

CASE STUDY | NIVELLMEDICAL

HP's 3D Printing technology helps **nivellmedical** improve its digital workflow and create a sustainable advantage



With help from HP's Multi Jet Fusion technology, **nivellmedical** makes high-quality dental models faster and less expensively.



Introduction

"Aligners are not a brand-new treatment option," says Dr. Milan Stojanovic, nivellmedical's Head of Board. "But over the last five years, their acceptance among patients and dentists has steadily increased. We started our company with the goal of enhancing the process—delivering a better product for the patient while simplifying the workflow for the dentist—ultimately leading to a more successful therapy."

Headquartered in Switzerland, nivellmedical AG was founded in early 2015 by experienced specialists from the fields of orthodontics, orthodontic aligner treatment, practical dentistry, and medical technology. Their goal was to develop an innovative product that would combine the most forward-thinking insights

from nearly 20 years of treatment practice with dental aligners.

The founders achieved their goal by developing the **nivellipso dental aligner system**. This innovative splint for straightening teeth combines maximum transparency with an effective design and a three-splint system that treats various types of malocclusion with high precision and maximum comfort for the patient.

nivellmedical AG is the first company on the market to offer customized, handmade solutions for aligner treatment: **a distinct feature that enables dentists and orthodontists to provide customized treatment with minimum effort and with maximum comfort and aesthetic results for their patients.**

• Industry

Healthcare

• Sector

Dental | Medical devices

• Objective

Use 3D printing to create models to produce dental aligners.

• Approach

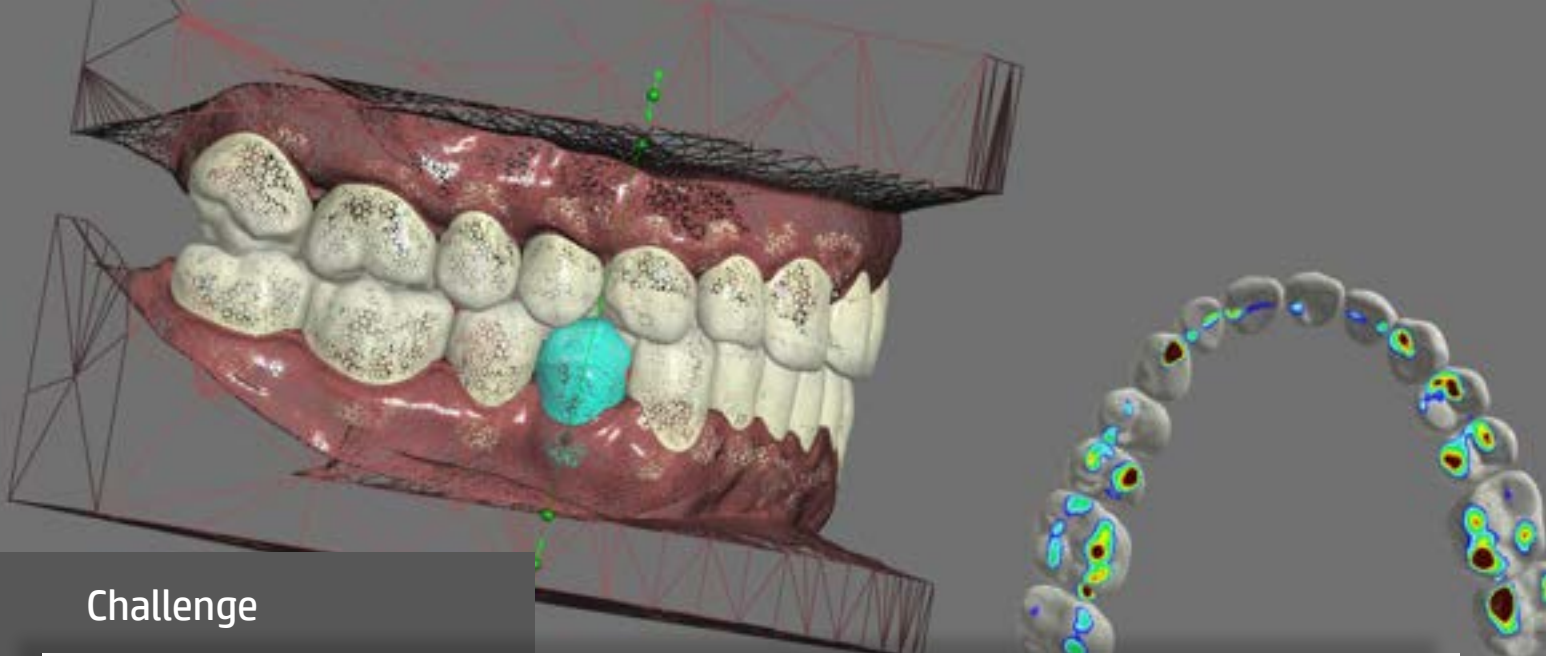
Determine if HP's Multi Jet Fusion technology can be used to produce dental models, confirm that the materials used meet the company's and industry's medical standards, and compare HP's technology with other 3D printing methods. If competitive, implement it for use in the production of dental models.

