

In the beginning was the wheelchair.

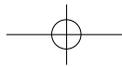
It had a hard wicker or board seat, and maybe a towel to soak up our incontinence while we waited for progressive conditions, pressure sores or failing kidneys to abbreviate our lives. I'm guessing now, but the rubber donut probably came next, then foam and the BBD, the first designed-for-the-purpose wheelchair cushion, and the flat gel cushion, 18 pounds of ineffective blubber. The 1970s and '80s brought a seating revolution with the advent of manifolds, air bladders, fluids, new plastics and composites, contouring and experiments with alternating pressure cells. They all made valuable contributions to the welfare of our butts.

And then the music stopped.

21st Century Seating



Staying healthy and happy—and free of decubiti—has always been a struggle for wheelchair users. Innovative new seating systems make the ride a lot easier.



Throughout the 1990s seating technology stood still, even in the face of an urgent new need that wasn't being met. The problem is easily stated: Improved survival pushed large numbers of us into long-term disability, and long-term disability pushed existing wheelchair seating technologies to their limit.

Why? You sit on the same skin on the same cushion on the same wheelchair. What could change?

If you've been sitting for 10 or 20 or 30 years, *you* have changed. Your skin is more brittle and less elastic; less tolerant of trauma, pressure, shear, heat and moisture. You may have postural changes on top of skin problems. You thought you could slouch like that for 30 years and not pay a price?

Skin that has done perfectly well for years

and fitting Ride Designs seating. They know it's the first major advance in wheelchair seating in 15 years, and they want to be part of it. They hope it will rescue their aging customers' butts.

The Old

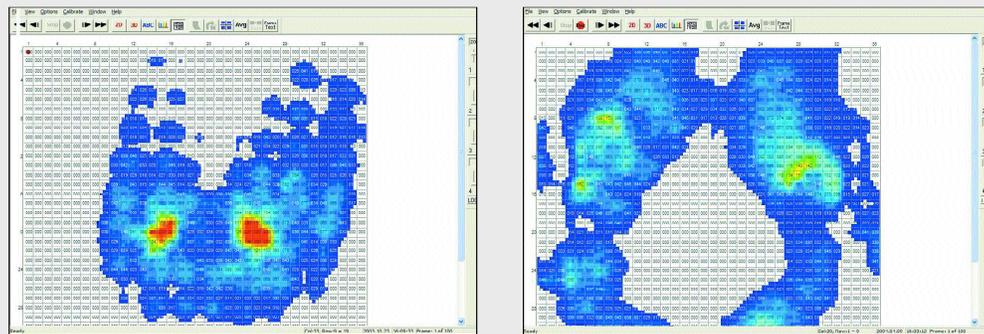
The certification course starts with what conventional seating—air, gel, fluid, foam and their combinations—does and doesn't do. The guiding principle behind these cushions is *pressure distribution*, which seeks to spread pressure evenly over the entire sitting surface. For most of us, it does very well. It might work for a lifetime, it might not.

Pressure distribution recognizes that sores form over bony prominences. You know those sharp nubbins you sit on, the ischial tuberosities or ITs for short? They're magnets

light up.

The materials tend to be heavy, hot and bulky. They retain heat and moisture that cause skin maceration, and make unstable platforms for active wheeling. Imagine wheeling across a waterbed or air mattress and you'll get the idea. Some materials are easily punctured, or change inflation with changing altitudes.

Shear, the abrasive lateral forces that occur when you move in your chair, is pressure's constant handmaiden. Most wheelers are aware of shear when they transfer, but are surprised to learn how far their bony prominences travel when they reach, recline, lean, bounce off a curb or simply wheel. As long as there's pressure on the bony places, movement causes shear. On aging skin, pressure plus shear can lead to breakdown.



Pressure maps of the same person on two cushions, with spine at bottom and knees at top. The left map shows pressure distribution with a top-of-the-line conventional cushion. Reds and yellows show peak pressures on the ischial tuberosities. The right map shows force isolation with a Ride custom cushion. White indicates zero pressure, with the ischial tuberosities, perineum and coccyx completely offloaded. Yellow shows pressure shifted to tolerant skin.

on conventional seating is now breaking down. One breakdown leads to another. What do you do when even the best off-the-shelf seating fails to save your butt?

The answer may be coming out of Colorado, where Ride Designs has quietly reinvented seating. That's why 40 or 50 people—rehabilitation technology suppliers, physical and occupational therapists, assistive technology practitioners and insurers—met in a suburb of Denver late in March to become certified in prescribing

for pressure sores. Other at-risk bony prominences are the trochanters, coccyx and sacrum. The idea of pressure distribution is to reduce pressure on those bones by roughly equalizing it over your bottom and thighs.

