Mosaic

ROI of Additive Manufacturing in Orthotics Production

Evaluating Cost Savings, Efficiency Gains, and Patient Outcomes

APRIL 2025

Introduction

Additive manufacturing is revolutionizing custom orthotics production by offering precision, flexibility, and efficiency at scale. With 3D printing technology, manufacturers can streamline workflows, lower costs, and consistently produce high-quality, personalized orthotics. This method not only accelerates production but also expands design possibilities, making it an optimal choice for patient-specific solutions.

This document provides an overview of Mosaic's approach to 3D-printed orthotics, showcasing the cost savings and production capabilities that mid and large-scale manufacturers can achieve with our additive manufacturing solutions, Element and Array.

Scale Your Orthotics Production with Additive Manufacturing

Traditional orthotics manufacturing methods, such as milling and casting, are time-consuming and prone to error. In contrast, additive manufacturing enables faster production, greater precision, and enhanced comfort. It also allows for easy customization, making it a more efficient and reliable solution for both accommodative and functional orthotics.

When used in conjunction with our print management tool, Canvas, Mosaic's products, Array and Element unlock a digitally managed solution for producing high quality custom orthotics. Furthermore – due to its automated capabilities – Array enables additional cost savings for practitioners by reducing the need for skilled labor and facilitating hands-off, 24/7 production.

By utilizing Array or Element for your orthotics production, you unlock the ability to:

Shorten lead times for customer orders.

Scans can be processed and designed within minutes, then remotely scheduled for 3D printing.

Drastically reduce the amount of waste you produce.

Unlike traditional subtractive orthotics manufacturing methods like milling, which can waste up to 80% of material, Mosaic’s solutions build insoles layer by layer, minimizing waste and maximizing efficiency.

Improve product accuracy and comfort.

Mosaic offers a variety of material options for either hard or soft shell orthotics, which have been tested to ensure maximum comfort and durability.

Increase Throughput and Reduce Total Cost per Part

Advancements in 3D printing have made the technology more accessible and reliable, but challenges like scalability and high labor costs still hold many businesses back. Array solves these issues by automating critical aspects of production, making high-volume 3D printing more efficient and cost-effective.

Included below are reference charts detailing the throughput capabilities and total-cost-per-part of both Element and Array, as compared to a typical industrial printer. Both charts present typical values, averaged between functional and accommodative orthotics.

Array boosts orthotic production throughput by 750% compared to other additive manufacturing solutions.

