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The New World of Pet Prosthetics

Anna Brooks
Craig Newmark Graduate School of Journalism

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The New World of Pet Prosthetics
And how it saved a dog named Buddy

By Anna Brooks

It was a cold January morning, around 4 a.m., when a worker at a Brooklyn animal shelter found the dog. Tied to a fence outside Animal Care Centers of NYC was a German shepherd, crouching in a pool of blood.

His oversized ears were like satellite dishes, alert and open, his black-and-tan fur still fluffy like a puppy's. But his left hind leg looked as if it had been caught in a garbage disposal. The paw was gone, leaving just a ragged stump of bone, fur, and flesh. Doctors examining the dog later determined that an object, maybe an elastic band, had been wrapped tightly around the dog’s lower leg, cutting off the blood supply. In an attempt to free the atrophying limb, the dog had gnawed off his own foot.

Dr. Robin Brennen, the center’s senior veterinarian, was called to consult. The shelter system opens its doors to 35,000 abandoned animals a year, many of them sick, injured, or abused. Brennen has treated almost every type of animal injury, but this case was “especially disturbing.” Never before had she seen a dog chew off its own foot.

Brennen needed to make a decision, but options were limited: either amputate the rest of the leg, or put the dog down.

While Brennen routinely faced difficult decisions, this dog, whom employees named Buddy, presented a dilemma. If he were older, ill-tempered, or beyond help, her choice would have been easier. But committing to the long-term rehabilitation of a dog in a shelter network already overrun with animals just wasn’t feasible. Last year, almost 700 unhealthy or untreatable dogs at the shelter were euthanized, along with more than 1.6 million others entering shelters across the country each year.

But Brennen couldn’t bear the thought of saying goodbye to Buddy, who in just a short time, had endeared himself to all the employees: “Why should he lose his life because of some stupid accident that happened? He’s a victim of bad circumstances.”

She didn’t like the idea of an amputation, either. German shepherds are a breed susceptible to orthopedic problems like hip dysplasia, which causes crippling arthritis in joints. How would losing a leg impact his quality of life? The young dog had already experienced a severe trauma from which many animals, especially unclaimed ones, do not recover.

There was, however, one more alternative. Brennen had no idea where the money would come from or if the dog was even a candidate but, in her view, if any animal deserved a prosthetic leg, it was Buddy.
The Cairo Toe, and 3D-Printed Alligator Tails

Prosthetics for people have been around for millennia. Discovered 18 years ago in an Egyptian tomb, the “Cairo Toe” is believed to be the oldest prosthetic in the world. Almost perfectly preserved, the 3,000-year-old wooden big toe was found still attached to a female mummy by a leather strap. The toe was so exquisitely crafted that it may have served more than just a functional purpose: life without a big toe felt incomplete. Were prosthetics, then, about the mind or the body? Is the purpose of a device to assist mobility and improve a person’s quality of life, or make them feel whole again?

Doctors and their patients deliberate these questions when deciding on devices, while insurers rate prosthetics on a scale of medical necessity to determine what to cover for the estimated 1.6 million people in the U.S. living without limbs. Advances in prosthetic technology have further complicated the matter. Many can’t afford the high costs of specialized prosthetic care, and insurers put limits on cutting-edge devices like myoelectric arms, which cost $50,000 and up.

As prosthetics enter the animal kingdom, will the same questions be asked? Should the standard be different, or do all creatures deserve the same level of care? The One Health Initiative, a movement supporting the integration of human, animal, and environmental health, is of growing importance in the biomedical world. Experts in the field believe that spending money and effort on prosthetics for animals is likely to have a benefit for people, too.

“Nonhuman species are very important, and even more important, is that we wouldn’t exist without the rest of the natural world,” said Lisa Moses, a Boston-based veterinarian specializing in pain and palliative care, and a research fellow at the Center for Bioethics at Harvard Medical School. “There’s a lot we can learn between veterinary medicine and environmental science that will work in a fashion to help us all.”

Animal prosthetics is “one of the fastest growing areas within the vet profession,” said Jonathan Block, the medical director of Water4Dogs, a rehabilitation facility in New York that provides services like hydrotherapy for pets. Rehabilitation training for vets now teaches what before were considered primarily human treatments — places like the Canine Rehabilitation Institute in Florida even offer a course on orthotics and prosthetics for dogs.

