WIMBA®
Let's restore pets mobility together

# Wimba improves pet mobility with HP 3D Printed Orthotics

## Startup leverages HP Multi Jet Fusion 3D printing technology and a turn-key digital workflow to produce custom orthotics and prosthetics for companion animals

Data courtesy of Wimba

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## Industry

Medical/healthcare

## Sector

Veterinary/orthotics

## Objective

Develop custom orthotics that improve pet mobility

## Approach

Wimba leverages HP's 3D printing solution and diverse materials to develop an all-digital workflow that enables veterinarians to quickly order custom orthotics for companion animals

## Technology

HP Multi Jet Fusion

## Material

HP High Reusability PA 11
HP High Reusability PA 12
BASF Ultrasint® TPU01

Data courtesy of Wimba

# Introduction

"We established Wimba about 13 months ago to solve a big problem for veterinarians and their customers," says Franek Kosch, Co-founder and Chief Product and Marketing Officer at Wimba. "We're helping dogs and cats with orthopedic pathology for them to lead more active and healthy lives."

Wimba, headquartered in Krakow, Poland, is a new service that allows veterinarians to create custom orthotics for dogs and other companion animals. The company's V-OP solution includes a unique software platform that enables clinicians to quickly scan an animal's limb and submit an order for a chosen device.

By leveraging the power of HP's Multi Jet Fusion (MJF) 3D printing technology, Wimba manufactures and delivers lightweight, inexpensive, custom orthotics and provides a simple but elegant solution for ongoing treatment planning. With its comprehensive digital workflow, Wimba simplifies the order process, saving time and money for veterinarians and their clients.

# Background

"I founded Wimba with my brother Greg Kosch, and Maciej Szczepański, who is a veterinarian," says Mr Kosch. "We previously founded another startup that was doing upper limb prosthetics for humans, but people kept asking us to develop a similar service for animals. From an assistive devices perspective, the veterinary industry is 10 years behind human medicine. We wanted to help it catch up."

Orthotics use braces, splints, and other devices to support or correct deformities and abnormalities, and they can be used to treat a variety of conditions including injuries, arthritis, and congenital defects. When used with animals, they can help improve mobility, reduce pain, and prevent further damage to an affected limb.

Some of the conditions that can be treated with a pet orthotic include:

- Carpal hyperextension
- Cranial cruciate ligament (ACL) tear
- Fractures
- Arthritis
- Hip dysplasia
- Luxating patella
- Degenerative myelopathy
- Spinal cord injuries
- Congenital defects

Pet orthotics are usually custom-made to fit an individual animal. The type of orthotic chosen typically depends on the specific condition being treated and the devices are often made from a variety of materials including plastic, metal, and fabric.

Pet orthotics can be a very effective way to improve the quality of life for animals with musculoskeletal problems. They can help to keep pets active and mobile, which can lead to a happier and healthier life.

# Problem

"The manual workflow that was used with human orthotics was transferred to the veterinary world," says Mr. Kosch. "It didn't work for people and it most certainly doesn't work for pets. There was just too much time and guesswork involved, and they often ended up with an unusable product. As a result, I'd say 90% of vets don't treat orthotics and prosthetics as a serious solution to the problem."

## The traditional  process was too painful and difficult

Clinicians and manufacturers face several problems when developing an animal orthotic. For one, it can be difficult to capture the animal's anatomy. Until recently, the vet would have to take a plaster cast of the affected limb. It's a messy, time consuming process that often results in poor fitment. For these reasons, many clinicians either tried to make their own orthotics, or abandoned them as a potential treatment.

3D imaging can solve the problem with capturing an animal's anatomy, but the thick coat of fur on most animals makes scanning difficult. Large stationary solutions are available, but most veterinarians aren't willing to invest in expensive scanning systems.

The process of prescribing an animal orthotic is also difficult. Plaster casts are typically packed and sent to a dedicated orthotics laboratory. Shipping times are slow and packages are frequently lost. Finished products show up weeks later and must often be sent back and forth again for adjustments. Veterinary staff spend valuable time throughout, tracking orders and handling inquiries from the lab and customer.

## Animals can't tell us it's uncomfortable or doesn't

Beyond imaging and workflow, there are also other challenges with design and use. Obviously, an animal orthotic must be engineered for their unique anatomy, but animals can't communicate verbally, which limits their ability to help technicians verify fitment and comfort. If they are uncomfortable, they may be more likely to chew or otherwise damage the orthotic. Materials used to manufacture the orthotic must not only be durable enough to withstand the subject's weight and activity level, but they must also be comfortable and safe for the animal's skin.

The traditional manufacturing process also exacerbates the problem. To be effective, orthotics must be built to very precise tolerances to ensure proper fit and function. Further, the orthotic needs to be lightweight, breathable, waterproof, and resistant to many environmental factors. Perhaps most importantly, orthotics must be easy for the veterinarian to prescribe and affordable for the pet owner.

