

DIGITALIZATION IN O&P

Navigating the future of O&P, together

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Executive Summary

We spoke with: Nigel Birkett, Operations Manager at Blatchford UK; Ayelen Fernandez, O&P/Healthcare Segment Manager at HP; Christian Käppel, Manager design projects/ AM at Ottobock and Christian Kotter, Head of go-to-market digital at Ottobock; Sagar Shetty, Director of Clinical Operations at Bionic; and Shiden Yohannes, Medical Market Development Manager, Formlabs.

In section one, each expert explores their journey with digitalization, specifically utilizing 3D technology within their organizations:



Nigel Birkett: Discusses the integration of traditional craftsmanship with digital technologies.



Sagar Shetty: Emphasizes a strategic approach to adopting 3D printing, balancing innovation with practicality.



Ayelen Fernandez: Explores HP's vision for 3D printing in O&P, focusing on scalability and customization.



Shiden Yohannes: Discusses the need to overcome resource obstacles and generational differences when implementing 3D printing.



Christian Käppel & Christian Kotter: Showcase a global perspective on digital innovation and AI potential.

Section two will explore the five key insights that came out of the interviews with reference to specific instances discussed. These are:

Cost Education Sustainability
Digital workflows External support

Section three will examine the future: What do the interviewees see as their future goals, and what does the future of digital technology within the orthotics and prosthetics industry look like?

Introduction

The orthotics and prosthetics industry has traditionally (O&P) produced devices via manual fabrication processes, which can be time-consuming and potentially not cost-effective. Of course, many of those in the industry are used to working in this way, having done so their entire careers, so they are hesitant to change workflows but recognize the need to make processes more efficient to sustain their business in the future.

Digital technology, particularly 3D technology, can help the O&P industry implement new techniques to streamline their workflows, produce more devices, and potentially save time and money. It can also help facilitate the best possible care for patients.

Through discussions with key players within the O&P industry, we have prepared this report to examine the challenges they face while tackling change and implementing new technologies within their organizations. They are all at different levels of their digital transition and have unique pain points that impact the rollout.

Why move towards digital in the first place? To remain at the forefront of the industry, organizations must embrace new processes, whether it be 3D printing (additive manufacturing), automation, Artificial Intelligence (AI), 3D scanning, or all of the above. The workforce increasingly relies on digital technologies, and healthcare has seen progress in the services provided and their efficiency.

As champions of digital, the interviewees in this report have supported the transition within their organizations, ensuring they undertake the relevant research and testing and showcase the benefits for the rest of their staff.

There is an awareness that digitalization is a long-term commitment, not only from the perspective of learning and implementation, but also from the fact that digital technology is consistently evolving, so organizations must evolve with it.

Read on to learn more about digital champions from the O&P sphere. They detail their journey so far and the challenges they have encountered regarding cost, education, establishing workflows, ensuring sustainable practices, and seeking support. They also look to the future, exploring how they would like to progress and how they view the future of digital and 3D printing in the O&P industry.



Nigel Birkett

Operations Manager
Blatchford UK

Blatchford

"A benefit of 3D printing is that our new orthoses are more environmentally friendly, which supports our growth in new business."

Combining tradition and modernity at Blatchford UK

I have been with Blatchford for many years. We have merged different technologies, from traditional manufacturing techniques that have worked for us for upwards of 40 years to modern digital/3D printing techniques. For example, we have already eliminated all plaster casts from our Seating department through CAD/CAM (computer-aided design/computer-aided manufacturing). All our insoles, whether ethylene vinyl acetate (EVA) or hard-shell 3D printed, are done through CAD/CAM.

The implementation of digital technology has not been as easy with our ankle-foot orthoses (AFOs) as the cost of manufacturing using CAD/CAM in the UK is high compared to the sales price in NHS clinics. Using a foam mold compared to a plaster mold results in a loss of margin. What we would like to do, therefore, is to be able to move from a direct digital model into a 3D-printed product, taking out the cost and labor time in between.

With our current CAD AFO manufacturing process, we're not filling the cast but designing it via CAD to create a mold, so we don't have massive production savings because we're still using expensive materials and a lot of waste plastics/waste materials. The actual technician time is virtually the same as well. This means that we lose our margin because CAD really should go straight to a 3D-printed product. That's where you would be saving labor, time, and material.



New technologies generally cost more money to implement, but there is a desire for them. Potentially, by mass-manufacturing designs and creating, say, 20-30 AFOs a day, you can streamline your processes and potentially save money by receiving batch-printing discounts at the 3D printers.

Just keep swimming...

Right now, Blatchford has a big clinical presence, with about 30 clinics and 50 clinicians. Some clinicians are desperate for 3D printing, but there is a nervousness around spending more money. So, we showcase the different options available, how repeatable it is and how environmentally friendly it is. Regarding traditional AFOs, they are the same across the UK regardless of the company producing them, so we can push for their creation with 3D printing, but we need to get that traction and encourage people to take that leap of faith.

“We use the analogy of jumping ship – once you are off, you can’t get back on, you just have to keep swimming.”

Yes, you will have some issues, there will be some choppy water, but you push through that. For example, one of our clinics has worked through its issues and decided to persevere with scanning. There are always those who are on board with digital and others who prefer physically getting their hands on plaster, working with the patient to size the AFO, etc, and are not keen on changing. However, as long as you deliver outputs of exceptional quality, regardless of input, people will continue to use them.

Around two years ago, we switched all our hard-shell insoles to 3D printing. With our previous software, we needed a technician for post-processing, which removed the repeatability aspect as each technician does it slightly differently.