For animals, an artificial limb can make the difference between life and death. But the world of bionic pets is murky, obscured by a whole other set of ethics to consider. Animals are incredibly adaptable, and resilient, but unable to rationalize the concept of an artificial appendage. Because of that — and the fact they can’t communicate in words how they feel — it can be difficult to know whether a prosthetic is improving a pet’s life, or causing stress and suffering.
For pet owners and professionals, there also has to be a pre-established acceptance that, as is the case with humans, a prosthetic might not be the appropriate choice. Janie Veltkamp, a raptor biologist, spent more than a year working with a team of engineers, dentists, and veterinarians to fashion a 3D-printed prosthetic beak for a bald eagle named Beauty, who had the top of her beak shot off by a poacher.

But after three weeks, the beak fell off. Veltkamp decided to abandon further attempts because it would have been too traumatic for the animal to endure. Beauty learned to live without her beak, but she would never again be a bird in the wild.

Sometimes, though, even the most unlikely cases are successful. Mr. Stubbs, an American alligator who lost his tail while being illegally smuggled by an animal trafficker, wouldn’t have been able to swim or walk properly without his artificial tail. Derby, a husky born without front paws, probably would have been fine without a prosthetic. But with his customized, 3D-printed legs, he was able to do something he never could before: run. In other cases, a prosthetic can not only improve an animal’s quality of life, but also advance the field of human prosthetic technology. Maja Kazazic lost her leg when she was a teenager during the Bosnian War, and was unable to run until she was fitted with a special gel originally invented for Winter, the first dolphin with a prosthetic tail.

Twenty years ago, there was usually only one option for a crippled or severely injured animal, and it wasn’t a prosthetic — it was death. Since then, some four dozen companies dedicated to animal orthotics and prosthetics have cropped up worldwide. Derrick Campana, one of the first in the U.S. to launch such a business, had worked as a human orthotist until he received an inquiry from a vet about a prosthetic leg for her chocolate Labrador, Charles. After that, Campana left the land of the bipedal, and in 2005, founded Animal OrthoCare in Virginia.

Since then, he has fitted leg braces for camels, cranes, and a 12,000-pound elephant. None of his clients were told how to use such a device. Nor could any tell him what it felt like to walk, run, or fly with one. Yet, he believes animals respond more genuinely than humans because they are not bound by social protocols — and animals don’t care how they look (or so it’s believed).

Campana chooses clients carefully, often declining requests he knows will fail, like from the person who wanted prosthetic legs for a lizard. “I want to help animals, not hurt them,” he said.

Campana mostly makes devices for dogs. As was veterinarian Brennen’s concern for Buddy, there can be complications for dogs following an amputation. Arthritis. Joint degeneration. Strain. Phantom pain. Reduced mobility. But if successful, a prosthetic can prevent many of those long-term effects, and add years to a dog’s life.
“I hear all the time that dogs can walk fine on three legs, but I want them to walk great on four,” said Campana.

Another Dog?

Susan Donatsky hadn’t planned on getting another German shepherd. She already had two, one now too old to accompany her to work at horse farms around New Jersey. Every morning the rangy woman, hands rough from hammering horseshoes, would load her younger shepherd Levon into her truck and head off to the horses. As soon as they rumbled to a stop, Levon would leap out of the truck to join the other dogs scampering around the farm, while Donatsky tied on a pair of weathered black chaps and got to work in the barns.

On a Friday last February, Donatsky arrived home from work and flipped on the news, like she always did. The first story she saw was about Buddy, who at that point needed a home.

“If I turned the TV on a minute later, I would have never found out about Buddy,” she said. “I couldn’t stop thinking about it. It bothered me all night long what this dog had gone through.”

The next morning, she called Animal Care Centers of NYC to see if Buddy was available for adoption. He was, but not yet. Once he healed from his injuries, he would be fitted for a prosthetic leg. The municipal shelter had been scrambling to figure out how to finance the prosthetic when something serendipitous happened. While Buddy was getting a surgical consultation at a veterinary hospital, the owner of another pet being treated there offered to finance everything, including all the long-term care Buddy would need.

Whether the prosthetic would be successful remained to be seen. If it was, Donatsky was told, Buddy still wasn’t “a normal dog to adopt.” The dog needed a special home with an especially dedicated owner responsible for monitoring and maintaining the device, as well as seeing Buddy through what would be a long, perhaps lifelong, rehabilitation process.

In May, after months of interviews, home visits, and discussions with the vet, Donatsky was approved by the shelter to take Buddy home. But as she drove into Manhattan from rural New Jersey to pick him up, she was anxious. What if the whole ordeal was too much for the dog to recover from?