Data courtesy of Wimba


# Solution

"We work directly with veterinarians and sell our products to their clinics," says Mr. Kosch. "We offer a solution that combines imaging, eCommerce, and 3D printing to produce state-of-the-art orthotics, and we have identified and validated significant benefits of these devices for pets and their owners."

The founders of Wimba have a medical background and have used 3D printing to develop other devices, including orthotics for human use. They recognized the problems with traditional pet orthotics and set out to restore pet mobility with state-of-the-art orthopedic devices and a simple, versatile, and user-friendly order experience.

## Revolutionary product design

As part of its V-OP supply solution, Wimba has already launched several turnkey orthotic solutions for dogs. Their carpus orthosis features a wrist joint for front limbs and the tarsus orthosis features an ankle joint for rear limbs. The company also offers an elbow orthotic and is developing their first prosthetic, in addition to several custom splints and other products.

### Products

Carpal orthosis
Available in application

Tarsal orthosis
Available in application

Elbow orthosis
Available in application

Prosthesis

"We are on the frontier of using 3D printing at scale," says Mr. Kosch. "We're aware of some competitors, but they are primarily using fused deposition modeling (FDM). With HP's 3D printing solution and our optimized digital workflow, we offer a better product and remove much of the friction and cost involved with ordering a customized pet orthotic."

## HP's MJF makes it possible

Wimba orthotics are entirely 3D printed with HP Multi Jet Fusion (MJF), which offers several important advantages:

- Design freedom - HP's powder bed additive manufacturing technology unlocks new tools for Wimba, allowing them to design lighter weight, more functional parts that are highly complex, yet easier to finish and assemble
- Excellent surface finish - HP's 3D printing solution helps Wimba make parts that look and perform like a finished product should
- Serial customization - An all-digital workflow, from design to production and order to fulfillment provides Wimba with unique scalability
- Material choice - With MJF, Wimba can make some components that are strong, rigid, and durable and others that are soft, lightweight, and breathable

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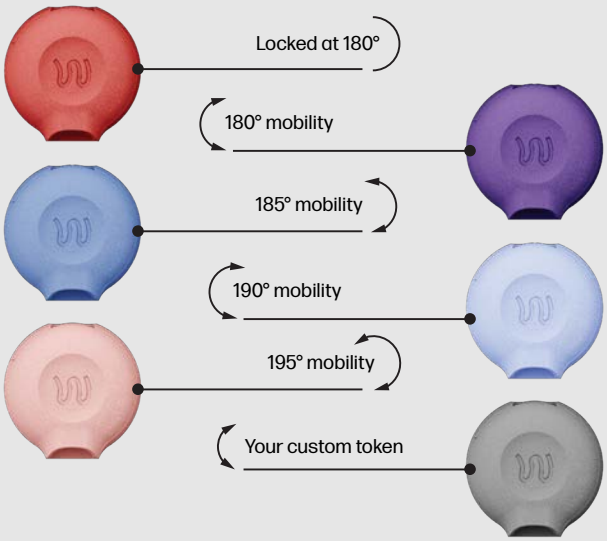
Wimba's orthotics utilize both rigid and flexible materials to allow a physiological range of motion while also providing functional stability. HP 3D High Reusability PA 11 material is used to produce the rigid frame, HP 3D High Reusability PA 12 is used for the hinges, and BASF Ultrasint® TPU01 is used for the soft distance pillows that provide comfort and support.




## Color enhanced innovation

Some of the components are even designed to be upgraded or replaced over time. For example, veterinarians can progressively prescribe different tokens to vary each orthotic's range of motion and resistance. They are manufactured using HP's PA-12 material and post-processed to achieve the various colors.

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## A turn-key digital workflow

"The process of ordering an orthotic for pets was basically the same as it was for humans," says Mr Kosch. "A plaster mold or cast was taken and shipped to a lab and weeks later a poorly fitting orthotic showed up. We knew we had to disrupt the workflow, in addition to the end product."


The orthotic is only part of Wimba's comprehensive solution. The company also offers WimbaSCAN software and a unique sleeve that allows vets to quickly and accurately scan a pet's limb using their smartphone.

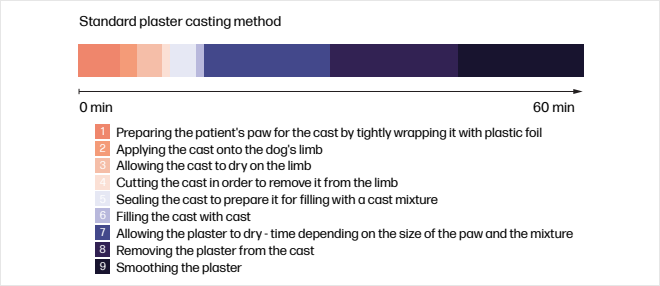

To facilitate and manage orders, the company provides WimbaAPP, a web-based software solution that allows veterinarians to upload scans, select the appropriate orthotic, and place orders online. The orders are automatically routed for production and manufactured with MJF, on demand.

