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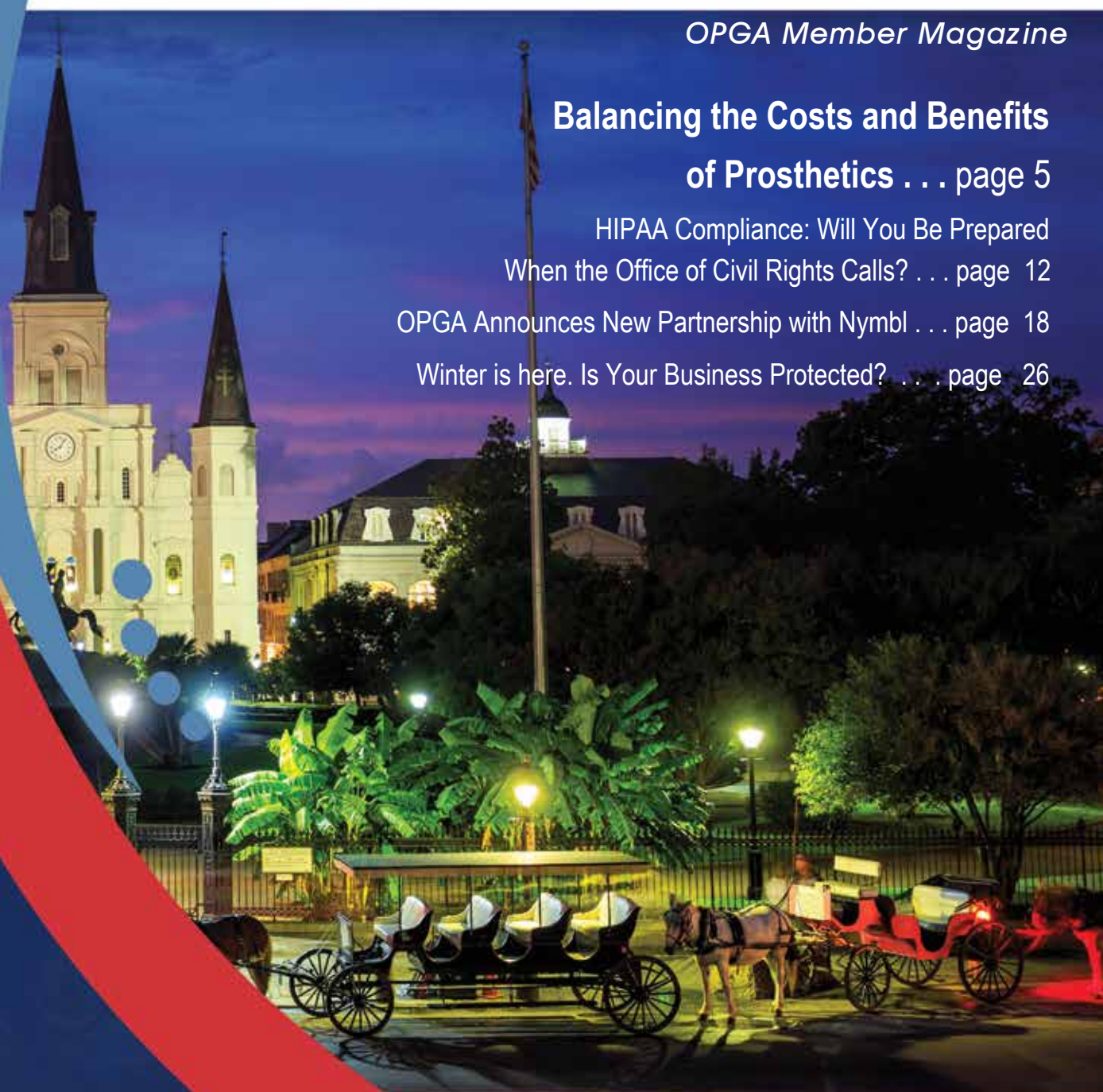
OPGA Member Magazine

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A Look at Basalt Braid

For centuries, the O&P industry utilized wood, metal, and leather in manufacturing prosthetics and orthotics. 1970 is considered to be the beginning of the modern age of prosthetics/orthotics. The introduction of plastics was the main driver of changing how devices are fabricated. 1950 can be considered the start of resin composites being used in orthotics/prosthetics.