Not only that, but older machinery also needs to be calibrated regularly, and you could lose half a millimeter in thickness, whereas, with 3D printing, you have a more consistent product – 3.2mm is 3.2mm.

Patients don't think too much about whether it's 3D printed or not—insoles are not glamorous, unlike AFOs, which you can customize with a pattern, for example, so we are more likely to receive feedback on them. We choose to use Spentys' AFOs with patterns, colors, and shapes that really make us stand out from our competitors.

How Blatchford enables the adoption of new tech in their clinics

We have branches across the USA and Europe, which I collaborate with regularly. Our orthoses are made in the UK and Norway. We work closely with Norwegian colleagues, discussing best practices and sharing knowledge, most recently with a focus on carbon fiber.

We have branches across the USA and Europe, which I collaborate with regularly. Our orthoses are made in the UK and Norway. We work closely with Norwegian colleagues, discussing best practices and sharing knowledge, most recently with a focus on carbon fiber.

We aim to be more innovative with 3D printing on the condition we prove the principle – should we continue to invest our time in 3D printing, or is the old-fashioned way better? We put together a clinical team to hold discussions and determine where to focus our attention.

They would like more input in the design process – they see patients every 15 minutes, so finding time can be difficult – so we came up with Blatchford orthosis styles one, two, and three that could be designed from the outset with the clinical team, who could then just order the type required for the patient and still feel like they have had design input.

A benefit of 3D printing is that our new orthoses are more environmentally friendly, which supports our growth in new business. With plaster casting used in Seating, up to six 25-kilogram sacks of plaster were required to make a mold, which made it very heavy.

This then created health and safety issues with manual handling of the mold. This was not a nice environment to work in. With 3D scanning and 3D rectification software, it is easier to recruit more staff as it has become a nicer environment to work in. Not only that, but many workers today want to work more with computers and tablets, so looking to the future, adding more digital fabrication processes is the way to go.

Ultimately, the goal is to move into a fully digital organization and eliminate the plaster manufacturing area of the business. Utilizing technology, with high-quality scans and even AI, will allow us to design everything in the clinic, making clinicians' jobs easier as they can input all the measurements, materials, corrections, shaping and more directly onto the tablet or computer.





Ayelen Fernandez

O&P/Healthcare segment
manager
HP



"I am sure we will also start seeing more patients ask for 3D-printed devices or specific applications of the technology."

HP: The future is 3D

Since joining HP, I have worked across a variety of teams, with a focus on healthcare, medical and O&P, as well as 3D printing (otherwise referred to as additive manufacturing). Having recently taken on the position of O&P segment manager, I am responsible for making the pie bigger, so to speak, and expanding the opportunity in the interjection between O&P and 3D printing. In my role, it is important to explore the value we can add to the O&P segment within HP in relation to additive manufacturing – we have identified it as an industry with a lot of potential and that is likely to end up using around 70/80% 3D printed solutions in the future.

Customization is important, with devices needing to be adaptable to every patient's morphology, so I focus on splitting my work into two buckets. One key focus is supporting customers, manufacturers, and clinics in having products that are different from others on the market, whether it be in relation to aesthetics, breathability, weight, comfort, or performance. Additive manufacturing allows us to achieve designs that would not be achievable with traditional technology.

The second focus is on manufacturing itself.

"I place a lot of emphasis on scalability, and additive manufacturing can help customers scale faster and more affordably."

The process is simplified through digital technology; the risk of error is reduced compared with traditional manufacturing processes, and due to the repeatability of the process, it is much more cost-efficient. There are a lot of positives!



Tackling problems through teamwork, digital, and reimbursements

While the industry is growing and developing, there are, naturally, problems that we need to overcome together. It cannot be an independent effort.

To achieve this, we should tackle education – we need to prove that 3D printing is a good technology to utilize. Many have been producing in traditional, manual manufacturing, but we need to justify the value of the jump to digital fabrication methods. To improve this, we undertake testing. The team has worked on different white papers comparing the performance of traditional versus digital manufacturing, and the results are fantastic. However, now we must spread the message and show the industry that this technology is suitable.

Secondly, we should tackle digital workflows, thinking of 3D printing as a whole process that needs to be incorporated into organizations. Printing is the easy part, but no one will be able to do this if they can't understand it. A digital workflow should be implemented, for example: who will be the scanner, who will be the designer, what are the pitfalls they need to avoid in the design, what is the right software to use, how can they use that software, how can they educate internal resources, and then how will they print?

Thirdly, we should tackle reimbursements and L codes. The industry is starting to catch up, but if we really want to expand O&P, we need to push regulatory bodies to have comprehensive reimbursements for additive manufacturing through education on the value additive manufacturing brings to the industry and the cost of this. In doing so, and if we collaborate to accelerate this, this could be more impactful.



Onboarding the entire industry – one step at a time

On the positive side, the industry is moving far faster than we expected. For example, if you attended different O&P conferences/shows five years ago, you may have only seen a few 3D printed parts, whereas more recently, around 80% of the booths are showcasing them. It is clear to see how fast the industry is adopting this technology, which is really encouraging. That remaining 20% represents people reluctant to change, more often more traditional companies, or those that only adopt a small level of 3D printing. The big question for those is: how can we support their adoption in a way that makes sense for them?

While the best way to do this would be a top-down approach, we often see bottom-up adoption, so it could require both, allowing organizations to meet in the middle while establishing the benefits of 3D printing. So, convince management and executives, but also utilize those in, say, R&D who are already pushing for 3D to onboard the rest of the organization. I am sure we will also start seeing more patients ask for 3D-printed devices or specific applications of the technology too, which should encourage further uptake in organizations.

