

## EDITORIAL

### Commending Ernest M. Burgess, MD, PhD with Senate Resolution 278 For His Unwavering Global Service to Prosthetics Medicine

*"...There is no greater act than giving people the tools to improve their own lives."*

The Honorable Ernest M. Burgess, MD, PhD.

Orthopedic surgeon, clinician, innovator, veterans advocate, and humanitarian are just a few words describing Dr. Ernest M. Burgess. His extraordinary career extends over half a century. For his groundbreaking achievements in prosthetics medicine, Dr. Burgess is honored with Senate Resolution 278, submitted on March 28, 2000 by democratic Senator Robert Kerrey of Nebraska. Dr. Burgess is commended for his exceptional service and life-long dedication to creating significant solutions for countless mobility-challenged people. His pioneering accomplishments in prosthetics medicine has developed a legacy for more progressive prosthetics research in the VA, national and international western medicine, and across the developing world.

Ernest M. Burgess was born in Roosevelt, Utah on October 29, 1911. Throughout his childhood, he was captivated by the medicine practiced by his aunt, whose work as a rural doctor had a major impact on his future in medicine. After attending Duchesne County High School in Utah, Ernest Burgess attended the University of Utah and received his BA degree in 1932. In 1937, he earned his MD from Columbia University College of Physicians and Surgeons in New York City and completed his internship at the Swedish Hospital and the Children's Orthopedic Hospital in Seattle, Washington in 1938. His residency was completed in 1941 at the Hospital for Special Surgery at Cornell University in New York.

Dr. Burgess' tour of duty with the Army as an orthopedic surgeon during World War II was the stepping-stone that led to his first complex involvement with amputee care. As the Chief of Surgery at Tripler Hospital in Honolulu in 1944, Dr. Burgess encountered the inferior quality of amputation surgery, insufficient wound healing, ill fitting prostheses, and limited post-operative



**Ernest M. Burgess, MD, PhD**  
*President, Prosthetics Outreach Foundation*

patient mobility. These observations inspired Dr. Burgess' development of improved surgical techniques, better-fitting prostheses and other mobility aids, and computer-aided implementation, used worldwide today. After completing his Army tour of duty in 1946, Dr. Burgess began consulting for the VA, also acting as a civilian consultant to the Army.

In 1948, Dr. Burgess began a private orthopedic surgery practice in Seattle, Washington. During the following 30 years, he pioneered total hip replacement surgery, and introduced the long posterior flap amputation technique. This procedure dramatically enhanced circulation in the residual limb, greatly improving prosthetic fitting. As a result of limb muscle stabilization during the operation, amputees enjoyed a level of activity they didn't imagine possible after the injury.

In 1964, Dr. Burgess attended an international conference on prosthetics medicine in Copenhagen. Dr. Robert Stewart, VA's Chief of Prosthetics and Sensory Aids, inspired by a new management system of surgical amputations discussed at the conference, encouraged the establishment of Prosthetics Research Study (PRS), a multidisciplinary research team. At the request of the VA, in collaboration with the Rehabilitation Research and Development Service, Dr. Burgess founded PRS in 1964. VA-funded PRS is one of the most outstanding post-operative care centers in the world. Dr. Burgess' tenacious efforts in developing postsurgical amputee management immediately improved the rehabilitation of amputees. His leadership as Director and Principal Investigator at PRS pioneered various innovative surgical techniques and devices, and made prosthetic limbs more functional, comfortable, life-like and affordable.

The Immediate Post-Operative Prosthetic (IPOP) technique developed at PRS radically changed the prospect of a person facing amputation. IPOP, in which the amputee was fitted with a prosthesis right after surgery, encouraged improved and quicker wound healing and tissue repair, and diminished postsurgical pain. The completion of the IPOP method facilitated rehabilitation in less time, enabling the amputee an earlier return to ambulation.

In 1984, PRS invented the Seattle Foot. This life-like prosthesis is made of lightweight and pliable materials, giving amputees the ability to participate in a full physical life, not hindered by bulky wheelchairs, residual limb discomfort, and limited mobility. PRS also developed The VA/Seattle Ankle. Over 150,000 amputees worldwide now use the VA/Seattle Limb System. In connection with Dr. Burgess' meticulous development of this prosthesis, the psychological aspects of a patient's self-motivation in adjusting to a new form of mobility had a direct impact on the overall success of the VA/Seattle Limb System.