Dale Perkins, CPO and co-founder of Coyote Design, was first introduced to exotic composites in early 1980. One of his patients who was a recent amputee and an outdoor enthusiast, Tom Whittaker, brought him some Kevlar he was using in kayak construction. One of his life goals prior to his amputation was to climb Mt. Everest, and this dream only intensified after the amputation. Dale fabricated several sockets for him, incorporating Kevlar, but these proved unsuccessful due to the polyester resin he was using at the time.

"Polyester resins would not saturate Kevlar, so we were basically just gluing the fabric together, not creating a durable composite," said Dale.

Dale started to use carbon cloth sourced from kit aircraft manufacturers with similar failures to Kevlar because polyester resin did not saturate carbon fiber. As carbon fiber started to be manufactured in knitted tubes (e.g., golf club shafts), it found its way into prosthetic socket manufacturing. Improved resin, both epoxy and acrylic-modified epoxy, improved performance of carbon prosthetic sockets, but due to brittleness of the carbon, there was still a high rate of cracking failure. By 1989 Dale created carbon fiber prosthetics for Tom's first Mount Everest attempted ascent and his two other Everest climbs. Tom was the first amputee to successfully climb Mount Everest in 1998. Tom's book, "Higher Purpose," describes his life and Mount Everest climbs.

In the 1990s, Dale's son, Matt Perkins, now CEO of Coyote Design, was a technician working in his father's lab. As with all



Dale Perkins



lab techs working with carbon fiber, he suited up in hazmat gear and used expensive dust collecting systems to help diminish the health risks and lessen the itch.

"As you well know, despite best efforts, there is still the never-ending itch," said Matt.

Years went by and Matt and Dale were trying to create a more flexible socket for their patients when they heard about an alternative to carbon fiber: basalt braid, formed from volcanic rock.

Dale recalls, "A large number of our patients wanted their copoly test sockets back; they said it was more comfortable because of the extra flex. By eliminating carbon fiber and fiberglass and using basalt and nylon stockinette, we were able to develop a basalt composite socket that had the flex characteristics of the copoly. Not only did we create a more flexible socket that patients preferred, we dramatically reduced socket failures, such as cracking, compared to carbon fiber/fiberglass sockets. The basalt/nylon stockinette sockets are much less toxic than carbon fiber/fiberglass. Eliminating the carbon and fiberglass has made a safer lab environment as well."

Dale found his patients preferred the little extra flex the basalt braid gave to their prosthetics and orthotics. For orthotics, they found that the less brittle nature of the basalt almost eliminated the breakdown, which leads to the cracking and splintering that can occur with carbon fiber. They found it holds its shape and rarely fails if made correctly.

The Frenchman Paul Dhé was the first with the idea to extrude fibers from basalt; he was granted a U.S. patent in 1923.

Around 1960, both the U.S. and the Soviet Union began to investigate basalt fiber applications, particularly for military applications. In 1970 U.S. glass companies imposed research strategies that favored glass fiber instead of basalt fiber, while in Eastern Europe research was nationalized by the Soviet Union's defense ministry, and they continued to develop basalt composites. After the breakup of the Soviet Union in 1991, the results of Soviet research were declassified and made available for civilian applications.

So, what's the difference? Carbon fiber is more rigid, slightly lighter, and more brittle. Basalt braid is tougher, less brittle, and saturates more thoroughly. Both composite braids create very strong, light-weight products.

