



# SECTION ON Clinical Electrophysiology

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## **SCE President's Message Spring 2001**

The mission of the Section is to serve society, the membership, and the profession by fostering and advancing education, research and political action related to the areas of interest of the section. Your Section leadership has been implementing activities and developing new initiatives in each of these areas in order to better meet this mission.

### **Accomplishments and Initiatives in Fostering Education**

Our 2001 CSM programming in San Antonio was well received by attendees. The case study presentations in each of the areas of interest were particularly well received and the open forums to discuss issues of concern to the membership fostered valuable and lively debate. In order to improve on this success, the SCE Executive Committee has adopted a new format for educational programming for future Combined Sections Meetings. The new format will insure that educational programming will be provided for four to six hours each day of CSM for each of the three special interest areas (ENMG, Electrotherapy/Physical Agents, Wound Management) of the section. This means that if you plan on attending CSM in Boston in 2001, we will provide up to 18 hours of programming in your particular area of interest. In addition, we will soon be adding a link to the Section web site ([www.aptasce.com](http://www.aptasce.com)) to allow each of our members to give us their recommendations on programming content and presenters for both the Combined Sections meetings and Section sponsored preconference/continuing education courses.

### **In this Issue**

- Official Ballot
- Case Report
- Book Review
- Quality Assurance
- CSM Meeting Minutes

Newsletter of the  
SCE of the  
American Physical  
Therapy Association

The new second edition of the Electrotherapeutic Terminology in Physical Therapy is now available through the APTA. This document has been updated and revised by representatives of the Section to keep it consistent with contemporary practice and to foster improved communication among parties interested in electrotherapy.

A plan has been approved to make better use of the Section web site for education. The Publications Chair in cooperation with the Program Chair will be soliciting new monographs for posting to the site. The plan calls for these new resources to be changed at least quarterly with at least one new article every three months in each major special interest area. For those of you who were unable to attend the 2001 CSM meeting, some of the new articles will be reports by our colleagues who spoke in San Antonio.

The Section has initiated a plan to examine the feasibility of the establishment of a clinical residency program in Electrophysiologic Evaluation. The first step in this process will be a review of a model clinical residency program constructed by the Section on Orthopedics.

### **Accomplishments and Initiatives in Fostering Research**

As you learned in the last newsletter, the Section has put forth a proposal to establish a "Partnership for the Advancement of Therapeutic Technology" between the Section and interested representatives in physical therapy industry. The partnership is intended to foster clinical research and other activities related to the use of physical agents and electrotherapeutic interventions. On this

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## President's Message

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front, we have opened up communication with representatives of the Foundation for Physical Therapy to explore the establishment of a dedicated fund where contributions would be used exclusively for clinical research on electrotherapeutic and physical agent interventions. The feasibility of the establishment of this dedicated fund will be examined between now and our annual meeting in June.

The participation of industry representatives at our "Partnership Forum" at CSM was poor because the meeting time conflicted with vendors dismantling exhibits in the exhibit hall. Most interested parties consequently did not have the opportunity to discuss the goals of the partnership and strategies on how to move forward. For this reason, parties interested in the "Partnership" will be contacted through our listserv to solicit recommendations on how to proceed on the issue of advocacy for electrotherapeutic and physical agent interventions with governmental and reimbursement agencies. This feedback will form the basis for discussion at our meetings in June in Anaheim.

### Accomplishments and Initiatives in Advocacy of Section Interests

Section representatives have reviewed the second edition of the "Guide to Physical Therapist Practice" and have noted several changes and or deletions in the guide that may impact on the use and/or reimbursement for electrotherapy, physical agent interventions, and wound care. The issues of concern will be summarized by the Section President in a letter to the APTA President. The issues include the criteria for inclusion/deletion of intervention and inconsistency of the "Guide" with SCE recommendations. The letter will also include recommendations on how to resolve the issues.

In the near future the Section Web site will contain documents and bibliographies that can serve as resources for therapists in their efforts to either preserve or secure reimbursement for electrotherapeutic and physical agent interventions.