Interestingly, smaller or more mid-sized organizations have been adopting 3D technology more quickly, so it is vital to focus on them and explore how they can expand to new applications. For instance, I recently met with a smaller organization that began by producing a cranial helmet, but now they have around seven or eight products in their portfolio.



They found it easy to develop new devices – they have become disruptors in the industry, making swift progress. I have also started seeing customers develop their own software to own the knowledge and capabilities associated with it, but I am also seeing organizations like Spentys providing support to customers in their expansion, helping accelerate the adoption of new manufacturing techniques and new software.

Going forward, we would look at producing a portfolio of solutions that can be adjusted to market and organization needs. We can achieve this by exploring how organizations use 3D printing and study/tackle the issues that arise, including it in our planning and solutions.



Christian Käppel

Senior Expert - Custom
Product Technology
Ottobock



Christian Kotter

Head of Go-To-Market Digital
Ottobock

ottobock.

Ottobock: Life at the forefront of digital and additive manufacturing

Christian Kotter:

Together with my team, we are bringing our digital innovations into our Ottobock.Care Clinics and supporting our global partners in transforming their markets. Ottobock has three main categories: Prosthetics, NeuroMobility and Business Solutions & Digital. For the past years, we have developed innovative treatment solutions, which include scanning of our users, digital modelling, and our 3D printing strategy.

Ottobock has always been on the forefront of innovation, which also counts for digital solutions for our patients and customers – some of our digital processes go back almost two decades – our aim is to transform the industry from plaster casting, heavy equipment, and big workshops to a leaner and asset lighter environment. Improving our current processes, allows us to give the clinician more time with patients and less time behind a workbench. Our digital eco system Life Lounge centrally combines all digital workflows to better support our clinicians and move the patient even closer to the centre of all we are doing. We want to offer the clinician a system that's allows for the best patient outcome while keeping it open and modular to still offer a high degree of freedom. It is great to see Spentys also innovating and transforming our industry and offering also our CPOs tools, which are not only making their lives easier but also driving great patient outcomes.



Trust the processes...

I have been working in med tech for the past 18 years, and it has always been a challenge to bring in new innovations – especially in this space, where trust plays such a big role. It doesn't matter whether you are working with a CPO or a heart surgeon; they can be skeptical about new technologies as they don't know the impact on their patients. If a procedure has worked for the last 30 years, then it makes it harder for them to want to change. Therefore, we must identify the innovators and champions in our industry that can help drive this change.

We also have the challenge of the technology's maturity—not everything is made in-house. We want to have stable processes, so we don't create additional work if there are technical challenges, and we need to determine whether it is the right time to launch the technology. One also wants to develop a more intuitive technology that doesn't require excessive training and can be adapted so that the clinician can pick up quickly without having to change their established workflows too much.

The biggest game changer for us is data. Based on data, we are automizing more steps in the process, training algorithms and utilizing AI to assist with decision.

"There is a lack of skilled workers in the industry: to counteract that, our technology can enable young CPOs who have just started treating patients to achieve great outcomes."

Our continuous will always be to empower our patients and clinicians with our innovative treatment solutions.



Christian Käppel:

In my role as Ottobock's 3D printing expert, I oversee the development of our custom products, primarily focusing on those created through 3D printing. Within our various research and development initiatives, I manage the technical aspects of our product development. Additionally, I am actively involved in strategizing the implementation of additive manufacturing technologies across our central fabrication hubs and patient care network.

While additive manufacturing is not new to us, and we have faced the same issues and problems with technology as other industry players. Right now, quality control and Cost per Part are the biggest challenges we face, but in the future, we would like to utilize additive manufacturing on a larger scale. However we aim to utilize additive manufacturing on a larger scale in the future. Currently, our primary applications are in custom orthotics and prosthetics. Additionally, we use 3D printing for typical applications like prototyping and production aids in other areas of our organization.

Education and technological advances – the key to better 3D printing

Enabling our customer to explore new technologies, including scanning, digital modeling, and design tools is key to ensuring a successful uptake of 3D printed solutions. There will always be early adopters who are open to trying new things, but there are many who simply don't have time to try multiple new technologies, where only one may work for them.

Over time, of course, and with more and more products and technologies coming out, experience and knowledge will increase.

Looking ahead, we see significant growth potential of additive manufacturing within the field of O&P.

"Data-driven workflows and designs will become more relevant to deliver optimal patient fit."

But also shifting from physical verification tests to simulation-based verification can help accelerate the development of 3D printed devices. Additionally, we can see opportunities in metal printing for other product groups within Ottobock, and we are curious about the possibilities of embedded electronics printing.

By a collaborative development with our Ottobock.care network we aim to validate our products through field testing and patient feedback.

"Ultimately, our goal is to maintain a customer-centric approach, ensuring that our innovations directly address the needs of patients and customers."



Sagar Shetty

BOCO, BOCP – Director of Clinical Operations

Bionic Prosthetics
& Orthotics Group



"It is much faster to take a scan and rectify it on a computer (over time) than to take a negative cast and then make a positive plaster model from it."

Slow and steady ... the progression of 3D printing at Bionic

In my role at Bionic, the primary goal is to find the most efficient work processes for improved patient care and patient satisfaction. I constantly focus on how to make the workplace enjoyable for our staff, while providing compassionate care for patients in a timely manner, with the best possible technology. Utilizing 3D printing has been an important part of this endeavor, but it was not without its challenges.

