



Addressing Future Needs of O&P Through Electronic Shape Capture

The challenges facing today's O&P practitioners are numerous, and will only become more significant in the coming years. The number of patients requiring an O&P service is expected to increase significantly, and the amount of reimbursement to be rendered for these services continues to decrease. To meet these challenges, owners of O&P facilities will need to find a way to see more patients and to reduce their costs. One key method of achieving both goals is to replace plaster casting with electronic shape capture.

Challenge #1: Increasing Numbers of Patients

In a 2002 report, Dr. Caroline C. Nielsen presented the following forecasts for the O&P industry¹:

- The total number of persons with an amputation, and those using a prosthesis, is expected to increase by at least 47% by the year 2020.
- With a ten percent increase in graduates in the year 2010, and another ten percent increase in 2015, the projected number of prosthetists available in 2020 will be able to serve only 66% of the population using prostheses.
- The number of persons using orthoses is expected to increase by at least 31% by the year 2020.
- With a ten percent increase in graduates in the year 2010, and another ten percent increase in 2015, the projected number of orthotists available in 2020 will be able to serve only 64% or less of the population using orthoses.

Challenge #2: Declining Reimbursements

As reported in O&P Business News, officials from the Centers for Medicare and Medicaid Services (CMS) reported that health care spending growth in the United States slowed for the third consecutive year in 2005, increasing 6.9% compared with 7.2% growth in 2004 and 8.1% in 2003. The 6.9% growth in 2005 marks the slowest rate of growth in health spending since 1999, when growth was 6.2%. Most significantly, Medicaid cost-containment efforts, such as reduced or frozen payments to physicians, contributed to the slowdown.²

Solution #1: Increase Efficiency

Faced with the prospect of needing to see more patients, facility owners might think that they need to either hire more staff or spend less time with each patient. Hiring more staff is not a viable option, as it will only exacerbate the profitability problem caused by declining reimbursements. Spending less time with each patient, however, can be done -- *without* sacrificing the quality of care and/or the quality of

the finished product. If clinicians can improve the *efficiency* of their work, they can significantly reduce the amount of time spent producing each device. The direct labor costs associated with each finished device would then also be reduced.

In examining the ways in which clinicians spend their time (aside from critical patient-care aspects such as such as evaluating the patient's condition or adjusting the alignment of a prosthesis), one glaring example of inefficiency stands out: the process of capturing the patient's shape with plaster. Casting is a lengthy and messy process, requiring time for preparation, application, drying, cleanup, and the creation of a positive plaster model.

Another time-consuming aspect of plaster is that the positive model must be modified somewhat in order to achieve the desired design. This process of applying or removing plaster by hand is extremely imprecise and tedious. It's a slow enough procedure when the clinician gets it right the first time; if he then makes a mistake that cannot be easily corrected, he must start over by making a new positive model from plaster. This is the *height* of inefficiency.

Solution #2: Reduce Overhead Costs

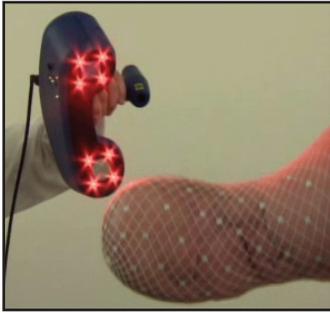
Producing devices more efficiently leads to seeing more patients and reducing direct labor costs, but it's not the only avenue for maintaining profitability in the face of declining reimbursement. Facility owners could also reduce overhead expenses such as rent and clerical expenses. With electronic shape capture, the square footage that is devoted to pouring, modifying, and storing plaster molds is no longer necessary. These same tasks can be accomplished in the space that it takes to hold a computer. A smaller office means lower rent payments, lower utilities, and all the other associated overhead expenses. That computer can also serve as a gathering point for all of the information related to each patient. All pieces of data related to a patient's care -- component orders, measurements, socket modifications -- are automatically recorded. Not having to write down everything by hand and then re-write it numerous times means that fewer hours are spend on basic clerical tasks.

Electronic Shape Capture

Fortunately, there is an approach that allows clinicians to see more patients and to reduce overhead in the face of declining reimbursements. That method is **electronic shape capture**. Creating a three-dimensional digital shape requires only a fraction of the time that is required to create a plaster one. There is no preparation aside from perhaps applying a sock or other covering to the body, and there is no drying or cleanup required. There is no additional time required at this point for the creation of a positive model. The three-dimensional shape of the limb appears on a computer screen almost immediately after it is captured, and can be quickly modified with a few clicks of the mouse instead of with the labor-intensive plaster process. Also, there is no chance of ruining a positive model with an inaccurately performed modification. CAD allows the practitioner to simply erase a modification and try it again.

Ohio Willow Wood's OMEGA Tracer System, a comprehensive computer-aided design system for the O&P market, features three different electronic shape-capture devices: the OMEGA Scanner, the OMEGA T-Ring, and the Tracer Pen. These three options allow clinicians to choose which devices are most appropriate for their particular practices. All three devices are portable, making it easy for orthotists and prosthetists to visit hospitals, nursing homes, or anywhere else the burgeoning patient population can be found.

