Challenge Accepted.

THE RIGHT FIT FOR FLEXIBILITY

AVIENT™

» **CASE STUDY:** GORDON™ COMPOSITES UNIDIRECTIONAL LAMINATES

WILLOWWOOD MEETS PROSTHETIC PATIENT NEEDS WITH ADVANCED COMPOSITES

THE CHALLENGE

Nearly 110 years after it was founded, WillowWood continues to fulfill its mission to free the bodies and spirits of amputees. This fourth-generation, family owned and operated company is a global leader in designing and manufacturing innovative prosthetic products that help amputees lead more comfortable, active lives.

When developing a more flexible prosthetic foot for low-activity amputees, WillowWood approached the Avient advanced composites group for help improving the experience of end-users. Low-activity amputees—level K2 as defined by the Medicare Functional Classification Level (MFCL) rating system—have the ability to traverse low-level environmental barriers such as curbs and stairs.

Through their close work with amputees from all five activity levels of the MFCL system, the team at WillowWood recognized that prosthetic options were limited for K2 amputees who are able to handle more uneven surfaces. Insurance coding requirements for this level specify that the prosthetic must allow no energy return, or "push-off," that would exceed patients' ambulatory abilities. As a result, the prosthetic foot is fairly stiff with little lateral movement and often requires a breaking-in period before amputees feel comfortable wearing it.

WillowWood sought to develop a more flexible foot that would help low-activity amputees improve their mobility and comfort while still meeting the K2 classification. In addition to increased flexibility, designers wanted the prosthetic foot to provide multiaxial stability, have a symmetrical shape for right or left side application, and provide a modern, attractive design—a feature generally reserved for higher activity prosthetic feet.

THE SOLUTION

Leveraging decades of experience creating customized composite materials for archery bow limbs and other high-performance applications, the engineers at Avient worked closely with WillowWood's special products team to identify a solution. A unidirectional fiberglass laminate produced with a surfacing veil for added durability provided the ideal combination of flexibility and multiaxial stability. And, the fiberglass solution did not yield the "push-off" that would prevent the foot from meeting K2 level coding requirements.

Beyond material selection, the collaborative team also identified a proprietary design and finishing process that could be achieved with the tooling already in place at WillowWood's Ohio-based manufacturing facility.

After extensive testing, including mechanical testing to ISO 10328 standards and a six-month participant clinical trial, WillowWood introduced DuraWalk™, their most advanced low-activity foot.

THE IMPACT

Finding a material that could enable just the right amount of flexibility as well as necessary stability was critical to meet the needs of WillowWood's target market. The DuraWalk foot, made in the USA with our Gordon Composites™ fiberglass laminate material, offers flexibility while walking without the "push-off" of a higher activity level foot, combined with the multiaxial stability needed for a low-activity amputee. And it does all of this in an updated, attractive design.

To learn more, please contact Avient at +1.844.4AVIENT (1.844.428.4368) or visit www.avient.com.