

THE VALDOSTA DAILY TIMES

YOUR HEALTH MATTERS

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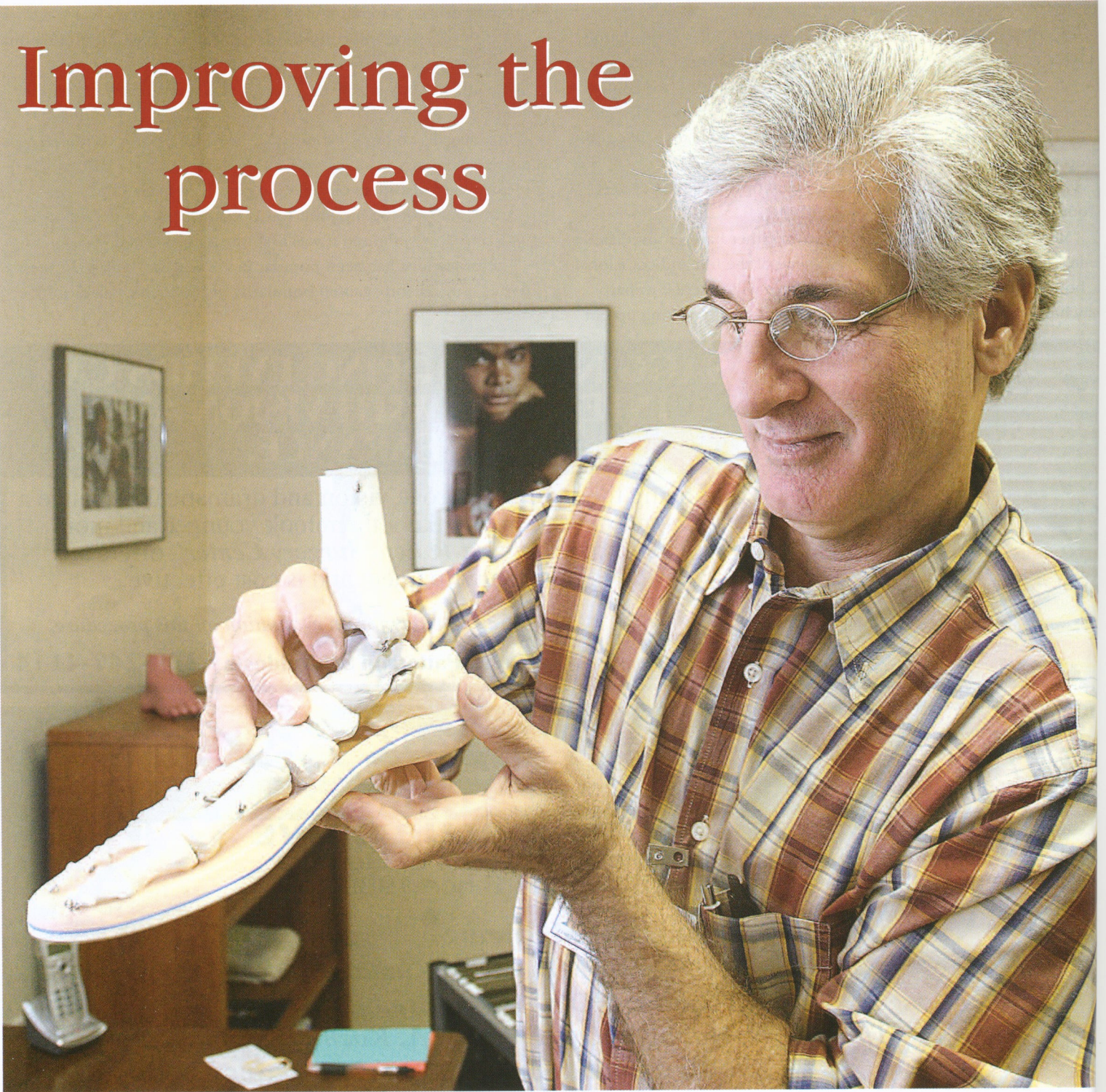
...and Medical Directory



