

CASE STUDY | INVENT MEDICAL

With HP 3D printing,
Invent Medical streamlines
the production of custom
orthotics and prosthetics



Invent Medical combines **custom software** with **HP Jet Fusion 3D Printing Solutions** to reinvent the production of orthotic and prosthetic devices



Introduction

“Invent Medical is focused on the application of digital technologies in the field of custom-made orthotics and prosthetics,” says CEO Jiri Rosicky. “The company’s mission is to introduce a new generation of patients to the benefits of 3D printing.”

Invent Medical is startup company located in **Ostrava, Czech Republic**. The company was founded with the intent to use digital technologies like 3D scanning, computational modeling, and 3D printing to reinvent how custom orthotics and prosthetics are made.

The team at Invent Medical includes not only orthotists and prosthetists but also biomechanics specialists, product designers, software engineers, and experts in algorithm design, artificial intelligence, and biomedicine. Continually building on their **25 years of technical and clinical experience**, the experts at Invent Medical have experienced many of the industry’s issues first-hand. **They embrace new ideas and technology to improve outcomes for patients around the globe.**

• Industry

Healthcare

• Sector

Orthotics and Prosthetics

• Objective

To use state-of-the-art software, hardware, and other innovations to **continually improve how custom orthotics and prosthetics are made.**

• Approach

Leverage HP’s Multi Jet Fusion technology along with 3D scanning, software, and artificial intelligence to **create a workflow that allows medical professionals to quickly design and order custom orthotics and prosthetics.**

• Technology | Solution

HP Multi Jet Fusion technology, HP Jet Fusion 3D Printing Solutions

• Material

HP 3D High Reusability PA 12
HP 3D High Reusability PA 11

Challenge

“Our whole business model is based on 3D printing,” says Invent Medical’s Vice President of Business Development Jan Rosicky. “In 2015, we were just days away from buying a large SLS machine. Then we heard about HP’s plans to disrupt the 3D printing industry. We decided to cancel our order and postpone our launch until we could learn more.”

Traditionally orthoses and prostheses are made using subtractive manufacturing processes. Baby helmets, for example, are used to treat head shape deformities. They were previously made by milling the model from polyurethane foam and then draping thermoplastic around the model, a process that is time both consuming and not scalable.

From their inception, **Invent Medical planned to change how these types of devices are designed and made.** The plan was to leverage 3D scanning, software, and 3D printing to simplify and streamline the process. In the past, however, 3D printing technology was too limiting. The materials were inadequate, the machines were too slow, and they didn’t offer the mechanical properties that Invent Medical needed to fully execute their vision.

“Until recently, our biggest limitation was manufacturing,” says Jan Rosicky. “We needed a strong partner with technology we could rely on to deliver on our business plan.”

Solution

“When we first heard about HP’s plans back in 2015, we became fascinated with their vision,” says Jiri Rosicky. “We approached HP with our concept and had an early opportunity to see their technology in action. They were focused on taking 3D printing beyond rapid prototyping and into manufacturing of real-world products. That was exactly what we needed.”

Working with HP, **Invent Medical spent a significant amount of time and energy developing its products** including orthotic insoles, ankle foot orthoses, cranial helmets, and protective face masks, among others. Once the products were designed, they conducted **rigorous testing to ensure the products would perform as needed.**

The first product unveiled by Invent Medical was **orthotic insoles**, which was branded **“8sole”**. With 8sole, the company’s goal was to create custom-made prescription orthotic insoles that set a new standard in comfort, treatment, and pain relief for patients’ feet.

“With HP Multi Jet Fusion technology, we are able to design and directly print out the final product,” says Invent Medical’s Chief Designer Ales Grygar. “This allows us to deliver higher performance orthotic insoles that are lighter, more flexible, and more comfortable.”

Their solution includes a software tool that allows podiatrists and other medical professionals to quickly design and order each pair of custom orthotics. First a patient’s foot is 2D scanned, and then the clinician visits

Invent Medical’s configurator tool where they can choose and customize their product. The system uses a complex algorithm, anatomical data and clinical data from the configurator to design the final 3D printable part. Once an order is placed, the insoles are manufactured, packed, and shipped to the customer.

“With the interactive configurator and 3D printing technology, I am able to design custom and perfectly fitting orthotic insoles,” says Orthotist Eliska Stralkova. “What is most interesting for the patient is watching their insoles being designed in real time on the screen.”

Beyond insoles, Invent Medical is clinically testing a **baby helmet** branded **“Talee”**. The device is intended to correct a cranial deformity known as plagiocephaly, or flat head syndrome. Like 8sole, Talee is a custom-made, 3D-printed product that delivers gentle, effective orthotic treatment while offering improved comfort and aesthetics.

In the future, Invent Medical plans to release its ankle foot orthosis, which it is named **“Piro.”** **HP’s Multi Jet Fusion technology has allowed Invent Medical to create a design that is lighter and more comfortable.** When the software configurator is enabled, clinicians will be able to order Piro the same way they can order 8sole and Talee. Invent Medical also plans to offer a protective face mask as well as other orthotic and prosthetic devices.

Result

"I started working out with a personal trainer and began experiencing pain in my feet," says patient Micheala Kocourkova. "After I started using my 8sole insoles, I was really surprised because I was able to run for nearly an hour without feeling any pain. I also like that that I can fit them into any of my shoes without even noticing them."

While the innovative products developed by Invent Medical create better outcomes for their patients, the system also delivers benefits to the clinicians. The software developed by Invent Medical allows clinicians to track each order as it goes through the production process.

The combination of software and HP's Jet Fusion 3D Printing Solutions helps create a symbiotic relationship among patient, caregiver, and medical device manufacturer. It also allows Invent Medical to more easily scale its model worldwide.

"We believe that with our unique software and technology from HP 3D Printing we can completely transform the industry,"

says Jan Rosicky. We can provide patients all around the globe with advanced, new products, helping improve their lives. Further, we create a sustainable business model for the healthcare providers who support them."

Invent Medical plans to expand its presence worldwide. Their exceptional solution allows clinicians to focus on their core competencies such as acquiring new patients and caring for their existing customers. Invent Medical provides ongoing support, helping clinicians market their services and deliver the best possible products.

As Invent Medical executes its strategy, HP Jet Fusion 3D Printing Solutions will continue to play a central role. HP's Multi Jet Fusion Open Platform for materials will continue to offer new materials, removing even more constraints from the design process. **As HP 3D Printing continues to innovate with HP Multi Jet Fusion, Invent Medical will further fulfill its mission of developing and delivering the world's most advanced 3D-printed orthotic and prosthetic products.**



Learn more about HP Multi Jet Fusion technology at hp.com/go/3DPrint

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