Dyncorp has been retained to act as the Therapy Review Program Safeguard Contractor. Dyncorp ([www.dynpsc.org](http://www.dynpsc.org)) was hired to

perform a review of PT, OT and Speech Therapy in all settings except inpatient hospital. They will collect and analyze data from 1998 through 2000 and intend to develop medical review protocols and a plan for reviewing all therapy services. The overall goal is to make recommendations to HCFA that will insure that the legitimate providers of care are reimbursed appropriately for reasonable and necessary services. These services include not only therapeutic interventions but also electro-physiologic evaluation. The Section will be actively cooperating with Dyncorp in this effort to insure that your ability to provide services and be reimbursed fairly for services will be protected. I encourage each of you to visit the Dyncorp web site noted above to learn more about what this company is doing, the background behind the project and how each of you can participate to protect the access of our clients to physical therapy services.

In closing I must once again stress that our Section will be successful in reaching our goals only if more of you become actively involved. We need members to prepare articles for the web site and others to participate on the practice committees and in our Wound SIG. We need current members to recruit new members and show potential members the value of belonging to the Section. I encourage each of you to plan on attending our annual and mid-winter conferences. Your participation can make a difference and your voice can be heard.

If you have questions or comments regarding my remarks please do not hesitate to contact me at [Robby@Ithaca.edu](mailto:Robby@Ithaca.edu).

*Andrew Robinson, PT, PhD*

### Section on Clinical Electrophysiology

Matt Walsworth, Editor

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# Minutes from Section on Clinical Electrophysiology Business Meeting Combined Section Meeting

**SAN ANTONIO, TEXAS FEBRUARY 17, 2001**

Meeting called to order

Minutes from previous SCE business meeting approved

## Standing Section Officer and Committee Reports:

### PRESIDENT

- Thanks to membership for participation and support of Section initiatives

### UPDATE TO MEMBERSHIP ON INITIATIVES

- a) Position statement on ES/biofeedback and urinary incontinence: rejected by APTA board rep. Coordinate revision with Women's Health and Geriatrics
- b) 2nd Edition to Guide for Physical Therapist Practice: concerns with changes to second edition will be sent to APTA President; all section interest groups and committees asked to review and comment
- c) Partnership for Advancement of Therapeutic Technology: will investigate feasibility of special fund as part of Foundation.
- d) Section name change issue: discussed at open forum; will develop alternatives for consideration.

### VICE PRESIDENT

#### Action in 2000 House of Delegates

RC 45 passed - only PTs will do sharp debridement  
RC49A APTA statement does not support certification for reimbursement referred back to APTA Board of Directors. VP to get copy of RC 49 to place on website.

**Continuing Education** - International Symposium continuing education course for physical agents and electrotherapeutics - plans are ongoing for July timeline. Lu Kloth is point of contact.

### TREASURER'S REPORT:

*Available funds as of 2/17/01:*

Checking \$10,574.00

EMG Legal Fund \$ 5,810.00

Scudder Fund \$66,298.68

2001 Income = \$29,165.23

2001 Expenditures = \$31,316.67

Revenues overall were down by approximately 17%.  
The fall EMG course generated \$4,617 which was placed into the EMG Legal Fund.

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# S C E

## Officers

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**Minutes***Continued from page 3*

Legal fund Expenditures as of 2/2001 were \$15,639.

**EMG COMMITTEE ON PRACTICE AND REIMBURSEMENT**

- Strong Fund is depleted due to recent challenges to practice.
- EMG practice compendium completed by Daryl Menke
- Renew dialogue between Practice committee and APTA Governmental Affairs

Office for exchange of information.

Arnold Tripp, EMG Practice committee chair updated attendees on the status the HCFA issue in California.

Residency Program Development: Orthopedic residency practice model to be viewed

**ELECTROTHERAPY COMMITTEE ON PRACTICE AND REIMBURSEMENT**

Position statement on urinary incontinence was sent forward for edit and review. It was not accepted in its original form. Meryl Gersh and Neil Spielholz will see that this document is guided forward to the APTA House through the proper channels by representatives of this practice committee. Coordinate revision with other Sections

Guide to PT Practice should be reviewed and compared across all versions to ensure that appropriate aspects of our practice patterns are addressed in the proper format. President (with input from various practice committees) will generate a letter to the APTA President Ben Massey identifying concerns and discrepancies along with proposal to rectify the concerns.