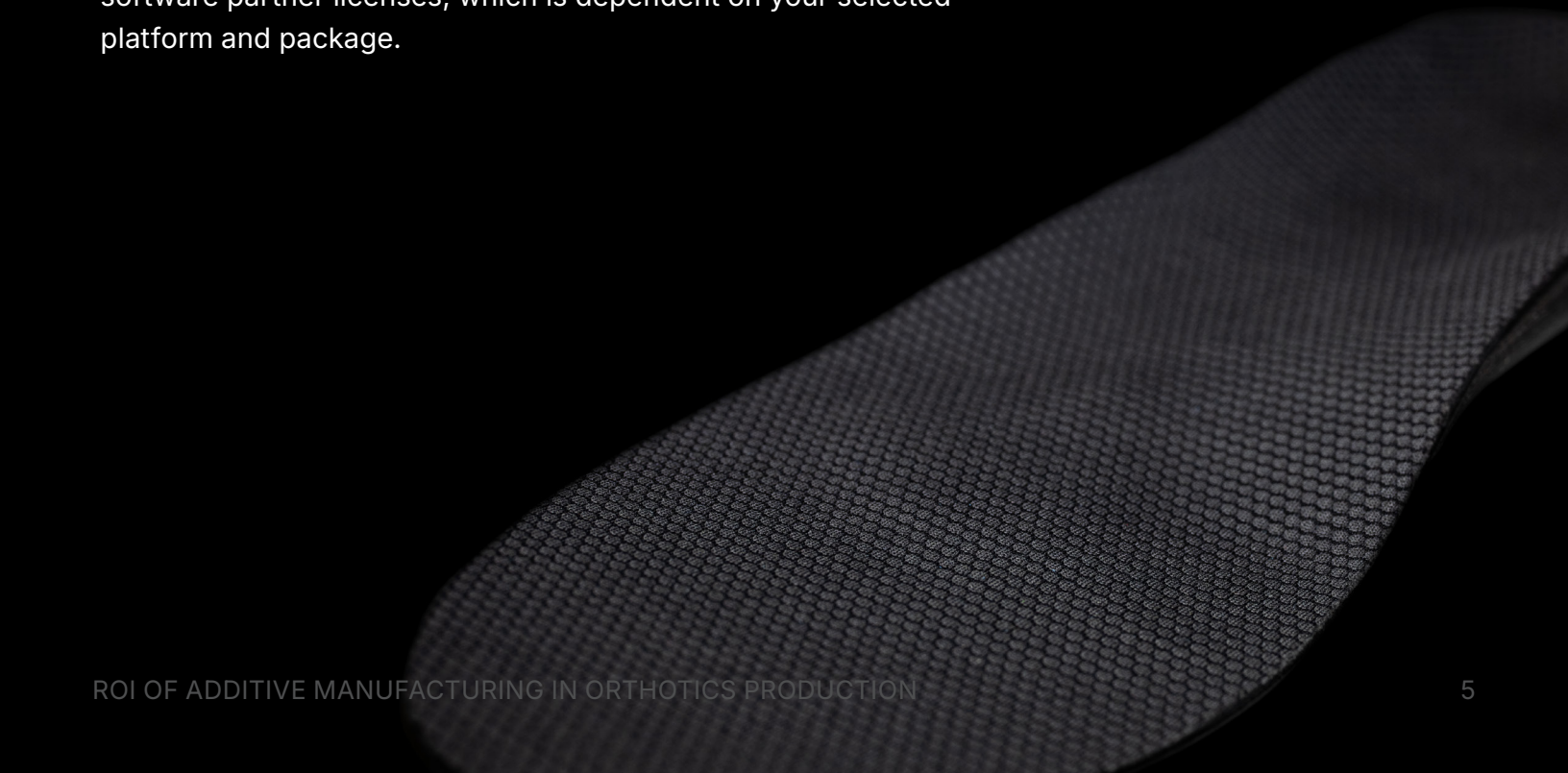
SCALABILITY AND THROUGHPUT FOR ORTHOTICS PRODUCTION

PER	INDUSTRIAL PRINTER	ELEMENT MP2	ARRAY MP8
Week	19	20	167
Month	81	85	723
Year	970	1021	8679

TOTAL COST BREAKDOWN PER PAIR OF ORTHOTICS

COST TYPE	INDUSTRIAL PRINTER	ELEMENT MP2	ARRAY MP8
Material Cost	$16.58	**$3.94**	**$3.94**
Labor: Operation	$9.66	**$8.45**	**$0.71**
Equipment Amortization	$3.26	**$1.36**	**$1.88**
Running Costs (Parts, Service)	$3.29	**$3.01**	**$1.57**
Overhead	$0.63	**$0.18**	**$0.22**
Total Cost Per Build	$33.42	**$16.94**	**$8.32**

Please note that this table does not include the cost for orthotics software partner licenses, which is dependent on your selected platform and package.



Materials and Applications Overview

Mosaic offers a comprehensive selection of premium, industrial-grade materials designed to meet diverse application needs. To ensure maximum flexibility, we take an open approach to materials, allowing users to work with nearly any compatible third-party options on Element or Array.

Mosaic provides a wide range of proprietary materials engineered for seamless integration with its systems. In order to guarantee the best results for both accommodative and functional orthotics, Mosaic has developed two custom, high-performance materials: Form and Aero.

Mosaic Form For Functional Orthotics

To create functional or corrective orthotics with Element or Array, Mosaic engineered Form, a proprietary material that has been cytotoxicity rated and is safe for skin contact. Mosaic Form has been optimized for durability and ease of use; unlike with traditional PolyPropylene filaments, there are no special adhesives or pre/post print processes to consider – your orthotic can be fitted straight off the printer.

Key Features

- ✓ Strong
- ✓ High moisture resistance
- ✓ Durable
- ✓ Sandable

Mosaic Aero For Accommodative Orthotics

To create accommodative orthotics with Array and Element, Mosaic developed an additional proprietary filament: Aero. Similarly to Mosaic Form, Mosaic Aero has been cytotoxicity rated and is safe for skin contact. Aero is a TPU based material with special properties that allow it to print with a matte finish. From within Canvas, users are able to adjust the firmness of the material, allowing for unlimited customization in both the look and feel of the final product.

Key Features

- ✓ Low Density
- ✓ Matte Finish
- ✓ Flexible

Product Overview:
Discover Element & Array

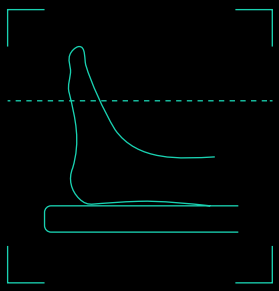
Included below is a product comparison chart, featuring both of our additive manufacturing solutions, Array and Element.

	ELEMENT	ARRAY
Supports a diverse range of proprietary filaments, including specialized orthotics materials, Aero and Form	✓	✓
Third party material compatibility to ensure ultimate flexibility	✓	✓
Completely digitized software workflow, from scanning to printing	✓	✓
Automated print queuing and material management	✓	✓
Intelligent print error detection	✓	✓
Automated bed changing to enable lights-out, high-throughput production	✕	✓
Storage cart with capacity for 40+ pairs of accommodative orthotics*	✕	✓

* for functional orthotics, storage capacity would vary based on the height of each pair

Workflow Overview

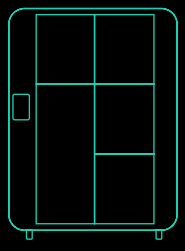
The traditional method of orthotics production poses inefficiencies that often result in long wait times for patients who require custom insoles for daily comfort and pain management. By combining Element or Array with Canvas and one of our software partners, practitioners are able to access a faster, more modernized process for orthotics manufacturing. Instead of cycling files back and forth between doctors and labs, and relying on skilled laborers to craft insoles by hand, production can be digitally managed by one user to produce quick, consistent, high-quality results.



Patient is scanned by clinician and scan is converted to file format

Clinician sends file to orthotics lab

Scan is uploaded to Canvas for slicing and 3D print management



Orthotics are printed using Mosaic's additive solutions

Software Partners

Mosaic has partnered with a selection of top tier orthotics scanning and design software to allow for a streamlined, end-to-end digital workflow. Each of these platforms integrates seamlessly with Mosaic's Canvas platform, allowing clinicians to transform a patient's scans into a completed print within a few hours or less.

LUTRACAD™
OUTSTANDING SOFTWARE

Taika3D®
Capture, Create, Grow

SNUGFIT SOLUTIONS

THE PRINTED FOOT
3D PRINTED ORTHOTIC SOLUTIONS

Let us tailor a solution for you.

Want to learn more about orthotics manufacturing with Array or Element?

Whether you're interested in a free product sample, a hands-on demo, or more details on how our technology can enhance your production, we're here to help. Contact us at **sales@mosaicmfg.com**, and our team will be in touch!

More information on our line of products can be found at **www.mosaicmfg.com.**

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