



Capabilities

Communicating the Science of Prosthetics and Orthotics

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Getting Back to Life: First You Make A Plan

Brian Ruhe and Jennifer Uhlers conducted tests on vertical shock-absorbing pylons in the Human Mechanics Measurement Laboratory at NUPRL&RERP this summer under the direction of Dr. Dudley Childress and Dr. Steven Gard.

By Jan Little

Spending the summer of 1997 as a Dole Young Scholar conducting research into gait patterns of people with amputations is a logical step toward the career Brian Ruhe has planned for himself. Some amount of luck was involved in achieving this step because when Brian called Northwestern University Prosthetics Research Laboratory and Rehabilitation Engineering Research Program (NUPRL&RERP) earlier this year, he had never heard of the Dole Young Scholar Program and didn't know that Northwestern was a candidate to participate in the program by hosting a scholarship recipient. Brian was just taking - to him - a typically logical step in pursuing his goals.

Brian wanted to talk to Dudley Childress, PhD, the director of the prosthetic and orthotic programs at Northwestern, about biomedical engineering, the field in which Brian had decided he would spend his career. In Brian's way of thinking, if you want to meet Dr. Childress, you pick up the phone and call him at Northwestern. Because Childress was out of the office, Brian had to convey his request to a staff member, but his enthusiasm was apparent even on the phone. When the Northwestern staff was considering a candidate for the Dole Foundation scholarship, Brian came immediately to mind.

Logical planning and confidence of success have

played a large role in Brian's life. He is a senior at Wright State University, Dayton, Ohio and will graduate in biomedical engineering next winter. Like many young men, Brian will graduate after four years of college, has earned top grades in college, worked part-time, enjoyed sports and the usual college students' fun. But, Brian had to add some other achievements. He has perfected walking on prostheses after his left leg was amputated at the lower thigh (transfemoral level) and his right, through the knee (disarticulation) level.

Brian's life changed at 10:27 p.m., January 30, 1993

A freshman in aeronautical engineering at the University of Cincinnati, Brian had brought his girl friend home to spend the weekend with his parents in Greenville, Ohio, a town several hours northwest of Cincinnati. Then came the accident. There has never been agreement on the details, but his car left the road and split in two against a tree. Brian's girl friend, Courtney, was killed instantly. The transmission gears of the car went through both of Brian's legs. The destruction of the car was so complete that the police had to call Brian's parents to determine the make and model.

Much of what Brian tells about the events following

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Dole Young Scholar Program Provides Experience in Science

Brian Ruhe is one of eight young men and women who were awarded Dole Young Scholarships this summer. For the past three years, the scholarships, provided by the Bob and Elizabeth Dole Foundation, are intended to give young men and women with disabilities the opportunity to further explore their interest in any area of science. Highlight of the program for the scholars is a meeting in Washington, DC where each scholar presents a report of his or her research. The meeting is also an opportunity for the scholars to talk with researchers and various representatives of agencies including the National Institute of Disability and Rehabilitation Research (NIDRR), which managed the scholarship program for the Dole Foundation.

Each scholar enters a mentoring relationship with an established scientist. Brian has worked under the direction of Dudley S. Childress, PhD and Steven A. Gard, PhD in analysis of the gait of bilateral amputees. Brian has been able to analyze his own gait using the instrumentation of the Human Mechanics Measurement Laboratory at NUPRL&RERP. He has also conducted some of the testing in a project to evaluate vertical shock pylons.

Brian has analyzed the gaits of people without amputations and people with amputation at the transfemoral, transtibial levels. Brian grins as he tells that his gait most resembles that of a Northwestern student who used full-length casts on both legs to act as a subject for Steven Gard's research into toe clearance. "I use a lot of hip hiking." ♦

Brian Ruhe

Continued

the accident was told to him by his parents because the accident caused loss of memory. When emergency medical personnel reached the scene, Brian was very close to bleeding to death from the open wounds of his amputated legs. The nearest trauma center, Miami Valley Hospital in Dayton, Ohio, could only be reached by helicopter — and Care Flight could not take off for Greenville because of high winds. Brian's luck was with him. The wind died down long enough for Care Flight to pick him up and take him to Miami Valley Hospital, where doctors realized that the amount of blood he had lost, combined with a lacerated liver, punctured lung, compound fracture of the humerus in his right arm, unidentified internal bleeding and severe head trauma made his chances for survival minimal — perhaps about 10%.