OMEGA Scanner



The OMEGA Scanner is a non-contact, hand-held laser scanner that is designed for use with transtibial, transfemoral, transhumeral, transradial, and cranial shapes. Accurate to ± 0.5 mm, the Scanner provides exceptional definition for capturing deep scars, invaginations, and intricate anatomical surfaces.

The scanning process is simple. The clinician applies reflective stickers to the surface to be scanned, points the scanner toward the body part, and presses the button. The contours of the shape are determined by a pulsed crosshair laser that is emitted from the scanner. Simultaneously, LEDs illuminate the reflective stickers, allowing digital cameras in the scanner to record their position.

As the practitioner moves the scanner around to capture the contours, he may release and press the button as often as desired. The process takes only a few minutes and is completely safe for the patient. The patient may even move slightly during the process without corrupting the scan, as long as the targets do not move with respect to each other.

OMEGA T-Ring



The OMEGA T-Ring is also a non-contact device, but instead of lasers and LEDs, it employs four synchronized optical imagers and four projectors mounted in a ring. The T-Ring projects lines onto a white sock that is worn over the patient's limb; the imagers "see" the lines and capture the three-dimensional shape.

Accurate to ± 1.0 mm, the T-Ring is designed for use with transtibial and transfemoral shapes. It is the quickest of the three OMEGA devices, requiring only a few seconds to capture the entire shape of the limb. The T-Ring is ideal for cases where there are no particularly intricate anatomical details that need to be captured, or for when the patient is incapable of holding the limb steady for more than a few seconds.

The difference in the amount of time required for using plaster casting versus the T-Ring is dramatic. In a time study in which the total time from preparation through positive model fabrication was documented, the T-Ring process required only 22 minutes for a below-knee prosthesis and 40 minutes for an above-knee, compared to plaster casting times of 70 minutes for a BK and 105 minutes for an AK.

Tracer Pen



The third of the OMEGA devices, the Tracer Pen, is the only one that is not non-contact. A transmitter mounted on a tripod sends an electromagnetic signal that is picked up by the Tracer Pen and by a sensor that is strapped to the patient's limb. As the clinician moves the pen over the surface of the limb, a control unit determines the location of the Tracer Pen in space and conveys this information to the software.

The Tracer Pen provides an interactive experience that is well-suited for clinicians who do not want to relinquish the tactile process of taking and modifying a cast. Not only does the Tracer Pen allow the clinician to touch the patient's limb, but it also allows the practitioner to make modifications directly on the limb. For example, a prosthetist can press the Tracer Pen into the patella tendon area of the limb and instantly see a patella tendon bar appear on the model on the computer screen.

The Tracer Pen is designed for use with transtibial and transfemoral shapes, and can also be used for tracing the shape of existing socket for duplication. A caliper attachment that is provided with the pen also allows an orthotist to take and automatically enter measurements for the creation of an AFO.

Addressing the Learning Curve

One issue that clinicians face when deciding to use electronic shape capture is the fact that there is always a learning curve associated with any new technology. Plaster, on the other hand, has been used extensively for as long as all of today's clinicians have been in practice. The fear of becoming even less efficient by spending a great deal of time learning a new technique is certainly understandable. Fortunately, clinicians who purchase OMEGA devices will benefit from two key aspects of the system:

- The OMEGA software features on-screen, user-friendly “wizards” as well as audio prompts that provide the clinician with step-by-step guidance in using the devices. No previous computer experience is required.
- Ohio Willow Wood employees provide on-site training using the clinician's own patients, and return for follow-up visits to ensure that the clinician is achieving success.

The first few fittings may require as much time as a plaster casting, but the combination of intuitive software and personalized training will help the clinician to quickly become proficient with the new technology.

Summary

The electronic shape capture devices of the OMEGA Tracer System offer an ideal solution for prosthetists seeking to meet the challenges faced by the O&P industry. For less than the cost of the salary of a facility's least-effective employee, a facility owner can acquire an electronic shape-capture system. By eliminating plaster from their practices, clinicians can reduce the amount of time required to produce each device as well as the amount of physical space required to operate a practice. The resulting cost savings will allow clinicians to remain profitable in the face of declining reimbursements, and to address the needs of an increasing amputee population.

Ohio Willow Wood is an innovative industry leader in the manufacturing and distribution of prosthetic products, including the Alpha® family of liners and the Pathfinder® II foot. Founded in 1907, Ohio Willow Wood is headquartered in Mt. Sterling, Ohio. For more information about Ohio Willow Wood and its products, call 1-800-848-4930 or visit www.owwco.com.

¹Nielsen, Dr. Caroline C. *Issues Affecting the Future Demand for Orthotists and Prosthetists: Update 2002: A Study Updated for the National Commission on Orthotic and Prosthetic Education*, May 2002.

²Health Care Slows for Third Consecutive Year. *O&P Business News Online Exclusive*. 01 Feb. 2007. <http://www.oandpbiznews.com>.