**The advantages
of hip arthroscopy**

INSIDE: Dr. Fredrick develops foot orthotic system

Improving the process



Dr. Jeff Fredrick of Rehab Engineering LLC uses a model skeleton of a foot to show how one of his custom shoe inserts is imprinted with a person's own custom fit after wearing the pad for a week. (Photo by Paul Leavy)

Dr. Jeff Fredrick develops foot orthotic system

By *Matt Flumerfelt*

Dr. Jeff Fredrick of Rehab Engineering LLC came to Valdosta in 1981 and loved it so much he set up practice. He hasn't really invented a new device: what he has done is improve a process. He must be good at what he does because one of his customers is Charlie Ward, Florida State

University's first Heisman Trophy winner.

"I didn't actually set out to do feet. We did everything — artificial limbs, computerized knees, myoelectronics, all types of bracing for children and others — but we developed a foot orthotic system that I think is second to none. We're trying to match the technology to what's happening in our culture by recognizing what we need to do if we're

going to stay active into our 70s and 80s.”

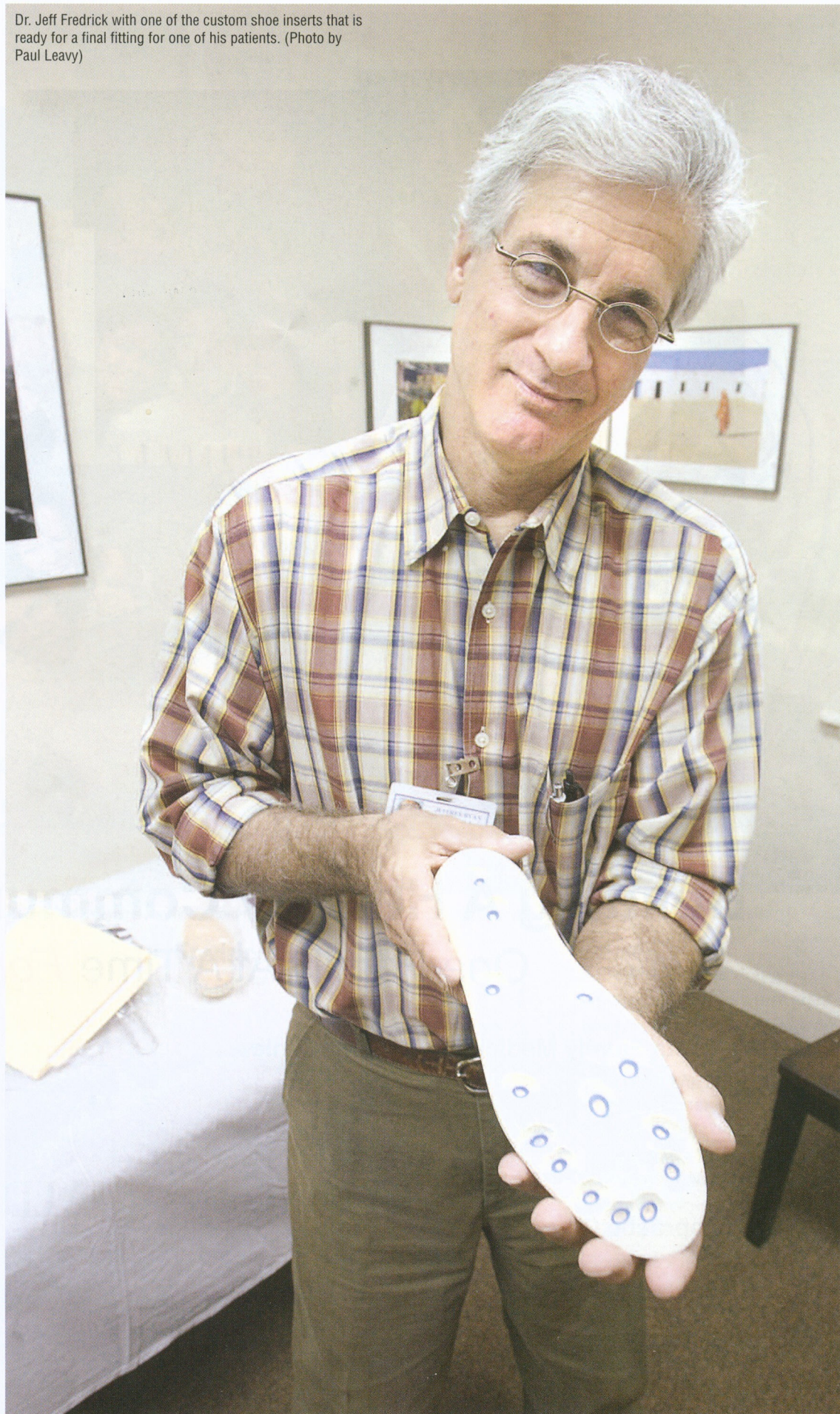
When he started out, braces for children were still made of metal and drew attention to their disabilities. During his practicums at FSU, he saw handicapped kids in braces that he described as “atrocious” and “hideous.” He said he thought the whole situation was terrible and took a part-time job making artificial limbs and braces. He said that there was a prevailing attitude at the time that the kids would get used to it.