"I don't remember the first six weeks of my stay in the hospital," Brian recalls. "I wish I could have had the chance to thank the Doctor who saved my life — his name was Moran and he was connected with Wright-Patterson Air Force Base. But, I was totally out of it. Maybe someday, I'll find out where he is and be able to say thanks."

Brian's first memory of the period following the accident is of waking up at 2:00 a.m. in the morning. "I realized I was in a strange place — not my dorm room — and that I hadn't just had a bad dream about being in this condition. The first thing I did was call my Mom and ask her to help me clear my mind and tell me about what happened. In the days that followed, I had to make a decision. Would I dwell on what I had lost — that I was an amputee and accept the role that people seemed to be assigning to my condition? Or, would I say, 'OK. This is

where I am.' and go about getting back to being a student — becoming an engineer — living the kind of life I wanted." Brian chose getting back to building the life he'd planned.

"Getting back" began with therapy as an inpatient at Miami Valley Hospital as soon as his condition was stable. The head trauma caused Brian's short term memory to be affected. "My Dad would visit me — and go down the hall for a Coke and when he came back I'd have forgotten he'd been there. I was likely to say, 'Hi Dad. It's good to see you today'". The psychiatrist was pessimistic about Brian's chances to regain a high enough cognitive level to return to college. Perhaps Brian could

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Brian Ruhe: First, A Plan

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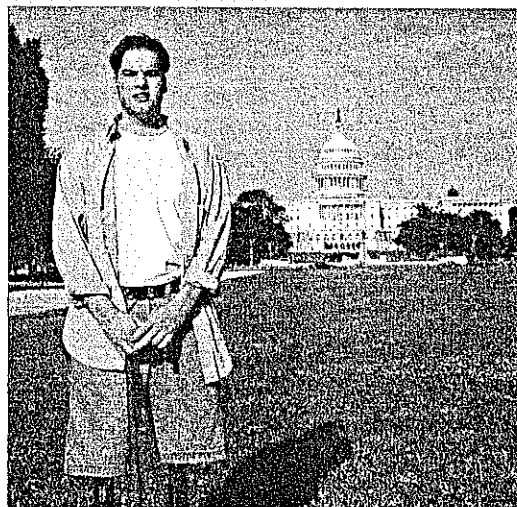
never be self-sufficient, the psychiatrist told Brian's parents.

April 19, 1993, sixty nine days after the accident, Brian went home. "Everything was still fuzzy," Brian says. The orthopaedic surgeon who took over Brian's care after trauma treatment had told Brian that it would be a waste of time for the surgeon to prescribe prostheses. They would only be cosmetic because there was no chance that Brian would ever walk again. But there was one person at Miami Valley Hospital who encouraged Brian to talk his way into being seen at the amputee clinic at Miami Valley Hospital. Dr. Jacob, head of the Rehabilitation Department, seeing Brian's determination, decided it was worthwhile to let him try to learn to use prostheses.

that designing prostheses is an engineering challenge."

Brian had only begun to succeed when infection set in around the pin holding the compound fracture in his right arm. He had to have surgery to remove the pin, then spent six weeks at home on IV treatments to eliminate the infection. Then he had surgery on his wrist in an attempt to restore some of the function lost when the ulnar nerve was damaged. Carrie Brush taped the crutch to Brian's arm to take some of the stress off the wrist and they kept working. He progressed from parallel bars to crutches to leaning against walls to walk. When snow and ice came to Greenville in the late fall of 1993, Brian was outside learning how to walk on ice and snow with two prostheses.

He was also back in school. The psychiatrist had made Brian angry by telling his parents that he would not regain much cognitive ability. He enrolled in gen-



Brian's summer as a Dole Scholar focused on three activities. (Left) Like all students, Brian spent some time "hitting the books". (Right) Using the Human Mechanical Measurement Laboratory, Bryan studied his gait and compared it to gaits of others. (Center) But, there was time for sightseeing as Bryan attended the Dole Scholar Meeting in Washington, DC.

Carrie Brush, RPT, had been assigned Brian as a patient because her specialty was working with people after they had severe head trauma. Their personalities were complementary and Carrie believed in the stubborn 18-year old. Although Brian would ordinarily change therapists to work with one who specialized in gait, Carrie Brush and Brian decided to continue to work together. Carrie had never worked with an amputee and didn't consider herself an expert in gait training, so she and Brian experimented until they found what worked.