Pressure distribution has saved a lot of butts over a lot of years, but it has limitations. Even though it attempts to reduce pressure on bony prominences, that's still where much of it ends up. If you're skeptical, get a computerized pressure map made of yourself on your cushion and watch your ITs

Conventional contoured seating acknowledges this problem with a good idea imperfectly executed. To work, contouring has to reflect *your* butt, not some "average" person's. Even with accurate contouring, your bones will want to travel with movement and a statically captured shape will convert that movement to shear.

What if you sat in wet concrete to get the correct shape? When it's dry, it will match your shape *in that position*. But if you move or change position even slightly within those contours, the cushion is unforgiving and pressure and shear result.

And what about people whose posture, strength and mobility are deteriorating? When it comes time to choose between saving skin, controlling posture and preserving function, skin always wins. What about people who don't sit symmetrically, who have

EDITOR: Former NEW MOBILITY editor Barry Corbet knows butts, especially his: "I own a \$400,000 butt myself, or at least the co-paid part of it. Blue Cross holds title to the other 80 percent." ("Save Your Butt: Custom Orthotic Seating," September 1997). The following story is his take on the latest in custom seating, complete with disclaimer: "The co-founders of Ride Designs are close friends, so I can't claim objectivity." You'll find Barry's photo and comments as a satisfied customer on the Web site for Aspen Seating—the parent company of Ride Designs—but he has no financial interest in either.



While firm to the touch, Brock Composite is also porous enough for water to pass right through it.

pelvic tilts or amputations? Off-the-shelf seating has few answers for them.

Conventional seating has served us well, but there is a need to recognize that it may not be adequate when we get older. Aging skin calls for new ideas.

The New

Imagine an ideal wheelchair cushion. It will be built from your shape for your shape. It will offer a firm platform to support good balance, good posture and any desired mobility. It will provide optimal protection of skin *and* optimal posture *and* optimal function, no compromises. It will be affordable and durable. It might even be capable of adjustment as your weight, muscles or spasticity change.

To build this cushion, start with an idea borrowed from orthotics and prosthetics. Orthotists tend to completely remove pressure from vulnerable places and move it elsewhere, not spread it out over a surface like peanut butter on a slice of bread. Call it *force isolation* as opposed to *pressure distribution*.

Force isolation transfers pressure from at-risk skin to tolerant skin. In seating, that requires new methods.

Your shape, nobody else's, must be captured accurately and dynamically. Enter the Ride simulator. Think of an ABS box the dimensions of your wheelchair seat, about 4 inches deep and filled with low-density impression foam.

The box usually sits on your wheelchair, although it can be used on any flat surface. You sit on, or rather in, the box. You'll sink in with a satisfying crunch, maybe 2 or 3 inches, and the shape will be your very own. Now pop a wheelie or wheel into your van, make your moves. The foam captures the

travel of your bony prominences. When you transfer or are lifted out, the simulator will tell everything that's pertinent, plus what brand of jeans you're wearing. The detail is that good.

The simulator is now a negative mold of your butt, faithfully reflecting your shape and movements. In the shop, plaster composite is poured directly into it, which yields an equally faithful positive mold. That mold is then modified as necessary to off-load the ITs, greater trochanters, perineum, coccyx and sacrum, and to shift weight to tolerant areas like the proximal thighs and the posterior and lateral gluteal muscles. When finished, it is put in a molding box and a composite foam slurry is poured around it to make the cushion.

That's the shape. Now imagine the ideal material. Imagine something that is resilient, waterproof and durable. Imagine that air and moisture flow rapidly through it. Imagine a material that maintains its strength and shape over time. It's called Brock Composite—you'll find it in products as diverse as military helmets and siding for commercial construction—and it's at the heart of all Ride cushions.

Brock is surprisingly firm to the touch, and provides the solid platform needed for good wheeling balance. It's so porous that if you pour a glass of water on it, the water pours right through. Heat buildup and moisture retention don't have a chance. It's washable in the sink or shower and it's light, about 3 pounds for a 16-by-16-inch cushion. Once it comes off the mold, slap a moisture-reventing cover on it, Velcro it to your chair and you're ready to roll.

Your posture and position on the finished cushion will exactly match your posture and position when you sat in the simulator. Your ITs will be effectively off-loaded, as well as your tailbone, perineum and trochanters as needed, with extra room for them to travel when you move. There's no longer a disconnect between sitting and mobility. The pressure still has to land somewhere, of course, so it's shifted to the parts of your anatomy that can take it.

What if you change weight, or your muscles atrophy? The contours can

be adjusted without the need for add-on components. The very nifty contour adjustment mechanism or CAM, built into the cushion, opens and closes the supportive contours on both lateral and lengthwise axes. Bottoming out because you're losing muscle mass? Give the CAM a tweak, no tools required.