Buddy was young, still a puppy at heart. In his short life he had survived a trauma that would shatter other dogs. He’d also dealt with the ensuing medical interventions: surgery, pain medication, prosthetic appointments, all things incomprehensible to a dog. Now he was being relocated, handed over to another stranger who might leave him.
And on top of everything else, Buddy still had to accept the prosthetic, and learn how to use it.

“Pets don’t always understand that this is something that’s going to overall improve their wellbeing,” Block, the Water4Dogs veterinarian, said. “Sometimes they’re resistant, and we have to train them to be comfy in a device. It’s kind of like breaking in a new pair of hiking boots.”

It’s a huge challenge even for the most adaptable of animals, like dogs. And it’s even harder, sometimes impossible, for animals in the wild.

In Danger of Drowning

Mr. Stubbs lost his tail while being illegally trafficked by an animal smuggler. In 2005, Arizona state troopers pulled over a suspicious driver on the highway and searched his trailer.

Peering under a hide-a-bed with his flashlight, an officer heard a hiss, and then went scrambling backwards when his beam illuminated a nine-foot long alligator. In his shock, the officer knocked down a stack of Tupperware containers holding smaller gators. In total, they found more than 30 alligators stuffed inside the trailer, including Mr. Stubbs, whose tail had likely been bitten or ripped off by one of the bigger alligators.

“A lot of times other gators will kill a weaker one to eliminate another mouth to feed,” said Russ Johnson, co-founder of the Phoenix Herpetological Society. “He still walks around to this day with a piece of meat in his mouth, even when he’s full — he’s afraid someone else will get it.”

Troopers knew the reptile rescue center was the only place for the congregation of malnourished alligators to go; no one knew reptiles better than Johnson. Even though Mr. Stubbs had somehow survived his devastating injury, his longevity was in jeopardy. Without a tail, Mr. Stubbs couldn’t swim or walk properly. The first time he was put in a pool, he flipped over and sank. Without the counterbalance of a muscular tail to keep him afloat, Mr. Stubbs would forever be in danger of drowning.

The alligator eventually learned to doggie paddle, and swam that way for eight years until a man named Marc Jacofsky, who worked at an orthopedic research center called The CORE Institute, suggested building Mr. Stubbs a prosthetic tail. Justin Georgi, a professor at Midwestern University who specializes in reptile anatomy and locomotion, was brought in to assess the alligator’s gait, pace, and spinal alignment. The data he collected could then determine whether the prosthetic tail was actually improving the alligator’s quality of life.

But customizing a prosthetic for a wild animal, and then teaching him how to use it, was not the same process as for animals comfortable being handled by humans.
“Alligators are always a challenge to work with, even when they’ve been in captivity as long as Mr. Stubbs has,” Georgi said. “There’s always a balancing act working with a wild animal. Can we keep ourselves safe, can we keep the animal safe, and still do what we need to do?”

The team decided the benefits outweighed the risks. Just watching Mr. Stubbs walk was exhausting — it was like he was wearing silk socks on ice. With no tail to keep him balanced, his stumpy hindquarters would fishtail, his scaly feet slipping out sideways instead of pushing back to propel him forward. Over time, Mr. Stubbs would face significant bone and muscle deterioration from improper pressure on his joints. Most likely, Mr. Stubbs would become crippled, and eventually need to be put down. As do people, animals suffer from afflictions like arthritis and muscle disease, signals that remind us our lifespan batteries are fading. And some animals, like alligators, can live just as long as humans do.

Mr. Stubbs was now part of a family at the herpetological society, and would be treated with the same standard of care afforded to humans. The prospect of improving Mr. Stubbs’ quality of life was especially important for Johnson, who was dedicated to changing perceptions about reptiles.

“If this was a cute animal like a dog or a cat, there would be public outcry to help. But most people would never have given this a thought because it’s an alligator,” he said.

The first tail was molded from an alligator cadaver — using a live donor could be dangerous, and stressful for the animal. But the process was arduous and time-consuming. Plus, they couldn’t just make one tail and send Mr. Stubbs off into a scaly sunset. Unlike humans, alligators never stop growing, and the team was committed to spending the foreseeable future making Mr. Stubbs new tails as he continued to grow.

Teaming up with Stax3D, a 3D printing company in Phoenix, researchers created a digital model of the original tail using an Artec 3D scanner. The computerized tail could then be adjusted to any size and shape, down to the millimeter. As Mr. Stubbs grew, all they would need to do is readjust the digital model, and print out a new tail.

