



Designing Partial Hand Prostheses Patients Want to Wear



Industry
Healthcare/O&P



Material
HP CBPA12



Application
Partial Hand Prostheses

Point Designs uses additive manufacturing to produce customized partial hand prostheses tailored to each individual patient. By integrating PostPro vapor smoothing into their workflow, the company achieves smooth, sealed surfaces that enhance color vibrancy, enable clean and disinfected surfaces, and create a more comfortable user experience. The result is a prosthesis that not only restores function, but also delivers the quality and appearance expected from a patient-specific medical device.

About the Application

Point Designs develops custom partial hand prostheses for individuals who have lost fingers or were born without them.

Each prosthesis is designed around the unique anatomy and functional requirements of the patient. The device consists of a custom silicone interface combined with a full-color 3D-printed frame. Attached to this frame are 3D-printed titanium ratcheting fingers that restore the ability to grasp and manipulate objects.

Traditionally, upper limb prostheses were manufactured using composite wet laminations or prepreg carbon fiber processes. While effective, these methods are labor-intensive, difficult to reproduce consistently, and often result in components that are quite rigid and stiff.

By leveraging additive manufacturing, Point Designs can precisely control flexibility and stiffness within the same component by adjusting wall thicknesses. This enables a more natural fit and movement, while also allowing patients to personalize the appearance of their prosthesis through color and design options.

Challenge & Solution

While HP Multi Jet Fusion enabled Point Designs to manufacture customized, full-color prosthetic components, the printed parts still required additional finishing before they could be delivered to patients.

The primary challenges included:

- Rough surface texture on as-printed parts
- Muted color appearance directly from the printer
- Difficulty sealing the surface against contamination
- Achieving a premium cosmetic finish suitable for a medical device

Before implementing vapor smoothing, Point Designs used paraffin wax as a surface treatment. While this helped seal the surface, it failed to provide the desired appearance and left a waxy residue that patients found unpleasant.

To overcome these limitations, Point Designs adopted the PostPro SFX. Vapor smoothing created a sealed, smooth surface while preserving and enhancing the color output from the HP 580 platform. In addition, the company was able to bring all post-processing operations in-house, improving production control and efficiency.

The Difference Made by PostPro Vapor Smoothing:

For Point Designs, vapor smoothing delivered several key advantages:

- Enhanced color quality: Vapor smoothing locks in and intensifies the colors printed by the HP 580 system, creating a more vibrant and premium appearance.
- Improved hygiene: Sealed surfaces help prevent biological contamination and make the prostheses easier to maintain.
- Greater user comfort: Smooth surfaces eliminate the waxy feel associated with previous finishing methods and improve the overall user experience.
- More homogeneous parts: Vapor smoothing creates a more consistent and uniform surface structure across the prosthesis.
- In-house production capability: By investing in the PostPro SFX, Point Designs was able to internalize its finishing workflow and increase manufacturing efficiency.



Conclusion

Point Designs demonstrates how combining HP Multi Jet Fusion technology with AMT PostPro vapor smoothing enables the production of customized prosthetic devices that prioritize both functionality and user experience.

By improving surface quality, enhancing color performance, and creating hygienic, sealed components, vapor smoothing helps transform 3D-printed prostheses into patient-ready products. At the same time, bringing post-processing in-house has enabled Point Designs to streamline production and maintain greater control over quality.

This case highlights how advanced post-processing plays a critical role in delivering personalized healthcare solutions through additive manufacturing.

Benefits of PostPro Vapor Smoothing for Prosthetic Applications:

- ✓ Enhanced color vibrancy and cosmetic appearance
- ✓ Smooth, patient-friendly surface finish
- ✓ Improved hygiene through sealed, non-permeable surfaces
- ✓ More uniform and consistent part quality
- ✓ Increased production control through in-house finishing
- ✓ Supports customized prosthetic devices



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