My education and work in the O&P field started in India, where I was privileged to be exposed to a variety of traditional workflows in the industry and several grassroots efforts in provision of O&P care to a large population with all kinds of socio-economic backgrounds. I brought that unique perspective with me when I moved to the United States and joined Bionic P&O in 2010, whilst it was still in its infancy, with a single clinic in northwest Indiana. Today, we have grown to around 50 clinics in 12 states, and continue to embrace our mission of competent, compassionate patient care.

Growing to that size means that there is a lot of work to be done, and that is where the need for efficiency and improved productivity becomes paramount – administratively, clinically and also in terms of production – if we are to survive and thrive. We realized the importance of it pretty early on, and that is one of the primary reasons we decided to move towards 3D scanning, design and printing in our production workflow – not to replace the traditional methods, but to add to and expand the possibilities.





It's like using a landline phone to make calls back in the day, it was the primary channel of communication, but now we have portable smartphones, with capabilities beyond a simple phone call. Sure, landline phones still exist, but most people today rely on their smartphones to stay connected to the world. There is still a place for the old technology; it is not completely irrelevant, and there are certain things you cannot do with newer technologies yet, but the key is knowing the difference.

Embracing all available methods, and making the most of each of them for their efficiencies and capabilities can make your practice more efficient and save time, resources, and energy – so 3D printing is a no-brainer. Until a few years ago, it had been more of a 'nice to have', but it is now becoming more and more a part of the mainstream workflow. However, people must embrace it with an open mind for it to succeed.

How can 3D printing transform a business?

One way 3D printing can transform a business is financially: while the traditional workflows require a decent sized lab space, multiple tools and equipment that require routine maintenance, lots of casting and fabrication material, technician and clinician time – all of this costs money. With a digital workflow, you need far less equipment and far less space – a scanner, a computer and essentially a printer, with minimal equipment. Raw material wastage is also minimal as compared to traditional techniques with 3D printing.

And while you still need clinical and technical skill, you could see far more patients in the same timeframe using the digital workflow, which improves and increases individual productivity and output. I cannot emphasize enough the impact this change can have on your O&P practice.

The other key factor is time. As they say, time is money. It is much faster to take a scan and rectify it on a computer (over time) than to take a negative cast and then make a positive plaster model from it, and then manually rectify it to prepare for fabrication.

“You do not have the advantage of the quick ‘undo’ button if you don’t like a certain rectification you made on the plaster model.”

It is also much quicker to design the socket from the rectified model and print it, depending on the print technology you use, than using traditional methods of fabrication over the plaster model. Don’t think of it just in terms of the time saved to allow you to do other things, but also think of the effect it can have on your patient care and patient satisfaction. It narrows the gap in the timeline from evaluation to fitting and delivery of the device, thus being fitted on the patient quicker.

Also, think about the “wow” factor it brings to your practice, and the impression it creates with your patients and referral sources when they identify you as the one with the “cool 3D technology” that you use for improved outcomes for your patients. The patients of today are well informed about what’s out there, and are considering things like these when making healthcare decisions every day for their care.

How easy is it to go digital in your workflow?

It is far easier to adopt the digital workflow today, than it was even a few years ago. However, it is important to understand the process in its entirety and take some committed steps towards it. The common mistake I see practices and clinicians make is jumping into it excitedly with incomplete and insufficient knowledge, time and resource investments, which often leads to failures and disappointments.

When we bought our first printer, we didn’t really know what to do with it, but we were just excited to try it. However, we didn’t know much about design software, so it ended up sitting in the clinic gathering dust for a while. It’s therefore important that people commit to it and really understand the processes – capturing a scan, rectifying a scan modifying, designing the socket, preparing for the print, and printing itself. It took us several months to successfully 3D-print our first test socket in-house, and when we did, it took around 70 hours for the single print. It was also so fragile that my coworker told me it would break if we looked at it the wrong way, let alone trying it on a patient. We then dedicated time and resources towards appropriate and affordable software, skills, training and research, so we could confidently print these sockets to use on our patients.

We kept fine tuning the process until we reached desirable results - whether it was the right type of material, settings, temperatures, speeds, among other things. We also found the right technology partners to help us create a successful workflow.