The first time they put the tail on, Georgi was preparing to deal with a very cranky alligator. Going from no tail to 15 pounds of rubber cinched to his backend didn’t sound like something Mr. Stubbs would particularly enjoy.

Georgi was anticipating Mr. Stubbs to snap or try to get the green triangle of rubber off. To his surprise, the alligator stood up and walked in a straight line. Not long after, Mr. Stubbs left paddling to the dogs and was back to swimming his snaky alligator swim.

“The first time he did it his eyes got big as dishes, like what in the heck was that!” Johnson said. “I don’t know who was more surprised, him or me. But watching him propel himself the length of the pool, I was excited. I was looking at an alligator again.”
Superdog

The elevators at Water4Dogs in lower Manhattan opened, and out bounded Buddy and one of Donatsky’s other shepherds, Levon. Donatsky staggered out behind them, clutching their leashes with white knuckles as Buddy bee-lined for a cat, who quickly slipped out of sight.

Block, Buddy's veterinarian, strode out to greet them. Buddy's ears immediately perked up. He jerked Donatsky forward once again, his long, black snout sniffing at the vet's pockets for treats. A savory reward emerged. Block then asked Donatsky how the dog was doing with the prosthetic leg he had fitted Buddy with five months ago.

“He’s pretty much figured it out,” Donatsky replied. “He runs like there’s no tomorrow. Isn't he cute?”

“He is really cute,” Block said. “To be honest, this prosthetic works so well. It's beyond my expectation.”

That day, Buddy would be breaking in his new “hiking boots.” He had spent the summer “reliving his puppyhood,” as Donatsky put it, and was quickly wearing out the first device. The prosthetic had served its purpose, but Donatsky wanted something less cumbersome than the black and bulky leg affixed by a harness that snaked up his hindquarters and hooked over his shoulders. Stuck to the harness was a Superman sticker — Donatsky had bought it after her first few days with Buddy.

“He went from nothing to Superdog,” she said. “He says, There ain’t nothing I can’t do.”

Buddy's new prosthetic, made by Campana in Virginia, was more compact, and didn’t require a harness. Block checked Buddy's teeth, ears, and heartbeat, and then gave the dog a kiss on the head before pulling off the old prosthetic.

Without it, there was no disguising his recent trauma. The amputated leg looked like a wishbone, its atrophied thigh tapering down to a slender knob where his lower leg once was. Buddy faithfully leaned into the vet assistant as his backend, now off balance without the prosthetic, wavered.

Block guided Buddy’s stump into the foam socket. Buddy didn’t seem bothered, even when Block put the prosthetic on backwards the first time. The dog tried to walk with it, awkwardly sticking his back leg up and out, as if he were trying to kick up dirt. Velcro crackled as Block unfastened the straps and started over. With the device now properly in place, Block asked Donatsky to walk Buddy up and down the hall to assess his gait. The pair moved into a trot, the prosthetic making a dull clopping sound every time it met the hard rubber flooring.

Buddy was used to wearing a fake leg, but this one was a different make and model. Buddy would have to develop proprioceptive-awareness to the new device, learning
where the false limb was in space. It’s one of the hardest parts of learning to use a prosthetic for both people and pets: there’s no sensory input from the false limb to help step off a curb or over an obstacle.

Motivated by the lure of treats, Buddy followed a trainer over a row of plastic hurdles, first forwards, then backwards. He then moved on to a serpentine line of orange pylons, weaving around them like he was learning how to drive for the first time. He stood, sat, and laid down. Even when he started to pant, he kept going, dutifully responding to the trainer as she placed his front paws on a wooden board resting atop a hump of squishy rubber to see how well he could balance on his back legs.

“The fact that he’s using this as well as he is right now, is great,” Block told Donatsky, giving Buddy a pat. “He’s already wanting to run with it.”

Whole Again

On a fall morning five months after Donatsky adopted Buddy, the pair seemed as comfortable together as an old married couple.

They had a routine down pat: wake up, put Buddy’s leg on, hop in the truck, and head out to tend the horses. Days were spent running up and down hills, racing over ruts and rocks, and hunkering down in the long grass hoping to catch Levon unawares. When Levon grew tired of being antagonized, Buddy would hover near Donatsky as she cleaned and changed horseshoes. He would inch closer and closer, until Donatsky had to scold him for getting too close to the horse’s backend. He would then scamper out of the barn in search of other farm dogs to race.

“They’ve made him whole again. He’s just a full, complete dog,” she said.