Peripheral vascular disease and diabetes account for at least 75 percent of all major amputations performed in the United States. Dr. Burgess conducted diabetic footwear studies at PRS. Diabetic foot ulcers, which sometimes go

unnoticed due to foot insensitivity, are a significant risk factor for amputation. PRS conducts further research to determine the long-term effectiveness of unique footwear and custom insoles to prevent foot ulcers in the population at highest risk for diabetic reulceration and amputation.

Dr. Burgess' application of the Computer Aided Design and Manufacture (CAD-CAM), one of the first systems created for prosthetics, resulted in the Automated Fabrication of Mobility Aids (AFMA) system. PRS developed AFMA in alliance with the New York VAMC and Northwestern University/Lakeside VAMC. The AFMA system makes it possible to produce high quality, low cost, and lightweight limbs in less than 4 hours. AFMA techniques have improved accuracy, efficiency, and consistency in prosthesis design and production. This system is also responsible for the VA/DAV/PRS Knee development.

Seattle ShapeMaker, shape-sensing software, was developed to implement computers to support AFMA, and is used in over 150 centers worldwide. Training courses were developed and initiated for the technology transfer of AFMA, as well as training for the VA clinical staff in new PRS techniques. To assist caregivers in developing their skill in alignment, PRS produced the Visual Interactive Prosthesis CD-ROM to teach the subject of prosthetics in 49 universities, in 20 countries, on five continents. The result of Dr. Burgess' transformation of prosthetics medicine has revamped the prosthetic care services in 37 VA Medical Center sites in the United States.

Ever the humanitarian, Dr. Burgess has abundantly contributed his time, money, and wisdom to benefit amputees. In 1989, Dr. Burgess founded the Prosthetics Outreach Foundation (POF), a non-profit medical service which provides high quality prostheses to amputees around the world. POF supports communities by establishing clinics to produce and fit amputees with prostheses manufactured with local materials. The Philippines benefited from POF assistance in designing a prosthetics clinic, donating equipment, prosthetic supplies and training the Philippines staff in AFMA techniques. POF also designed and installed a

mobile prosthetic workshop, which was then transported to Nicaragua. This unique self-contained workshop is housed in a 20-foot long shipping container and provides prosthetic services for the surrounding region. The Nicaraguan staff was also trained in AFMA techniques and limb fabrication.

Vietnamese amputation victims are another group that benefited from Dr. Burgess' work. The Vietnam War resulted in 20 percent amputee casualties within the Vietnamese population, primarily caused by land mines. Vietnam veterans, returning to America, appealed to Dr. Burgess to help these victims. With volunteer assistance, POF began planning for a demonstration clinic in Vietnam in 1988. POF established the Prosthetics Outreach Clinic (POC), a prosthesis fabrication workshop and research facility for prosthetic quality improvement. POC provided free limbs to thousands of amputees in Vietnam.

In partnership with the Vietnamese government, the Seattle POF opened a medical clinic in Hanoi in 1991. Since then, over 10,000 children and adults have been able to walk again with pride. The Hanoi prosthetics program has enabled the Vietnamese-staffed medical clinic and prosthetics factory to become self-reliant in prosthetics technology and clinical services. In 1998, the newly renovated prosthetic foot production facility opened at the Ba Vi Orthopedic Technology Center. Located west of Hanoi, this center is the national manufacturing hub for rehabilitation products in Vietnam. Dr. Burgess was delighted to see his fulfilled dream of a sustainable prosthetic project in Vietnam. The POF prosthetics program in Vietnam is a model of success, serving as an example of self-sufficiency for other countries.

The enduring legacy of warfare throughout the regions of Asia, Africa, Europe, and the Middle East continue to expand the amputee population caused by residual land mines. Many of the victims are children, threatened with a limited future due to political tension that can delay foreign humanitarian efforts for years. The poverty that precedes the war is worse after the war ends. Poor amputees cannot afford prostheses, or in many cases, basic medical assistance. Buried munitions removal, especial-

ly in rural communities, has been a slow process. Dr. Burgess' goal is to expand POF's outreach to more war-torn and developing countries where amputees are literally abandoned. The Seattle POF plans to send 250 prosthetic feet to victims of land mines in Albania and Kosovo to help sustain survivors in this region during the transition to peace.