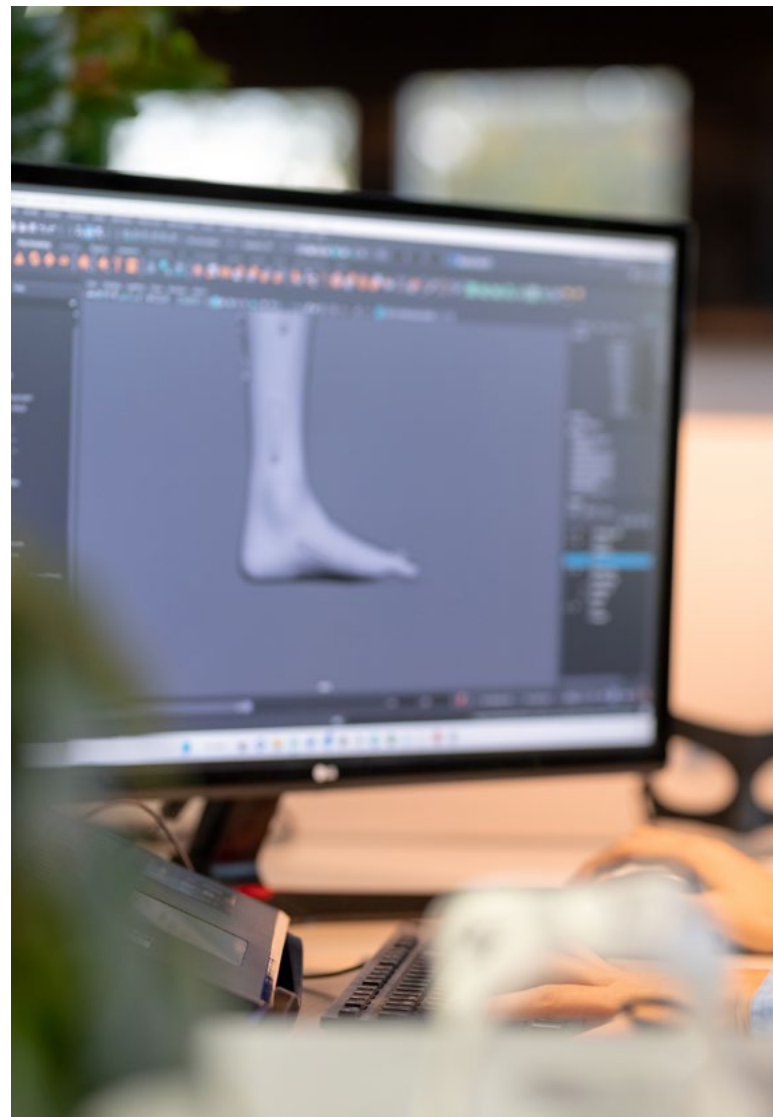


Practitioner buy-in is also critical. We work closely with each individual clinician to understand their comfort level with technology, learning pace, concerns and questions. We have a lot of younger or tech savvy clinicians and residents, who are excited about 3D design and printing, and embrace digital tools pretty quickly.

And there are others, who still believe very strongly in the magic of their hands, who want to cast and hand modify a plaster model. We tried to meet them in the middle. We scan their hand modified plaster models, and design and print their sockets, so they still get a taste of part of the digital process. Once they get comfortable with that, then we work with them on possibly trying digital rectifications on their next case, or maybe doing the digital and traditional sockets simultaneously, so they can get both, identify and learn from the differences.

We also have internal clinical discussion groups where practitioners share feedback and updates on how they save time with the process or share pictures of how well the sockets fit the patient. Practitioners are more likely to buy in when they see their peers succeeding with these things. In almost every case, there is no going back once they experience how efficient and time saving the digital workflow is. This is why we have been successful – we work with them, and make them a part of the process, to gradually increase their confidence in 3D printing and designing. Change is hard – and slow – and there has to be an acknowledgement of that fact. Today, more than 90% of test sockets we produce for our clinics, and a sizable portion of preparatory and definitive sockets are 3D designed and printed – our practitioners love it.

It is also important to take one step at a time. We invested slowly and gradually in the technology, starting with just one printer in one clinic and investing in software as much as we could afford and we needed. Technology is constantly evolving and improving. We went from handheld white light scanners to structure scanners on iPads to scanning apps on your smartphone in just a few years. The same goes for printers and other digital tools and equipment.



The prognosis for 3D printing

In the coming years, I believe digitization is going to become a crucial part of the standard workflow for O&P practices. Improvements in different additive manufacturing technologies, including fused deposition modeling (FDM), multi-jet fusion (MJF), and selective laser sintering (SLS), as well as material technology, will further drive innovation and adoption of digitization in the field.

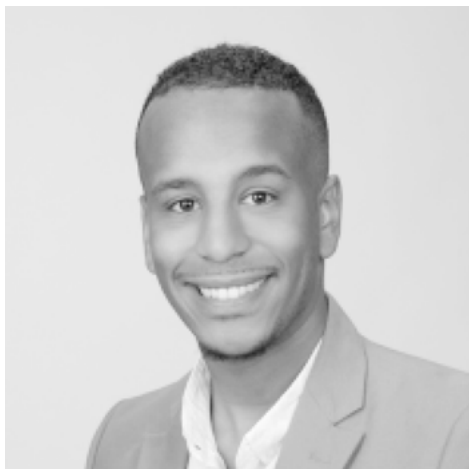


“Better, simplified, consolidated software solutions will emerge that will allow practitioners to scan, rectify, design and slice to print a variety of device types on the same platform – it is already starting to happen.”

When we started out, different vendors offered different solutions, addressing only certain parts of the overall digital workflow; for example, one company may provide software for modifications, while another only for scanning; one would provide the software that does the 3D design of sockets only, while other would provide a scanning, design and printing solution together, but only for a certain type of device, like hand splints or cranial remolding devices, which made it harder, since you had to have many permutations and combinations of different software to be able to successfully use digitization in your practice. That will soon be a thing of the past.

“Automation will also be necessary, as the more options we offer that will save time for clinicians, the better.”

Further down the line, using AI will aid the process – say I have a scan and want a modified AFO design, I could choose from a few different designs to get the exact product I want, then click a button to view what I need, with the ability to modify if needed, this would speed up the process. The future looks positive, and I am confident that 3D printing is the way forward for O&P devices.



Shiden Yohannes

Medical Market Development
Manager
Formlabs



"Younger generations entering these businesses often exhibit a willingness to embrace innovation, leading to higher adoption rates of 3D printing technologies."

Achieving Long-Term Savings with 3D Printing at Formlabs

As the Medical Market Development Manager at Formlabs, my role revolves around internal education for our team, spanning service, sales, and marketing. Additionally, I identify potential markets for 3D printing in emerging medical device sectors. This involves careful consideration of various factors, including detecting high-potential areas and ensuring that the materials chosen are suitable for medical applications while remaining economically viable, with a good clinical outcome.

