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JOEL A. DELISA, MD, MS, Professor and Chairman of the Department of Physical Medicine and Rehabilitation, University of Medicine and Dentistry-New Jersey Medical School-New Jersey Medical School (UMDNJ); Senior Vice President and Chief Medical Officer of Kessler Rehabilitation Corporation; and President, Kessler Medical Rehabilitation Research and Education Corporation, is an experienced senior investigator, administrator, and teacher of medical rehabilitation. He received his M.D. from the University of Washington School of Medicine in 1968 and was Associate Professor at that university from 1981 to 1987. He has published 101 articles and 31 chapters and books. He is the Co-Director of the Physical Medicine and Rehabilitation (PM&R) Residency Training Program at UMDNJ-NJMS and maintains the integration of the research and clinical aspects of training, as well as a supportive institutional environment, for research. He has been certified by the American Board of Physical Medicine and Rehabilitation for 23 years and has written extensively in the field. The third edition of his textbook entitled *Rehabilitation Medicine: Principles and Practice* was released in July 1998. Dr. DeLisa is an active member of numerous professional organizations and has had wide-ranging experience on committees such as the Education and Examination Committees for the American Association of Electromyography and Electrodiagnosis (AAEE) and the Continuing Education Committee of the American Academy of Physical Medicine and Rehabilitation (AAPM&R).

EDITORIAL

by Joel A. DeLisa, MD, MS

I had the pleasure of doing my residency in psychiatry under Justus Lehmann, MD, Professor, Department of Rehabilitation Medicine, at the University of Washington in Seattle, and, for my first five years on their faculty, taught functional anatomy to undergraduate physical therapy, occupational therapy, and prosthetic/orthotic students. Functional anatomy included the teaching of kinesiology and biomechanics, which became predominant as I taught both normal and abnormal gait to these students.

Locomotion is the process by which we move from one position to another. This process is a continuum from standing to walking to running and involves starting, stopping, changing directions, and altering speed. Most mammals are quadrupedal, but man is bipedal. The mastering of erect bipedal locomotion appears to be a learned activity and thus, each of us displays peculiarities that are superimposed on the basic pattern of bipedal locomotion. Therefore, on analyzing human gait, one should explain the similarities as well as the dissimilarities and then describe how these variations may represent an impairment.

In putting together this gait analysis monograph, I divided it into four sections: 1) clinical observation; 2) review of the instrumental gait analysis systems; 3) the value of information resulting from instrumented gait analysis from the perspective of a physiatrist, an orthopedic surgeon, and a physical therapist; and 4) discussion of future trends for gait laboratories. The authors were selected as experts from multiple rehabilitation specialties to give the readers an understanding of how gait analysis can be used to evaluate a person's walking abilities to maximize function and maintain or improve quality of life.

It is my belief that instrumented gait analysis systems offer objective evaluation of the effectiveness of the various rehabilitation treatments that

are aimed at improving gait disabilities. Current recognized uses are in the gait patterns of persons with spastic paralysis to evaluate various orthopedic procedures such as tendon transfers, tenotomies, and rhizotomies pre- and postoperatively. In adults with other neurologic disorders and who exhibit spastic gait, quantitative analysis offers us objective data to evaluate therapeutic modalities and treatments such as strengthening and stretching exercises, biofeedback, functional electrical stimulation, various orthoses, and nerve or intramuscular neurologic blocks. One of the limits to its widespread use has been the limited reproducibility and usefulness of the data. Improvement in the computer technology, as well as the simplification of the systems, allows a much faster acquisition of kinematic data and analysis.

Clinicians will demand outcome studies with respect to who should be referred for these quantitative studies. Standardization of data collection and reporting procedures need to be implemented so that the cost-effectiveness relative to functional outcome can be established. Evidence-based practice is becoming a key driving force in medicine. This approach needs to be embedded in the determination of effective quantitative gait laboratories.

It is my hope that physicians and therapists in practice, as well as students at various levels of training, will find this monograph to be a user-friendly, valuable teaching tool.

I wish to thank the Department of Veterans Affairs Rehabilitation Research and Development Service for giving me this opportunity to organize and edit this monograph. I also want to thank Philip Melchiorre, MD, Assistant Professor of Physical Medicine and Rehabilitation, University Hospital, New Jersey Medical School, who was good enough to add his critique to the chapters.

Dr. DeLisa has been the Chairman of the Ad Hoc Committee on the Resident Matching Program of the Association of Academic Physiatrists (AAP) and a member of the AAPM&R/AAP Research Committee. He is past President of the AAEE, past President of the AAP, and past President of the American Paraplegia Society. He was an associate written examiner for the American Board of Physical Medicine and Rehabilitation (ABPM&R), is one of its 14 directors, and is its chairman. He is on the executive committee of the American Board of Medical Specialties and was a member of the Scientific Advisory Board of the Paralyzed Veterans of America and the National Multiple Sclerosis Society. He was on the Editorial Board of *Muscle and Nerve* and is currently a member of the following Editorial Boards: the *American Journal of Physical Medicine and Rehabilitation*, the *Journal of Spinal Cord Medicine*, and the *European Journal of Physical Medicine and Rehabilitation*. Among his many honors are The Special Advancement Award, in 1985, from the Seattle VAMC, for the development of the Spinal Cord Injury Program; The prestigious Gold Key Award, in 1991, from the American Congress of Rehabilitation Medicine; the Excellence Award, in 1995, from the American Paraplegia Society; the Outstanding Service Award from the Association of Academic Physiatrists; and the Charles L. Brown New Jersey Medical School Alumni Award in 1996. Dr. DeLisa was elected faculty member Alpha Omega Alpha in 1994.

From 1974 to 1987, Dr. DeLisa was affiliated with the Department of Veterans Affairs (then called the Veterans Administration) in the following capacities: from September 1974 to June 1975 as consultant in Rehabilitation Medicine at the American Veterans Hospital, Tacoma, WA; from June 8, 1975 to June 1982 as Assistant Chief of Rehabilitation Medicine Service, VA Medical Center, Seattle, WA; from October 7, 1979 to June 1982 as Associate Chief of Staff for Education, VA Medical Center, Seattle; and from August 20, 1984 to June 15, 1987 as Chief of the Spinal Cord Injury Service, also at the Seattle VAMC. He has served as liaison to the VA from 1993 to the present, as a member of the Special Medical Advisory (SMAG) to the Department of Veterans Affairs from 1992 to the present, and he has served on the VA congressional mandated Prosthetics and Assistive Devices Committee from 1991 to the present.

On November 6, 1998, Dr. DeLisa is scheduled to be the guest lecturer at the 31st annual Walter J. Zeiter Luncheon and Lecture, AAPM&R, which will be held at the Washington State Convention and Trade Center. This annual lectureship is awarded to a physiatrist who shares Dr. Zeiter's qualities of statesmanship, scholarship, executive leadership, and warm friendship. It is sponsored by the Physical Medicine and Rehabilitation Education and Research Fund (PM&R-ERF), AAPM&R.