“If you examine the amount of energy that goes into appearance and image in our society and culture, it’s extreme. So to just assume that we can carve off a sector of our people that might have disabilities and not worry about their appearance or expect them to just adjust to it is an absurdity and a cruelty. Think about what could be done, especially for children, if we had the money in research for orthotics and prosthetics that’s budgeted for special effects in one of Spielberg’s movies,” he said.

The improvements Fredrick made to the shoe inserts he creates is that, instead of taking a foot imprint and creating an insert from a static footprint, he uses the initial cast to make a blank, which patients wear for a week and then bring back so he can build the pad using the imprint their foot made while walking. Letting people wear the pad a week and bring it back provides him more information on how the person actually walks and how their foot moves. He then incorporates that information into the finished product.

“In most cases, people come in, they cast it, and the next visit you get it. Our approach is that you come in, we measure you, we build a blank, and then you

Dr. Jeff Fredrick with one of the custom shoe inserts that is ready for a final fitting for one of his patients. (Photo by Paul Leavy)



have to imprint it before we build your pad so it's a better fit. I see people as many as five times to pick up anomalies and build on top of the original platform. There are so many different variations in the way people walk," he said.

Treating patients with decubitus ulcers on the bottom of their feet is what led Fredrick to his breakthrough.

"A patient would be referred to me that had a decubitus ulcer, diabetic or otherwise, dead center on the heel, as big around as your finger and deep enough that you could put your finger in it and feel the bone. After trying unsuccessfully to treat the ulcer for a while, the physician would finally call me and say, 'Look, if we can't do something about this, this guy's probably going to lose his leg. What can you do?'"

Fredrick would get the patient to step into a foam block that takes a perfect footprint. The imprint taken of the patient's ulcerous foot had what he described as "a little sandcastle" in the middle of the heel. He'd make the pad very thick to offload the area where the ulcer was. When the patient came back a week later, Fredrick noticed something unusual. The drainage stain from the ulcer was off center from where he placed it when he made the pad.

"Never once was the drainage stain from the wound in the same place where I had put it. It was always off center in one place or another. After about the fourth or fifth time, I thought, something's going on here."

Fredrick realized the glove of tissue — tendons, ligaments and muscles — that surround the bony structure of the foot is so mobile that, during ambulation, the actual area where the most stress was was not where he was placing it. It became obvious to



Dr. Jeff Fredrick with one of his custom-made inserts and an antique metal insert that was used for years. (Photo by Paul Leavy)

Fredrick Fun Facts

- He relieves stress by flying his antique bi-plane, a De Havilland Tiger Moth.
- He writes novels in his spare time. His current work-in-progress is titled "The Eternal Centurion."
- He does mission work. With help from a Clinton-era grant, he started a first of its kind rehab program in Vietnam, based in Hanoi. His office walls are lined with photos he's taken during medical mission trips to places like Vietnam, Haiti, Columbia, and the Sahara Desert in Algeria, among others.

him that a cast made in a standing position doesn't really reflect the position of the foot during ambulation.