Overcoming Resource Challenges

One of the primary obstacles faced by O&P clinics in adopting 3D technology is resource availability. For instance, in many orthotic supply companies, the workforce may lack expertise in Computer-Aided Design (CAD) design and newer manufacturing technologies, hindering their transition from manual to automated processes.

When considering the broader market landscape, we encounter different tiers of labs, each facing unique challenges. Tier three labs, typically smaller medical supply stores, may lack the financial means to invest in 3D printing technology. Conversely, tier two labs may be more inclined to embrace innovation, leveraging investments to enhance efficiency in their production lines. However, smaller labs may struggle with the higher initial costs associated with 3D printing compared to outsourcing from traditional manufacturers.

I've observed that the adoption of new technologies tends to be lower among established businesses as they may be resistant to change. However, younger generations entering these businesses often exhibit a willingness to embrace innovation, leading to higher adoption rates of 3D printing technologies.

Tier one labs, which operate on a larger scale, stand to benefit significantly from integrating 3D printing into their operations.

By producing orthoses in-house, these labs can streamline production processes, reduce shipping costs, and expedite delivery times, ultimately enhancing patient care.

Another significant challenge lies in changing perspectives within the industry to encourage broader adoption of 3D printing. This involves addressing concerns such as labor shortages and demonstrating the long-term cost and time-saving benefits of embracing new technologies.



The Role of Reimbursement in Driving Adoption

Moving forward, expanding reimbursement systems to include additive manufacturing processes is crucial for increasing adoption rates among O&P labs. Clear reimbursement guidelines provide a roadmap for investment, facilitating cost-effective production and incentivizing further adoption of 3D printing technologies.

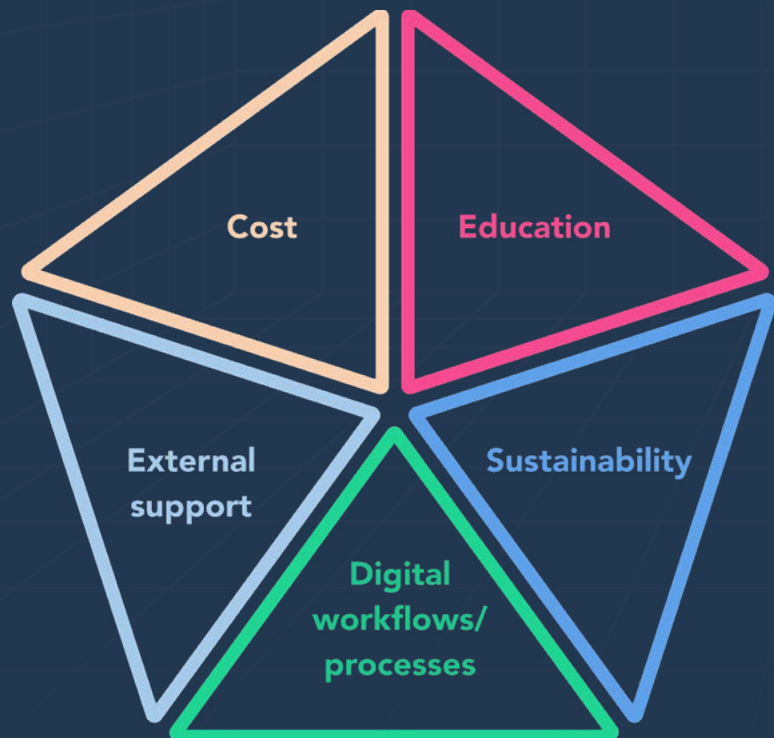
"In conclusion, by overcoming resource challenges, shifting perspectives, and advocating for expanded reimbursement, we can accelerate the adoption of 3D printing in orthotics and prosthetics, ultimately improving patient care and driving innovation within the industry."

Emerging trends: the top five areas of focus for your digitalization journey

The future of orthotics and prosthetics looks bright – many organizations and clinics have already begun digitalizing and implementing new processes, specifically the 3D printing of O&P devices. Whilst everyone is at a different stage in their journey, many are open to progression and trying new things but are also aware that there will be some pushback, acknowledging the need for clear communication and training amongst staff and patients.

Also, there is an awareness of the need for new digital developments within the industry to streamline and improve workflows and devices. The industry is changing at a rapid rate—in recent years, more and more organizations have adopted new technology, and this is being seen during external events, like industry conferences.

Based on the five key interviews explored in this report and day-to-day conversations with key players, we have established five key points of focus for those looking to implement or develop digital techniques within the O&P space.



► Cost

As we have seen, digital transformations can be costly, but there is a desire for them across the board. If undertaking 3D printing in-house, for example, there will be the cost of the software, materials and printer to consider. However, in the long-term, it can be cost effective as it can save on labor, external printing costs and materials – making healthcare more accessible.

Digital processes are simpler – the risk of human error is lower than with traditional manufacturing processes – and the repeatability of the process, as discussed by Ayelen Fernandez, is more cost-efficient and scalable as the time between a scan, device creation, and the patient receiving their device is reduced. Additionally, you can see many more patients and can reduce costs by saving on things like rental space, administration, fixed expenses, HR, technician costs, maintenance of machines etcetera.

In the case of the UK, the ability to use 3D printing for both the public and private sectors must be considered. Nigel Birkett noted that implementing O&P devices has not been easy for Blatchford due to high manufacturing costs compared with public sector prices, and bringing in lower-cost materials results in a loss of margin. However, if cost can be saved elsewhere – such as reducing the amount of materials or saving money by not repairing or maintaining older machines – then money can then be utilized for 3D printing.