• Technology | Solution

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

• Material

HP 3D High Reusability PA 12



Challenge

“Our process typically begins with either a direct scan of a patient’s mouth or a scan of a plaster model,” says Dr. Stojanovic. “From there, the scan is processed, and a treatment plan is developed. Once approved by the practitioner, 3D printed models are created and used to thermoform the final aligner material. The 3D models must be of the highest quality to successfully manufacture our product.”

The first step in nivellmedical’s digital workflow is to convert what the practitioner sees in a patient’s mouth into digital form. Many dentists and orthodontists now have the ability to do this directly by using an intraoral scanner to make a digital cast. In instances where the doctor cannot take a scan, a plaster model is made and sent to nivellmedical’s lab where it is scanned.

Once that step is completed, each scan is processed by the team at nivellmedical. The company’s proprietary software helps eliminate scanning errors by closing all holes that are not suitable for 3D printing. It also separates each tooth,

allowing them to be moved independently as the treatment progresses. Then a virtual model cast base is developed, which corresponds with the dental prescription.

Once the prep work has been completed, a treatment plan is shared with the practitioner. Upon approval, nivellmedical’s software calculates the shape of each subsequent model that will be used during the treatment. **Each model is 3D printed, then serve as molds for the final aligners, which are produced using a thermoforming procedure.** After several stages, including cleaning and packaging, the final aligner is sent to the dentist.

For nivellmedical to deliver on its brand promise in a competitive industry, each model must be cost-effective and of the highest quality. Finally, given the industry’s growth, nivellmedical’s solution must be scalable to allow them to meet the ongoing demand.

Solution

“We started our own in-house 3D printing lab back in 2015,” says Dr. Stojanovic. “While it was a success, we are always looking to improve our technology. In early 2018, we were contacted by HP’s Swiss reseller, SGSolution. Our early conversations and internal talks led to the conclusion that yes, we wanted to change our 3D printing process.”

Working with SGSolution AG, the team at nivellmedical first provided files of dental models for test printing using HP Multi Jet Fusion technology. **The HP 3D High Reusability PA 12 material was also tested to ensure that it was safe for medical use.** Based on the results of the tests, nivellmedical decided to move forward.

“We, as a Swiss reseller, are extremely proud to have a customer like nivellmedical,” says SGSolution’s CEO and Founder, Martin Affolter. “It’s impressive to see how nivellmedical has set up a fully digital workflow, from 3D scanning and treatment planning, to 3D printing and final product manufacturing. It’s a perfect example of how HP’s Multi Jet Fusion technology can be used to enable mass customization in high volume.”



Result

“The fit of the nivellipso dental aligners has been perfect during the whole treatment,” says patient Haris Birdaini. “When my dentist informed me that I would be one of the first patients to receive aligners based on models produced with a brand-new 3D printing technology, I was very proud. I believe that HP is one of the companies which is working very hard to improve the industry and make the world a better place.”

When the testing was complete, nivellmedical decided to move forward with their purchase of HP’s Jet Fusion 3D 4200 Printing Solution. In production, they found speed to be a big advantage. **With HP Multi Jet Fusion technology, they can now print up to 1,000 models per day. This helped the team at nivellmedical multiply their productivity, clearing the pathway for growth.**

nivellmedical and their practitioner clients were very satisfied with the quality of 3D models produced using HP’s technology. The industry also places a high value on sustainability. Both internally and externally, customers are very impressed with the recyclability of HP’s materials.

“The models, which were delivered by nivellmedical, are of very good quality and absolutely satisfy all the needs of a dental professional working in the orthodontic field,” says Dentist, Dr. Cecile Freivogel. “But when nivellmedical announced the change in printing technique, what made me most happy was the increased emphasis on sustainability. In my opinion, it is the only way we can protect the environment for future generations.”

Perhaps the biggest benefit, however, is economic. By changing their 3D printing process, nivellmedical found that they were able to cut the cost of making parts by 90%. They were able to invest the savings back into the business, further preparing the company for future growth.

“HP’s Multi Jet Fusion helps us scale our business by enabling us to meet the increasing demand for nivellipso dental aligners,” says Dr. Stojanovic. “Having a powerful partner like HP, which is continuously pushing the limits, is a huge benefit for us. We are looking forward to a very promising future.”

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

Connect with an HP 3D Printing expert or sign up for the latest news about HP Jet Fusion 3D Printing hp.com/go/3Dcontactus

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