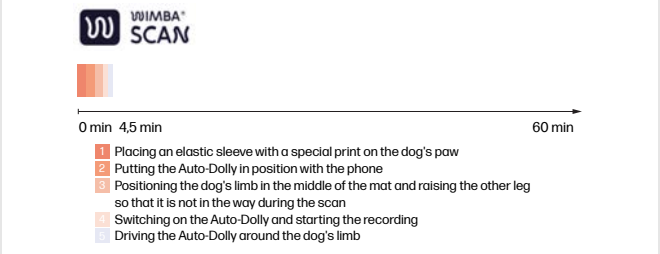

# Benefits

"From a business perspective, it all comes down to resources," says Mr. Kosch. "There was an immense amount of time locked up in the traditional process, and for veterinarians, time is money. By streamlining the workflow, we've removed the biggest barrier. Now our customers know their costs and can realize margin on their sales."

The combination of design freedom, additive manufacturing, and a digital workflow is profound and Wimba has already realized many important benefits:

- Quality and accuracy - So far, Wimba has handled over 200 cases and has received overwhelmingly positive feedback regarding quality and fitment. In part this is due to the accuracy of 3D scanning, but also because of the quality and repeatability of MJF technology.
- Speed-to-market - Wimba's technology and workflow allows them to operate at warp speed. When developing their products, Wimba found that HP's 3D printing solution enabled them to reduce their overall time to market by 83% and the time it takes to implement changes by 231%.
- Scanning - Wimba's digital workflow also saves considerable time for the veterinarian. The time it took to capture body measurements went from 90 minutes using plaster casts down to 15 minutes to scan and order. The web-based software made it easier to upload scans and place orders.
- Comfort - Design freedom enables Wimba to build an adaptive fit system into their devices. In many cases, this means the orthotic is ready for use immediately, without adjustments. Also with HP's MJF technology, Wimba was able to reduce the weight of their orthotic by 75% compared to a traditional device. Further, by using lattices and the soft BASF Ultrasint® TPU01 material, Wimba was able to reduce the occurrence of pressure sores by 95%.
- Assembly - With design freedom and HP's MJF technology, Wimba was able to combine many of the parts in their orthotics, achieving a part consolidation ratio increase of 182%. As a result, they were able to reduce overall assembly times by 34%. In addition, because the orthotics are 3D printed on demand, Wimba was able to reduce its inventory costs by 18%.



- Customization - With additive manufacturing, much of the front-end cost is removed, making customization and personalization feasible. Wimba leveraged this feature to increase the number of highly profitable customized variations by 159%.

### Custom Products

Tarsal splint orthosis

Carpal splint orthosis

Carpal splint orthosis

- Scalability - The combination of HP's MJF 3D printing and Wimba's automated design and scanning workflow enables the company to manufacture more than 1,000 devices weekly, which is not possible with any other manufacturing technology. Wimba can also establish manufacturing capabilities in other geographies, expanding scalability further while producing as close as possible to the consumer.

## What's next for Wimba?

"With 3D printing the obstacles to good design are swept away," says Mr. Kosch. "Many people don't realize that it also exposes a fourth dimension, which is functionality. When you figure out how to fully leverage that, you begin to see the complete landscape of benefits offered by additive manufacturing."

Beyond orthotics, Wimba has other exciting opportunities in its product pipeline. The company is developing customized boots that help service and other dogs navigate difficult terrain. In summer, the ground temperature can reach 140° Fahrenheit. In the winter, salt and snow can become packed between an animal's paw pads. Wimba's unique boots provide an exact fit and a level of comfort, durability, and protection that mass produced boots can't match.

Wimba is also expanding into prosthetic devices. Offering both fore and aft prosthetics, these devices are intended to assist limb-challenged animals by restoring their mobility and improving their biomechanics.

Tracheal collapse and Hydrocephalus are common ailments with chihuahua and other breeds. Vets have procedures to remedy these conditions, but maintaining head and spinal position is key to a faster and more complete recovery. Wimba is working on a collar that will help maintain the head and neck alignment of dogs recovering from surgery and those requiring ongoing therapy.

To scale its business and launch its new innovations, Wimba plans to expand its use of HP's Multi Jet Fusion 3D printing technology. With unparalleled design freedom, an excellent surface finish, and easy post-processing, MJF will enable Wimba to deliver a wide range of devices and fulfill its goal of restoring pet mobility.



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