Conversely, in the USA, there is the issue of getting the correct reimbursements for 3D printed devices, so those working within the regulatory landscape need to be educated about its value within the industry, thus justifying the cost and supporting clinicians working in the field.

If reimbursements can be solved, this will likely encourage further uptake across the board. Especially as for some smaller O&P providers, their reimbursement rates do not increase at the same rate as inflation, so it is currently not as sustainable, said Sagar Shetty.

Of course, the transition does not need to happen all at once. In the case of Bionic, they invested “slowly and gradually” over the course of five years, but now 90% of their test sockets are 3D printed and designed, and the whole team is on board. Blatchford currently combines traditional and digital manufacturing processes with the hope of one day transitioning to a fully digital organization. There are no rules so that each organization can go at their own pace.

► Education

Education is fundamental: a successful rollout and training are vital to getting others on board, working well, and working effectively. Each of the key players interviewed discussed the importance of educating colleagues on the uptake of 3D printing and digital workflows. As Shiden Yohannes said, there is a lack of skilled workers within the industry, which leads to labor shortages.

There will be those interested in diving into new ways of working, whilst others will be hesitant. However, it looks like the newer generation coming into the workplace is more open to learning and implementing digital technologies, as Shiden has found.

As Christian Kappel said, it can be challenging to bring in new innovations, especially as clinicians might be concerned about the impact on their patients.

If a procedure or technique has worked for them for their entire career, it is harder to drive change, so it is key to identify champions who are open to new ways of working and build out a training plan that is intuitive and easy to disseminate.

One solution to this is to create a team of clinicians from different areas of the organization that will provide differing insights and feedback to help improve the process before expanding the training to others. Training should include these key factors:

Change communications: Introduce the new digital technologies to staff, sharing the message across different teams and give details of what they will need to do to prepare, when training dates are and the clinical groups they can join if they would like to have a say in the rollout.

Demonstrations: Showcase the new technologies with practical demonstrations.

Hands-on training: Allow new users to practice themselves: scan, design, customize and print.

Discussions: Prove to your team that this is a worthwhile innovation to implement—showcase the benefits and the impact this has on time, cost, and more. Then, open the floor for feedback and questions, positive or negative, to allow the rollout to suit everyone's needs. This also allows everyone to feel included, which will encourage a trickle-down of information to others.

Whitepapers/training documents/presentations: Distribute step-by-step guides, summaries and explanations of why you are transitioning, what it means, who will be impacted etcetera – store them in an accessible location for future reference or to distribute to relevant stakeholders.

► Sustainability

Picking the right materials can ensure that a device not only lasts longer but can also be recycled or disposed of without impacting the environment when it is no longer needed.

As well, being able to scan and design a device with accuracy reduces the need for physical measurements or making molds. Once designed virtually, the device can be printed, saving time and reducing the need for additional materials (and labor).

As Nigel Birkett discussed, traditional plaster cast methods use a lot of consumables.

You may need multiple heavy bags of plaster to create one mold. With additive manufacturing, this is no longer needed as the design and molding are done digitally, so you only print the final product. This also lends itself to a nicer working environment, as staff are not required to carry heavy materials.

Not only that, but the uptake in automation and AI means less physical documentation is needed. Patient data, feedback, scans, measurements and more can be stored within the cloud or via the software being used, which also facilitates easy organization and access to information when needed.

This will not only reduce paper waste as everything can be saved in the cloud, but it can save clinicians time, as their data will be a few clicks away.

► Digital workflows/processes

Traditional workflows can be time-consuming and carry the risk of human error or issues with the machinery – as Blatchford found when their machines broke down. As digital becomes more prevalent not only within the O&P industry, but across the workforce, implementing new ways of working is necessary and beneficial. Establishing a workflow process from the outset will ultimately help reduce potential challenges and ensure the digital transition runs quickly and smoothly. However, there will be some specific challenges everyone will face. Read on for tips on how to minimize these.

The manufacturing process is more scalable and is simplified through digital; the risk of error is reduced, and thanks to its repeatability, it is more cost-efficient.

However, setting up a streamlined workflow is key. As Ayelen Fernandez and HP found, printing in 3D is the easier part, but if no one can understand it, it's going to be difficult to implement fully. Establishing a workflow, educating the relevant stakeholders, and determining who will be the scanner/designer, the pitfalls to avoid in the design, the right software to use and how to use it, how to educate internal resources, and how will they print, is all vital to the process.

Digital processes can save time—it can be quick and easy to scan a patient and modify a design on a computer or tablet. You can even build out specific designs that just need slight tweaks, so the time from scan to printing is a lot faster, and modifications can be done in minutes. This is beneficial to the patient as well, as it means they can receive their device faster or as fast as via traditional manufacturing.

► External support

In addition, digitalizing your workflows aids the collection of patient data. With automation capabilities, organizations can get better data outcomes and even utilize AI to assist with decision-making or to support training, as explored by Ottobock. Automation can also speed up bureaucratic processes like patient intake forms or patient feedback, saving valuable time to allow for more face-to-face time with patients, or even the ability to see additional patients.

Of course, technology is constantly developing, so ensuring stable digital workflows is vital to progressing and implementing additional software, for example. As time passes and internal knowledge grows, it will be easier to keep moving forward.

The Future of Digitalization Within O&P

The future of orthotics and prosthetics looks bright – many organizations and clinics have already begun digitalizing and implementing new processes, specifically the 3D printing of O&P devices. Whilst everyone is at a different stage in their journey, many are open to progression and trying new things but are also aware that there will be some pushback, acknowledging the need for clear communication and training amongst staff and patients.