Alarming statistics confirm why hackers target small businesses. According to the Small- to Medium-size Business Threat Awareness Poll, 67 percent of small- to medium-size businesses do not use web-based security, and 61 percent do not use antivirus on all computers. Phones, tablets, computers, and laptops typically access the infrastructure and at some point contain patient data or access to patient data.

Use these easy-to-implement tips to help protect your data.



Software updates and proper protection on devices do not require an IT expert and are crucial to protecting company and patient data.



Security experts agree that a business's computer systems and networks, or infrastructure, must be addressed in a cybersecurity program. Protect your infrastructure by using proper firewalls, antivirus, web filtering, email filtering, access levels, and by making smart decisions about the software you're using to store patient data.



Software systems, such as billing or patient management software, are another element of risk. Most providers use third party, cloud, or hosted software and rely on their software vendor for security.



When using a third party-hosted software, two-factor authentication should always be turned on when available. This is one line of defense, but don't stop there. Networks need to be able to protect files locally as well as software hosted elsewhere.

For more information about cybersecurity and HIPAA compliance, contact OPGA's Secure Tech Solutions team at 319-874-4797, or visit www.opga.com/services/securetech.

COYOTE DESIGN

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Here's an example of best use of each material in different terms; If you want a racing bicycle, the stiffness of carbon fiber is a must. If you are looking at snow boards, skis, and tennis rackets, the up and comer is basalt braid. That little bit of extra flex helps absorb the impact and deflect the energy but is still rigid enough to give the desired results.

Matt and Dale named this product Cc Composite to fit in with the rest of the company line. What is Coyote Comp? It is about 99 percent basalt braid heated and formed into a thread and woven into a sleeve, fabric, or rope. The other approximately 1 percent is called sizing. Sizing is a resin that holds it all together. All fiber braids have some type of sizing.



Anna Larsen, CPO, at Coyote Prosthetics and Orthotics, stated, "My patients have noticed it is more comfortable because of the added flex in the socket."

Anna said she doesn't see catastrophic failures as much with patients using prosthetics and orthotics made with Coyote Composite. She likes the added flex it gives to her patients and that it is better for the environment, better for her health, and that it is less itchy.

Technicians who have used Coyote Composite found they didn't suffer from the itchiness associated with grinding carbon fiber, and repairing AFO breakdown has almost become a thing

of the past. Russ Bartlett, Jr., CPOA, central fabrication lab manager at Coyote Design, has worked with the basalt braid for years and said, "Coyote Composite makes every bit as good a socket as carbon fiber. If I wasn't told what it was when I started using it, I wouldn't have known any different."

Coyote Design's other central fabrication manager, Bradley Davis, CPA, CTP, said he liked that it has very little itch and no smell when grinding when compared to carbon fiber.

Brad says, "It makes excellent sockets, and I wouldn't go back to carbon for working with or wearing."

Brad is a congenital below knee amputee and has worn prosthetics all his life. He started wearing a prosthetic made of Coyote Composite three years ago and loves it. He enjoys the added flex it gives him.

Basalt fiber is all natural and is finding its way into a number of industries because of its strength, low cost, fire resistance, non-conductivity, insulation, and absorption properties. It is being used to insulate pipes and wires from heat and replace rebar in concrete structures due to its strength and the fact that it doesn't corrode, breakdown, or rust over time. It has also become an asbestos alternative because it is non-toxic, non-carcinogenic, and inert.

Due to its variety of uses and the fact that there is an abundance of this renewable resource, basalt braid is considered to be "the green industrial material of the 21st century."

YOU'RE WORTH THE SWITCH

**Coyote
Design**

www.coyotedesign.com



Save your health

- *Basalt Braid is non-toxic, non-carcinogenic, inert.*
- *Little to no itch.*

Save money

- *Coyote Composite costs less than carbon fiber.*

Made from **Basalt** =  **Lava Rock** 100% Natural Fiber.

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Learn more online by taking our complimentary:

Alternatives to Carbon Fiber get 2.5 (S) CE credits from ABC, BOC or OPC.

Take the course and receive a sample of Coyote Composite.

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