It was May 5 when Donatsky and her new dog first drove home together. It was the day Donatsky feared would traumatize the dog more than he already had been. But Buddy had reversed their roles, mollifying her anxiety by hopping in her truck, putting his head down, and going to sleep. “It was almost like he knew, you’re my person. It was meant to be,” she said. Later, Donatsky decided May 5 would mark Buddy’s birthday.

That fall morning, Donatsky headed out to the horses, Buddy and Levon in her wake. Where Donatsky went, the dogs went, too. But that day, Buddy had other plans. He slunk off to an area where he knew he shouldn’t be, a small arena used for horse jumping. His escape didn’t go unnoticed. Donatsky hollered at him. Buddy rarely ignored his owner, but sometimes a dog can’t help it.

He charged at a pool of muddy water, his prosthetic making slap and suction sounds like a rubber boot in a forest puddle. Donatsky gave up on calling Buddy away — she knew the mud bath was too enticing for any dog to resist. Buddy pranced around the pool, pausing here and there to lap up silty water, before plopping down in the middle.
For a moment, the bulky, black prosthetic disappeared beneath the surface of the water. For a moment, he looked like just like a regular dog. And he is.

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SIDE STORIES

Derby: Born to run

Prosthetics have become an alternative for disabled pets, who before, had limited options. Around 400 years after the wheelchair was invented for humans, veterinarians began considering wheels as a viable aid for dogs. One of the first pet mobility businesses, K9 Carts, launched in 1961. Now, wheelchairs are fitted for all types of animals, including a squirrel named Karamel, who lost her front legs in an animal trap.

But as is the case with prosthetics, and maybe even harder in the case of wheels, animals don’t inherently know the purpose of these devices. While wheelchairs work well for some pets, for others, they are clunky, cumbersome, and can cause stress and trauma if an animal can’t figure out how to use it.

Wheels were the obvious — and at the time, only — choice for Derby, a husky born without front paws. To get around, he had to hobble on short, misshapen elbows that looked like T. Rex arms. Because his back legs were so much longer than his front ones, Derby’s belly often dragged on the ground (which was why he hated going out in the rain) as he army-crawled his way around.

Tara Anderson, Derby’s foster parent, arranged to get the husky a set of wheels so he could go on longer walks without damaging his front legs. Despite his disability, Derby was a happy dog, always wagging his tail even when his nose was in the dirt. He adapted to the wheels quickly, but there was still a lot the dog couldn’t do. He couldn’t run in the wheelchair; if he accidentally flipped over, it was impossible to right himself. Derby could now go to the dog park, but to other dogs, he was an outcast.

“Other dogs were very put off by the wheelchair, they were scared of it,” Anderson said. “Poor guy, one time another dog freaked out and knocked Derby over.”

Anderson considered prosthetics. She consulted with Derrick Campana at Animal OrthoCare, who said there was maybe a 50/50 chance it would work. Derby’s deformity wasn’t clean or straight, so he would likely have a difficult time balancing on a traditional “peg leg” style prosthetic. But, Anderson also worked at a 3D printing company: couldn’t they design a prosthetic that met Derby’s needs?
Evan Kuester, a senior engineer at 3D Systems where Anderson worked, had some experience making 3D printed prosthetics — he had made a limb for one of his classmates in college. But with Derby, yet another challenge emerged. The dog hadn’t lost a limb he already knew how to use. The life he knew was one without paws.

“Derby had no idea how to walk on his front feet, he had never done it before,” Kuester said. “When they tried to stick a peg leg on him, it didn’t quite work. He didn’t understand.”

They tried iteration after iteration, but none of the models seemed to work. Derby was either hunched over, up too high, or visibly uncomfortable. Eventually, Derby was adopted by a family states away from Anderson in New Hampshire.

But she was committed to finding her former foster a prosthetic that fit, and spent months mailing the family different prototypes to test out on Derby. Each time Anderson shipped one out, she was less convinced it would work. But one day, she got the phone call she had always hoped for. The last model had worked. Derby was running.

“No one had seen him run before, even though it’s engrained in a husky to do,” Anderson said. "It was pretty cool to watch him instinctively run with no learning curve at all."

**Maja and Rosie**

It had been 15 years since Maja Kazazic was last able to run. Before the Bosnian War in the ‘90s, she was an athletic teenager, soccer, her favorite sport.