**PROGRAM CHAIR**

Pam Unger has been appointed to complete the term of the vacant Program Chair's position.

Balanced CSM programming was proposed where each area of interest within the section will have ongoing programming for several hours each day of the CSM conference. Pam Unger has structure of this program put together. Each area of interest will be tasked to supply content experts for its facet of programming.

**MEMBERSHIP CHAIR**

As of December 2000, SCE membership stood at 588 members (503 PT,s, 29 PTA's, 56 Students). This represents a drop in membership of approximately 6%. The dropout rate is slowing and the rate of new members joining appears to be rising. Recruitment efforts: A "Welcome to the Section" letter and informational surveys continue to be sent to all new members. The #1 reason for joining the Section is to become a member of the Wound Management SIG.

**NOMINATING CHAIR**

Requested nominations for the following Section Officers:

- Vice President
- Secretary—nominee Michael La Plante
- Nominating committee—nominee Anne Meyer
- Treasurer—Debra Donovan will run for a second term

All nominations due to this committee by March 1, 2001.

All candidates consenting to serve will send a support statement by that date to Matt Walsworth, Publications Chair by email.

*Respectfully Submitted,*  
Lisa V. DePasquale, PT ECS

## Congratulations to the Following Members for Earning Board Certification

**Thomas Glumac, PT, MS, ECS**

Mr Glumac received a bachelor's degree in physical therapy in 1976 from the University of Pittsburgh. He earned a master's degree in physical therapy from Temple University in 1996. Mr Glumac is a physical therapist assistant professor at Pennsylvania State University in Mont Alto.

**Bret Kruthoff, PT, MPT, ECS**

Mr Kruthoff graduated from Gustavus Adolphus College in 1987 with a bachelor's degree in distributive science. He earned a master's degree in physical therapy from The University of Iowa in 1990. Mr Kruthoff is the owner of Special Medical Services in Charles City, Iowa.

**Randall Stewart, PT, MS, ECS**

Mr Stewart graduated from the University of North Carolina at Chapel Hill in 1971 with a

bachelor's degree in physical therapy. He earned a master's degree in physical therapy from Rocky Mountain University in 2000. Mr Stewart is the president of Carolina Physical Therapy Contractors, Inc in Rocky Mount.

**Darin White, PT, DPT, ECS**

Dr White earned a doctorate degree in physical therapy in 1996 from Creighton University. He is the director of electrophysiological testing services at East Tennessee EMG, Inc in Knoxville.

**Kevin Workman, PT, MPT, ECS**

Mr Workman graduated from US Army-Baylor University in 1989 with a master's degree in physical therapy. He is the owner of Greenbrier Valley Physical Therapy, LLC in Ronceverte, West Virginia.



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# SCE Candidates for Office

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CANDIDATES

## Candidate for Vice President 2001

### **Steve Folger, PT, PhD**

I am grateful to all section members for this opportunity to run for the office of Vice-President for the Section on Clinical Electrophysiology. Presently I am an Assistant Professor in the MPT program at Elon College, in North Carolina, and teach courses in electrotherapy and neuroscience. Although I am relatively new to this section, I am quickly familiarizing myself with the issues that face this section. As Vice-President I will actively represent the interests of this section in the House of Delegates and report on issues that are pertinent to the mission and growth of this section. As such, I am committed to working closely with the other section officers, committee chairs, and section members to further understand and therefore better represent the diverse needs of this section. Elected or not, as I begin to roam into new territory professionally, by running for this office, I hope that other less active section members begin to value and actively participate in section education programs, research efforts and facing challenges to our practice. I will enthusiastically work to promote the growth and development of this section. Thank you for your consideration.

