

CAD/CAM in Foot Orthotic Industry

Sharp Shape PFOLA Newsletter
Alex Shang, PhD, Director, March 25, 2005

CAD (Computer Aided Design) and CAM (Computer Aided Manufacturing) technologies have been used in the foot orthotic manufacturing process for many years. However, CAD/CAM is still a new tool in the industry, comparing with the history of traditional foot orthotic manufacturing process. This paper concentrates on the basic knowledge of the CAD/CAM technologies. It helps people who work in the orthotic field to make right decisions when CAD/CAM emerges in their visions. It also can be used as a reference guide for the existing CAD/CAM users.

CAD/CAM is a field in the computer technology. If a process is related to design and manufacturing, we can take advantage from the CAD/CAM. The production of the foot orthotics is a design and manufacturing process although each design is customized. Think about it. After negative casts come in, we pour the casts, add corrections, and form heated plastic on top of the positive casts. Day in and day out, the same process goes forever. It is a good candidate for the CAD/CAM. Since orthotic industry is a small industry comparing with other industries, the light didn't shed on it in the early years.

As part of the CAD/CAM system, a digitizer is used in gathering foot shape data for making orthotics. In our application, a foot digitizer is the counterpart of the traditional negative cast, a CAD program is the counterpart of the positive-plaster-cast correction, and a CAM program plus a milling machine replaces the pouring (if carving molds) and the plastic forming (if carving orthotics).

There are many types of foot digitizers: contact, non-contact, laser, regular light, stripe pattern, or other patterns. For example, our foot scanner is a non-contact laser stripe scanner. As far as the CAD/CAM software goes, I believe a dedicated software package designed for the orthotic industry is better than a generic software package. A typical generic CAD software package is AutoCAD and a typical generic CAM software package is Mastercam. Our AOMS CAD/CAM software is an example of the dedicated software package. AOMS is specially designed for making custom foot orthotics. Our cast correction software is the counterpart of CAD, and our milling schedule software is the counterpart of CAM. A question is that can we use the generic packages to make the foot products? The answer is 'yes', but we will spend a lot of time. It is not cheap to use these generic CAD/CAM tools though. We need to buy them, and we need to take courses to get trained. To build models for prefab, you may consider using them. To finish your daily production work on custom orthotics, you want to find a dedicated tool.

Because there are many scanners and CAD/CAM software packages and all of them claim good for you, it is not a simple matter to choose one. There are many questions and misconceptions. Some potential customers approached us with great enthusiasm. They were thinking about hundreds of foot scanners and a unified central fabricating plant in the country. There is nothing wrong with their ambition, but the key is to get the first orthotic made successfully from the system. When potential customers approach us, we always give them reading materials with recommendations and warnings. We suggest that you do some research before you are committed to this approach.

Choosing a good system provider is a very important factor in future success. However, there are not a lot of such providers, due to the fact that it is a tough business. There are always advantages and disadvantages with a certain provider. Some providers started as an orthotic lab. These providers have more experience in orthotic manufacturing, but they can be a competitor with their system users. Some providers went into the orthotic business after they started their system business. Sharp Shape started as a system developer and stays the same way as a non-orthotic business so far. We haven't charged royalties on our systems. The cost of CAD/CAM used to be much higher than nowadays. Even today, the cost is too high to many customers. We tried very hard to keep the cost low for our customers. On the other hand, Sharp Shape is a very small business. It is a disadvantage to some customers. Sometimes, you may have to wait in line for a delivery from us. If this is not OK with you, Sharp Shape is not a good choice for you. Putting all the factors together, you want to choose a provider that suits your needs.

Here are what you should expect and what you should not expect from the CAD/CAM. It is very important to understand this part, because you will be mentally upset and financially disturbed if your expectations are not met. You should expect a much smaller storage room for your electronic casts. You should expect easier retrieving of electronic casts and records. You should expect faster turn around time. You should expect a change in the process from receiving the casts to shipping out the orthotics. This change can be a challenge to you. You should expect better repeatability of orthotics, but not necessarily better accuracy. Better accuracy comes from many aspects, such as scan, cast correction, and milling. If not guarded well, errors can be introduced in these procedures.

Don't expect a push-a-button solution. CAD/CAM is a tool. You will be physically involved in the process. With the tool, you can make a good product or a bad one. Don't expect 100 percent replacement of the traditional procedures such as pouring plaster. Some customers estimated that 90 percent of their work could be done through our systems. Don't expect a surely financial winner from using the technologies. If your production volume is not large enough, you may not be able to justify the expense. If the system is not managed well enough, you may not be able to catch all the benefit that you should get from the technologies. Many of our customers had significant growth after they got our systems. Some of them didn't use our system as aggressive as they should and they gained only a little.

For more information about foot scanners and CAD/CAM software, the best way is to search the Internet. Try to find some keywords like "CAD CAM" in search engines. You will find an ocean of information about them. If you narrow your search to "CAD CAM" Orthotic, you will find more specific information. If you want to search "CAD CAM" "Sharp Shape", you will find our web site. If you are new to the search engines, spend some time with it. It is going to pay dividends. The one that I use often is Google (www.google.com). If you have questions for us, please feel free to contact us. You can ask us for documents about setup details, such as selecting milling equipment and the computers. When choosing a system don't just trust our words, ask existing customers.

Sharp Shape
Tel & Fax: 408-777-0461
sharpshape@comcast.net
www.sharpshape.com