

# EDSER ramps up production of customized orthotic devices with HP 3D Printing



Data courtesy of EDSER



# HP Multi Jet Fusion technology allows **EDSER** to conceptualize innovate orthotic solutions and explore new market opportunities



## Introduction

EDSER develops and provides superior quality, custom-made orthotics to clinicians and patients around the world. With more than 20 years in the orthotics field, EDSER combines the roots of the industry with the latest innovations in design, production methods, and materials and was one of the first companies in the orthotics and prosthetics space to embrace digital transformation.

Using their own software called EDSERScan, clinicians can manage patient information, 3D scans, and assessment

tools. The software links to an online app called EDSERAPP that allows clinicians to prescribe orthotic devices to patients and perform real-time follow-ups of orders.

In 2019, EDSER manufactured more than 38,000 pairs of orthotics devices, mainly foot orthotics and ankle-foot orthotics, an increase of 11% compared with figures from 2018.

- **Industry**

Healthcare

- **Sector**

Orthotics and prosthetics

- **Objective**

To employ additive manufacturing, specifically HP Multi Jet Fusion technology, to reduce manual labor, the need for product assembly, and increase manufacturing productivity.

- **Approach**

With the HP Jet Fusion 4210 3D Printer, EDSER has increased productivity of its 100% custom-made orthotic devices.

- **Technology | Solution**

HP Multi Jet Fusion technology, HP Jet Fusion 4210 3D Printer

- **Material**

HP 3D High Reusability<sup>1</sup> (HR) PA 12

1. HP Jet Fusion 3D Printing Solutions using HP 3D High Reusability PA 12 provide up to 80% powder reusability ratio, producing functional parts batch after batch. For testing, material is aged in real printing conditions and powder is tracked by generations (worst case for reusability). Parts are then made from each generation and tested for mechanical properties and accuracy.

## Challenge

Team members at EDSER are constantly searching for new technologies to optimize workflow and improve their products. In the past, EDSER manufactured its devices using thermoforming and CAD-CAM solutions for milling to create custom-made orthotics and prosthetics (O&P).

**“The [O&P] market is growing as professionals acknowledge the quality of central fabrication facilities and people become more aware of the benefits of orthotics for injury prevention and biomechanical enhancement,”** said Fernando Ferradeira, CPO of EDSER.

EDSER always saw potential in using additive manufacturing (AM) in the O&P industry: **“Traditionally, O&P is a sector of custom-made devices, as if every device is a prototype,”**

Ferradeira said. **“However, the AM technologies and materials that can deliver parts with the mechanical properties needed for O&P are relatively few and very expensive.”**

A second drawback of transitioning from traditional manufacturing to additive manufacturing is the reluctance of O&P professionals to adapt to these production changes. But according to Ferradeira, EDSER can serve as a link to help providers adopt additive manufacturing as a valid and versatile manufacturing method by facilitating design and development of products, as well as offering manufacturing capability.

## Solution

EDSER tested various 3D printing technologies and chose to adopt two HP Jet Fusion 4200 Series 3D Printing Solutions to not only replace current products but also to develop new products.

**“In order to validate a new technology, we apply it to a specific product and compare it with the current technologies in use in terms of manufacturing capacity, product durability, and mechanical behavior,”** Ferradeira said.

One new application made possible by HP Multi Jet Fusion (MJF) technology is an articulated joint ankle foot orthosis (AFO). EDSER was able to 3D print the device with the joint fully integrated, thus eliminating the need for assembly.

**“One of the key changes that HP MJF allowed us to do was to create devices with different mechanical behavior across the same device, allowing greater flexibility and/or rigidity where needed,”** Ferradeira said.



## Result

Implementing HP Multi Jet Fusion technology into EDSER's workflow has resulted in increased production capacity, decreased unnecessary manual labor, increased productivity by 35%, and repeatability for duplicate devices.

According to Ferradeira, the most critical advantage of using additive manufacturing is the reduction of the number of processes involved and, therefore, an increase in productivity.

**“We’ve reduced from a seven-step process—designing, nesting, milling, cutting, thermoforming, grinding, and finishing—to a five-step process—designing, nesting, printing, blasting, and finishing,”** said Ferradeira. The former process required 28 hours of manual labor per worker and a total of 11 workers, while 3D printing only requires 17.75 hours per worker, with six workers.

Reducing human interaction with the device also allows for reduced variations on final devices and improves the accuracy and repeatability of each device.

As far as device aesthetics and performance are concerned, Ferradeira noted that the most important difference between HP Multi Jet Fusion and other 3D printing technologies is the mechanical properties of the printed devices, including improved accuracy and precision.

A final advantage of 3D printing compared with other manufacturing methods is the ability to produce customized devices. **“Personalization is critical, especially in our line of business,”** Ferradeira said. **“Every device is unique and custom-made for each patient.”**

Ferradeira and EDSER view 3D printing as an opportunity for the O&P industry to re-shape itself and provide better products and services, and see HP 3D Printing as playing a key role in developing products specifically for this technology and creating the potential to enter new markets.

**“In the future, we expect that 90% of our products will be manufactured using AM technologies, and 80% with HP MJF,”** Ferradeira said.



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