shock absorption, durability, and customization. Vapor smoothing was also part of the post-processing of this material and provides increased mechanical properties along with a sealed finish to protect against liquids.

All of these manufacturing and material benefits resulted in an orthotic that changes the lives of patients with disabilities or mobility issues by offering increased comfort, wearability, and a customized fit.

[Learn more about TPU01:](#)