Kazazic was 14-years-old when a bomb dropped on her house. Five of her friends were instantly killed. Kazazic survived the impact, but was dying. An infection had crept up the ragged remains of her lower leg, which was blown off when the bomb struck. The infection permeated her insides, filtering into her organs, until everything she saw was tinged with yellow. Unlike many of the Bosnian War victims who died because they couldn’t access proper medical care, Kazazic was one of a select group of children sent to the U.S. for emergency treatment.

Doctors managed to save Kazazic, but could do nothing for her leg. The initial amputation, conducted in unsanitary conditions with no anesthesia in a makeshift hospital in Bosnia, was haphazard. Dead flesh was continually trimmed off to try and stop the infection from spreading, leaving the remainder of her leg looking more a half-chewed bone. Somehow the wound healed, but poorly. Still, she figured now that she was in the U.S., she could get a prosthetic leg and be able to live a life that was some version of normal.
She tried every rendition of prosthetic she could find, but all were too painful to use. When she eventually settled into adulthood in Florida, it had been almost two decades, and Kazazic was no closer to running, or even walking, without being in severe pain.

When she felt despondent, she would go to the Clearwater Aquarium, a marine life rescue center. “I felt like one with those rescued animals, they were just like me,” she said.

One day, after yet another failed running attempt, Kazazic headed to the aquarium to watch the dolphins. There was one in particular named Winter, soon to become internationally known, who didn’t have a tail.

“As I’m sitting there feeling sorry for myself, I see a trainer walk by and pop a tail on Winter and she starts swimming,” Kazazic said. “I thought, who is making a prosthetic tail for this animal? I had to figure out who made it because if they could make it for her, I was sure they would be able to take on the challenge of me.”

It was renowned prosthetist Kevin Carroll and his colleague Dan Strzempka who had made Winter’s tail in 2006. Carroll, vice president of prosthetics for the Hanger Clinic, was a human prosthetist who worked on projects with animals in his spare time. But a fake tail for a dolphin wasn’t something that had been done before, and he worried about hurting Winter. She had already lost her tail because of a human; if she rejected the prosthetic, it would be extremely traumatic.

As was the case with Kazazic, the materials traditionally used on humans were too harsh for the dolphin’s skin. They developed a new, gel-like material to be used as a liner, but didn’t want to test it on Winter before knowing if it would work. So Strzempka, an amputee, offered to try it out.

"Human products are always tested on animals, and this was opposite — we tested animal material on a human," Carroll said.

After a few weeks, Strzempka told Carroll his leg was feeling great with the cushiony gel-liner. If it worked for Strzempka, maybe it would work for Winter, too. More than a year went by before Winter was fitted for her new tail, and for the first time since she lost it, was able to swim properly again. The story gained so much attention it was made into a 2011 movie called *Dolphin Tale*, with the character of Carroll played by Morgan Freeman. But not all press was positive.

“We had some negative comments like, why is Kevin building a prosthetic for a dolphin when there’s so much need for humans?” Carroll said. “We work hard every day helping humans. It’s important to help all the little critters of the world, too.”

Unbeknownst to Carroll and his colleagues at the time, the gel they created for Winter would also go on to benefit people with sensitive skin or painful scar tissue, like
Kazazic. A couple months after Kazazic was fitted with the new gel liner, she ran her first 5K race.

Her life was finally going as she imagined it. She had her own house. She ran a small software company. She lived somewhere that never got cold. And, she achieved her almost two-decade long goal to run again. Then one day, she thought she was having a heart attack. Heart problems ran in her family — her grandmother had died from a heart attack.

She was relieved when doctors told her it was just a panic attack. But then it happened again, and again. Her mental health plummeted. She would sit on her porch and cry for no reason. She couldn't eat or sleep. She became agoraphobic, never wanting to leave her house, and was “afraid of the wind, afraid of everything.” Soon after, she was diagnosed with PTSD.

Struggling but surviving, Kazazic was at an appointment when her doctor suggested she get a dog.

“I don’t want a dog, I have my own crap to deal with,” she said.

“There’s this one dog I think would be good for you.”

Begrudgingly, Kazazic let the doctor show her a video of the dog. It was a Great Dane puppy, auspiciously, the exact breed of dog she had wanted growing up as a child. And just like her, the puppy had a prosthetic leg.

She didn’t expect Rosie, named after the dog’s veterinarian, to alleviate her PTSD, but she did. Rosie made her feel like, “the universe was finally working.”

“She truly changed my life,” Kazazic said. “Especially when I have those bad days, I have this companion who really knows what it’s like. I feel like I have a compadre, someone who just gets me and makes it okay.”