Also, there is an awareness of the need for new digital developments within the industry to streamline and improve workflows and devices. The industry is changing at a rapid rate—in recent years, more and more organizations have adopted new technology, and this is being seen during external events, like industry conferences.

Blatchford

Blatchford UK would like to become a fully digital organization, utilizing high-quality scans and even AI to design and make everything in the clinic. This would ultimately make clinicians' jobs easier in the long run.



HP focuses on customers, manufacturers, and clinics and hopes to provide products that are different from the rest of the market. They would like to continue working on proving the value of technology from the manufacturing and patient perspectives and collaborate with software/scanner companies to support their digital transition. However, they note that solving reimbursement issues is vital to their success.

ottobock.

Ottobock believes additive manufacturing will grow significantly within the O&P sphere in the coming years. In particular, they hope to utilize more AI models. These can be used for data-driven designs and the transition to simulation-based verification tests.

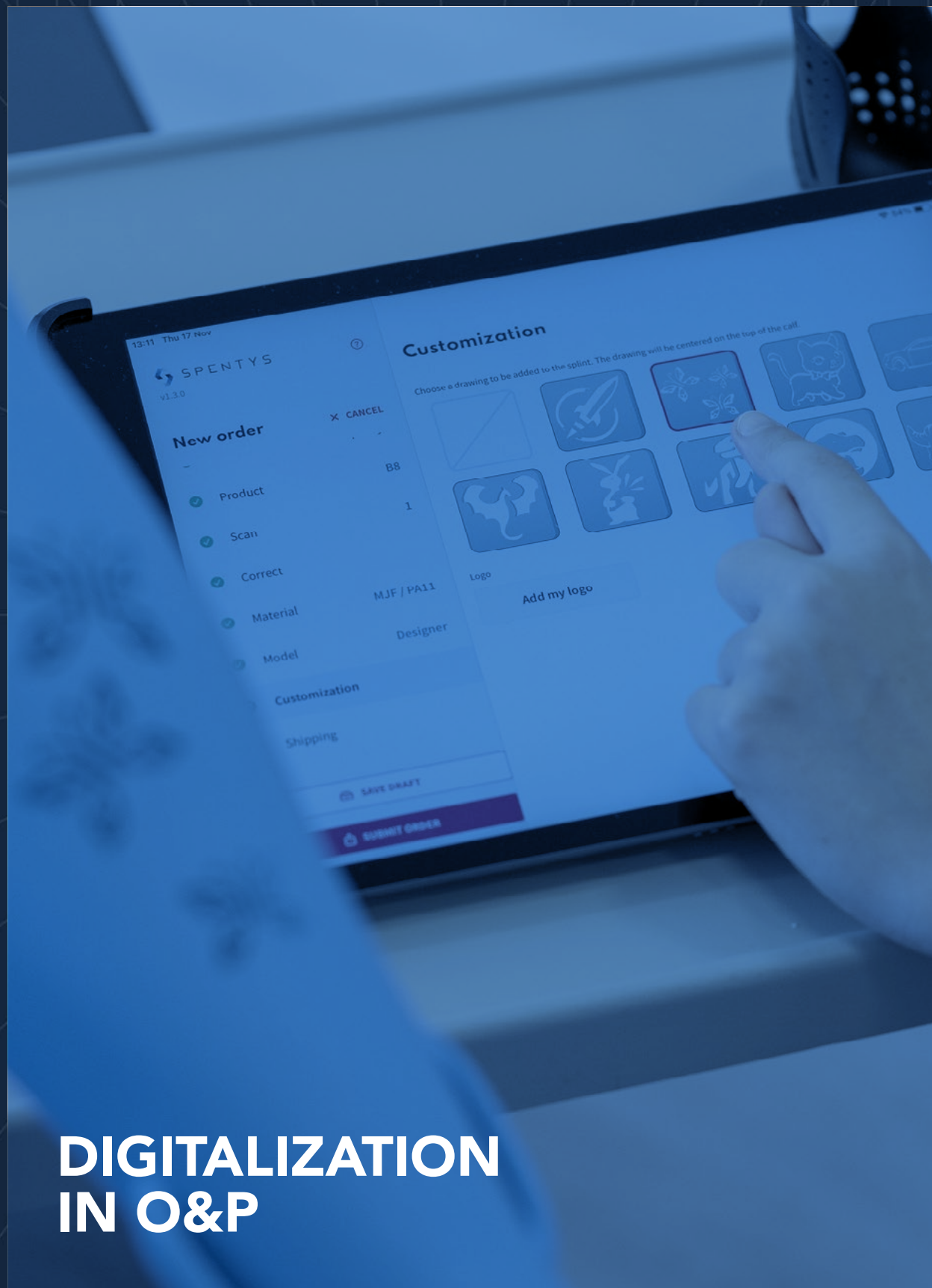


Bionic would like to unify digital workflows, combining fused deposition modeling (FDM), multi-jet fusion (MJF), and selective laser sintering (SLS) for 3D printing. They also look to AI to aid their scan and design process and ensure quick device turnaround.

formlabs

Shiden from Formlabs would like to see reimbursement systems include additive manufacturing processes to increase adoption rates in O&P labs. Overcoming resource challenges and shifting perspectives will also accelerate the adoption of new processes and drive innovation.

*The prognosis is optimistic ...
Digital is here to stay and it only
gets better from here.*



**DIGITALIZATION
IN O&P**