Prior to Dr. Burgess' involvement in prosthetics medicine, amputees suffered a great deal more, physically and psychologically. Painful medical procedures and prostheses prolonged their emotional instability. Sadness, shock, anger, and stages of denial are several emotions experienced as a result of amputation trauma. Throughout his career, Dr. Burgess has experienced a remarkable change in the physical rehabilitation and psychological well-being of his patients. The anxiety of the effects of limb loss will never be completely diminished. However, Dr. Burgess' achievements in amputation surgery and prosthesis development continue to have a positive impact on the emotional state of amputee patients. Amputees can now resume normal lives and some are involved in prosthetics research. Many communicate regularly with other amputees, providing a significant support mechanism in furthering their mental and physical adjustment process.

Dr. Burgess retired as Director of Prosthetics Research Study, however his retirement has not ended his participation as chairman of PRS. He also remains the president of Prosthetics Outreach Foundation. Since the early 1970's, Dr. Burgess has been a full member of the Journal of Rehabilitation Research and Development Editorial Board. Dr. Burgess reviewed proposals submitted to the RR&D Merit Review Committee for more than 12 years. He spent the last six of those years as chairperson of the Merit Review Committee. A sample of Dr. Burgess' past and present memberships in medical organizations include: the American Orthopaedic Association, International Society for Prosthetics and Orthotics, American Medical Association, and the American Association for the Advancement of Science. He holds an appointment as a Clinical Professor in Orthopedic Surgery at the University of Washington School of Medicine,

and is a former President of Staff and Director of the Amputee and Congenital Deficiency Service at the Children's Orthopedic Hospital in Seattle. Dr. Burgess also serves on Editorial Boards for several research and clinical journals on surgery and rehabilitation.

Dr. Burgess increases awareness of prosthetics medicine by acting as a visiting lecturer at many universities in the United States and abroad. He is also one of three authors responsible for the PRS publication of the classic textbook titled, *The Management of Lower Extremity Amputations*. Dr. Burgess has contributed to many surgical and rehabilitation periodicals, publishing articles over the past 45 years pertaining to prosthetics medicine. His consistent support of PRS and POF has led to articles about mobility aids, peripheral vascular disease, amputation trauma, and land mines. A fraction of the many publications Dr. Burgess wrote for are: *Prosthetics and Orthotics International*; *British Journal of Surgery*; *Diabetes Care*; and *the Journal of the American Medical Association*. The Department of Veterans Affairs publications that covered Dr. Burgess' work are: *Journal of Rehabilitation Research and Development (JRRD)*; *JRRD Conference Proceedings*; *JRRD Annual Supplement*; and *Rehabilitation R&D Progress Reports*.

Over the years, Dr. Burgess has been presented with several awards and honors. He is a recipient of the United States Veterans Administration Distinguished Physician Award for his perseverance in revolutionizing prosthetics medicine. Dr. Burgess received the United States Presidential Design Award for his pioneering development of the VA/Seattle Foot in 1984. He received the Veterans Administration, Olin E. Teague Award in 1985. In 1991, Southern Utah University presented Dr. Burgess with an

Honorary Doctor of Humanities degree. Honored internationally, Dr. Burgess received the Bridge of Peace Award, from the East Meets West Foundation in 1993. In 1996, the Department of Veterans Affairs presented Dr. Burgess with a commemorative silver bowl in honor of his devotion to improving amputee care. The Seattle Rotary Club presented him with an International Humanitarian Award in 1997. In 1998, Dr. Burgess was awarded with a Medal of Honor from the Ministry of Labour, Invalids and Social Affairs for his progressive work in Vietnam, and he received the first ever Paul B. Magnuson Award as a tribute to his career of service to veterans with amputations. Senate Resolution 278 was submitted in 2000 in recognition of Dr. Burgess' life-long commitment to prosthetics medicine and humanitarian causes.

Many greatly accomplished individuals think of themselves as ordinary people. However, if ordinary people were like Dr. Burgess, no words could describe the depth of humanitarian concern and service bestowed upon those who suffer any kind of loss. Spending a lifetime as a research scientist takes considerable courage. Some people spend their lives striving to attain the rare balance of compassion and achievement. Dr. Burgess was probably born with it. The birth and evolution of one man's life, devoted to the selfless pursuit of revolutionizing medical research, development and rehabilitation, has halted the suffering and death of many thousands of amputees. What further definition of a great man is necessary? Dr. Ernest Burgess is an inspiration to the progressive future of prosthetics medicine.

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