"Most orthotics are cast with the patient in a standing position, creating a static, flat footprint, but your foot moves as

you walk," he said.

What he started doing was building a blank and, instead of relieving for the place where the ulcer was, he let the person wear it for a week then built the orthotic using information from the pad with the drainage stain. That led him to the intuitive leap that, if the foot of someone with an ulcer moves that much, it moves that much for everybody. He started creating all his orthotic inserts using the same process, taking into allowance the natural movement of the foot as people walk.

It's an opened-ended, multi-stage process that ensures the

shoe inserts are a good fit, he said. The foot flexes when you walk like a buggy spring to keep the shock of walking from being absorbed further up. When you put a thin, rigid little plate under the foot, it blocks the flexion of the arch. The more rigid one's walking, the more the shock gets passed along higher up in the meniscus, pelvis, and spine.

"These are such simple concepts. Sixty-five percent of our success is having the good sense to make it thick and soft under the foot. The other 35 percent of finesse is what we do, and that's our skill," he said.

Fredrick has been in the field of orthotics for 35 years. Losing a leg himself in Vietnam when his squad was ambushed further contributed to his interest in providing for those in similar situations. He has worn a prosthesis since 1968.

"Unfortunately, prosthetics for the most part is heavily driven by war," he said. "It's conflict driven. War seems to function as a catalyst in that way for developments and advances in prosthetics and other technologies."

The difference in the way he makes orthotics is in the final product, he said.

"It's common sense if you think about it. What's happening to Boomers? They're having knees and hips replaced. Twenty years ago they came out with a directive — don't run on asphalt. We're conditioning all the soft tissues and destroying all the hard tissues. So why would we make foot orthotics hard? In other words, if we had to take one thing to do with a foot orthotic, what would it be? Cushion," he said.

During the Great Depression, he said the main emphasis was on mechanics, on making things last forever. People in that era were done by the time they reached 60.

"My grandfather, at the age I am now, would have been retired and sitting in a rocking chair. There's been a fundamental change in our culture. We now have people well into their 80s, extremely active, vibrant and doing things. I have a 90-year-old patient that still golfs. We're in a new generation now and recognizing that technology should work so that the organism lasts as long as possible and we stay functional," he said.



Dr. Jeff Fredrick goes over the process it takes to create one of the custom foot inserts for his patients. (Photo by Paul Leavy)

The best way to do that is to have as much compressibility under the foot as possible to absorb the shock; as much softness under the foot as possible.

If you take twin brothers, he said, one of whom works on a hard cement floor and the other who sits behind a desk, when they get in their 60s, other things being equal, the one with better knees and hips will be the one who hasn't beaten them to death. The two critical things are allowing the arch to flex and having as much thickness under the foot as possible to keep the shock from being absorbed higher up in the knees, hips, back, etc. All his customers are not elderly.

"I see a lot of young people. Most of the younger people come in with anomalies and problems that are a characteristic to them of having a foot problem. A kid with a foot problem is a serious thing, a 25-year-old with a foot problem is a serious thing," he said.

Frederick isn't on a crusade, but he believes in what he does. Oddly enough, both his brothers are also prosthetists.

"If everybody had this thickness in their shoes and wore thicker shoes, do I think that would be a benefit to them in the long run? Absolutely, because I see it when it isn't, but that doesn't mean everybody has to."

People who recently lost a limb often aren't ready to deal emotionally with getting an artificial limb.

The fact that Fredrick has one himself helps him help them. He'll sometimes enter a recent amputee's room, where parents or other relatives are sitting, understandably upset. He'll walk all around the room, drawing attention to himself, asking some rather routine questions. At some point he'll say, "Do you know what an artificial leg looks like?" He said they usually say no, at which time he puts his real leg up on the bed or chair for the relatives to feel. They'll touch it then draw back, embarrassed, when they realize it's his real leg. Then he'll say, "Oh sorry, that's the real leg. I sometimes forget which is which." He then holds up the artificial leg. The whole process is to let them see that this guy who's been walking all around acting very nonchalant has an artificial limb himself and isn't the least bit self-conscious or embarrassed about it.