Riders

There are about 1,000 people using seating made by Aspen Seating, Ride's parent company, and many of them have been shifted to the Ride technology. Those who have are messianic about it.

"I prayed for this for years," says John Morgan, 48, a para who was so impressed with his cushion that he bought a piece of the company. Since 1978 he survived repeated flap surgeries, osteomyelitis, an amputation at the left hip, a right hip dislocation and a 12-year-old pressure sore that wouldn't heal in spite of his following all the rules. He spent years thinking his sitting days were near an end.

His sore healed within a month on a Ride custom cushion. "I wish somebody had held this gift out to me years ago," he says. "This is the answer to my dreams. It's restored my life to me."

Morgan credits his remarkable turnaround to offloading of his sore and Brock's moisture permeability. "I lived in humid places like Florida, Texas and Hawaii," he says. "For years I was sitting in a puddle." He still lives in Hawaii, but the puddle is gone.

Dennis Bossman, 49, a para from Littleton, Colo., battled sores, bilateral flap surgeries and shaved ITs since his injury in 1983. The shaving made him sit asymmetrically, and he couldn't find a cushion with enough stability to keep him sitting upright.



View of a "naked" Ride custom cushion showing beaded construction and integrated Contour Adjustment Mechanism.

The result was years of back pain.

"It was agony," he says. "It kept me from doing things." And his Ride? Much better. "I could tell right away what it did. It straightened me right up. Now I'm not chewing on the steering wheel when I drive home at night. It's made me a happy guy."

Bob Woodell, 59, a para from Portland, Ore., who was injured in 1966, worked on his own contoured seating for years. And for years his trochanters worried him. "They're really quick to break down," he says. He kept altering the contours, but his trochanters stayed on the edge of breakdown. Then he went to Ride.

"These guys just nailed it," he says. "Now I look and I can't see any redness." Woodell also got a Ride cushion for his car, which he loves. "That's a lifesaver," he says. "I really have confidence in these people."

Woodell isn't the only person who has found out-of-wheelchair uses for Ride seating. I've seen several well known athletes at the Denver facility getting custom seating for handbikes, waterskis and monoskis, and there's no reason the technology can't be applied to kayaks, ATVs, golf carts or sitting

on a couch.

Almost any customization is possible. Some of many examples: The bottom of the cushion can be radiused for a manual chair's sling seat or flat for a power chair's seating pan. The front edge can be undercut for tucked-back feet, and height or width can be added or subtracted. It can be notched for dropseats or for recessing between the wheelchair's canes.

Sound too good to be true? For some, it may be. A sizable percentage of wheelers will do fine with conventional seating; others may find the Ride cushion's ride a bit stiff, and manual transfers require greater lift from within the slightly deeper contour. But for those who think they may be candidates for this seating—if you have a history of pressure sores and flap surgeries, or your aging skin is less able to withstand pressure and shear forces—now may be the time to reconsider the basic sitting rule: The best pressure sore is the one you never get.

The basic price of a Ride cushion is \$970, plus small add-on charges for some features, and it comes with an 18-month warranty. Medicaid funding is decided state by state,

but the seating is covered in Colorado and many other states. Ride has applied for Medicare coding. At press time, CMS was expected to issue codes and funding guidelines July 1.

You can be evaluated at the Denver facility or at Ride-certified rehab tech suppliers across the U.S. and Canada. As more and more suppliers and clinicians graduate from certification courses, the seating will become more widely available. To find the nearest certified custom cushion provider, call 866/781-1633 or 303/781-1676, or visit www.ridedesigns.com.

In Denver, it takes about a week to capture a shape, make the molds, and manufacture the seating. At suppliers elsewhere, the practitioner selects the right simulator—several sizes are available—then captures your shape and movements and fills out a detailed order form that allows for custom features and keeps the process airtight. The simulator with your impression embedded is then shipped in its container to Ride, where the cushion is fabricated. Two to three weeks later, it's ready for delivery—and your seating will join the 21st century. MM



Maximize your independence while providing unparalleled protection against skin breakdown.

The Ride™ Simulator captures your unique shape and desirable range of movement. The **Ride™ Custom Cushion** is a lightweight and breathable cushion created from that shape to meet your specific needs.

Product Features

Ride Designs introduces the concept of force isolation. Ride systems completely remove pressure and shear from areas at highest risk for skin breakdown, and isolate them to areas tolerant.

The Ride Custom Cushion is fabricated using a lightweight, breathable composite material.

The Ride CAM™ (Contour Adjustment Mechanism) allows you to fine-tune the fit of your Ride Custom Cushion. Lose weight? Not a problem...a few clicks on the CAM straps and your fit has been easily adjusted.



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