Progress is slow

His rehabilitation was still held up. "Even after the prescription, it took a couple of months to get my prostheses. The prosthetists at Fidelity Orthopedic in Dayton had to design what I would need," Brian said. "Working with them to figure out what I needed took time, but I learned

eral education classes at Edison State Community College in Greenville to prove to himself that the psychiatrist didn't know what he was talking about. "September 1993 was pretty hectic," Brian remembers. "I had the surgery on my wrist. I was back at school at Edison. I went back to visit high school teachers to fill in memories that I'd lost. There were ongoing legal problems because of the accident. And, mostly, I had to decide where I was going next."

The next step in Brian's campaign to "get back where I was" was to plan the career he would pursue. He had been fascinated by the design and fabrication of his prostheses by the prosthetists at Fidelity and later went to work part time for the company. Talking to his former teachers, the prosthetists and others strengthened his conviction that his interests and skills could best be used in biomedical engineering. Brian decided not to return to

The VA Presents

News from the Department
of Veterans Affairs

By Robert Baum, VA Chicago Health Care System, Lakeside Division

VA Chicago is Reducing the Risk of Amputation: Targeting Diabetes

In January of 1996, the Prosthetic and Sensory Aids Service of the Lakeside Division of the VA Chicago Health Care System, working with a registered nurse, became a key component in a newly established Glucose Meter Clinic. Since January 1997, over 400 patients have been trained to check their blood sugar levels and issued glucometers for home monitoring. These patients return to the clinic four times each year for follow-up. This practice has resulted in a 1.4 percent drop in glycosylated hemoglobin levels. This translates into a relative reduction in diabetic complications of approximately 40 percent. In addition, prior to distribution of glucometers, 45 percent of the patients in the study had glycosylated hemoglobin levels above 9 percent. One year into the project, only 25 percent of the subjects had a level above 9 percent, a drop of 20 percent. Gathering and analyzing statistics has been coordinated by the Associate Chief of Staff for Ambulatory Care with the involvement of many disciplines at Lakeside Division.

Diabetic care is being targeted by another avenue through involvement of Prosthetic and Sensory Aids Service and our membership on the Preservation-Amputation Care and Treatment Program (PACT), which was established by the VA in 1994. The PACT program educates and monitors numerous veterans at risk of amputation. Because approximately 15 percent of people with diabetes are at risk of amputation, proper and timely intervention and care can save limbs. PACT patients are screened, treated, counseled and, when appropriate, referred to specialty care.

According to Phyllis Trammel, RKT, PACT Program Coordinator at Lakeside Division, "PACT's interdisciplinary approach involves staff from Physical Medicine and Rehabilitation, Prosthetic and Sensory Aids Service, Medicine, Surgery, Nursing and the Rehabilitation Institute of Chicago. PACT is a great example of the emphasis the VA places on prevention and the wisdom of doing so." ❖

In the July issue of *Capabilities*, the Public Law offering increased access to prosthetics was listed as PL 103-262. The correct number is 104-262.

Brian Ruhe -- Continued

the University of Cincinnati, where the campus was inaccessible to someone using prostheses or a wheelchair. He instead chose Wright State University in Dayton, Ohio because biomedical engineering there was well known.

By September of 1994, Brian had rented an apartment in Dayton and enrolled in Wright State University as a biomedical engineering student. "I was finally feeling good about getting back to where I was. I needed to prove my independence to myself." His work at Fidelity progressed from working as a prosthetic technician to programming CAD/CAM sockets on computers.

While studying at Wright State, he learned about the Northwestern University research program in prosthetics and orthotics. Brian added a new goal — go to

Northwestern. He hopes to enroll in the Northwestern University graduate biomedical engineering program.

Why does Brian think it's important to tell his story? "I got so mad when doctors made up their minds that I couldn't go back to college — or that I couldn't walk on prostheses. I've done both. I've gotten where I am because I was raised to go after what I wanted and not expect to have things just given to me. If you have the will, you can overcome tragedy. There are many ways to take back your life and to achieve your goals. Sometimes the traditional ways that medical people have been taught aren't the only ways — or even the right ways. Sure, using prostheses isn't as much of a success story as if they had been able to re-attach my legs — but my life works for me. Maybe people reading my story will learn that if the person with the injuries has a plan, the medical people should listen — should be supportive. No one can really forecast how any person will handle his or her disability." ❖