## Candidate for Treasurer 2001

### **Debra M. Donovan, PT, MBA, MS (Incumbent)**

I consider my extensive background in program organization and management, especially within large organizations with highly politicized environments, a strong qualification for this position. I have been a military officer for 22+ years as well as a physical therapist and have been assigned to a variety of clinical and administrative positions. I am a credentialed APTA Clinical Instructor and am on the faculty to instruct in use of the Guide to Physical Therapy Practice. I was the Chairperson for the Integumentary Panel to Part 2 of the Guide. I currently hold the position of Secretary/Treasurer of the Wound Management SIG/SCE, and have been the acting Treasurer for the SCE since February 2000. I realize the need to continue the integrity, responsibility, and accountability that the former treasurers have brought to this office and will continue to do so, if elected.

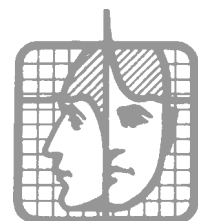
## Candidate for Nominating Committee 2001

### **HARRIETT B. LOEHNE, PT, CWS (Incumbent)**

A 1965 graduate of the University of North Carolina at Chapel Hill, I am a full time wound management physical therapist, team leader, OSHA Trainer, and Clinical Instructor at Wake Forest University Baptist Medical Center, in Winston-Salem, NC. I am board certified as a Wound Specialist by the American Academy of Wound Management. An active member at the national, state, and district levels of the APTA, I have had the privilege of presenting at several CSM and APTA conferences. A member of AC/HCP Section and the SCE, I am also a founding member of the Wound Management SIG, where I serve on the Nominating and Practice Committees. I have also had the opportunity to serve as Chair of the Piedmont District, NCPTA Board Member, and NC delegate to the APTA House. I was honored to receive the 1999 NCPTA's *Excellence in Clinical Practice Award*, and our SCE's *2000 Professional Merit Award*.

A member of the Editorial Advisory Board of *Physical Therapy Products*, I was also on the Advisory Board and Faculty Search Committee for Elon College's PT School. A current adjunct lecturer in wound management, OSHA training, and infection control at Winston-Salem State University physical therapy school, I am also a national lecturer on wound management, including irrigation, debridement, and treatment with pulsatile lavage with suction (PLWS), as well as on latex allergy and infection control. Publications include numerous articles; contributions on latex allergy to Goodman's text, *Pathology: Implications for the Physical Therapist*, 2nd edition in press; the chapter on PLWS for Sussman and Bates-Jensen's book, *Wound Care: A Collaborative Practice Manual for Physical Therapists and Nurses*, April, 1998, 2nd edition in press; and the chapter on debridement and irrigation in the 3rd edition of Kloth, McCulloch, and Feedar's *Wound Healing: Alternatives in Management*, in press.

It has been a privilege to serve on the Nominating Committee and as its Chair for the past 3 years. As a firm believer in the important role APTA plays in our professional lives, I appreciate the opportunity to be involved in encouraging our members to participate actively in directing the goals of our section, especially as physical therapy contends with national practice and reimbursement issues. Thank you for your consideration of my candidacy.



# 6 BALLOT

## Section on Clinical Electrophysiology Official Ballot 2001

Mark one selection for each office or write in the candidate of your choice.

### VICE PRESIDENT:

- Steve Folger, PT, PhD  
 Write-In \_\_\_\_\_

### TREASURER

- Debra Donovan, PT  
 Write-In \_\_\_\_\_

### SECRETARY

- Michael LaPlante  
 Write-In \_\_\_\_\_

### NOMINATING COMMITTEE MEMBERS:

- Harriett Loehn, PT, CWS  
 Anne Myer, PT, GCS, CWS  
 Write-in \_\_\_\_\_

My membership status is:  Active PT  Affiliate PTA  Student

### Directions:

1. Vote for only one candidate for each of the positions listed, or write in the name of the candidate of your choice.
2. Mark the appropriate space for your membership category.
3. When you have marked your ballot, fold it, and place it in a **PLAIN** envelope.
4. Place the envelope in a second envelope and address it to:

**HARRIETT B. LOEHNE**  
2583 Dogwood Falls  
Winston-Salem, NC 27103-5817

5. Print your name and address on the outside of the second envelope for membership verification.
6. Ballots must be postmarked by 1 June 2001 to be valid and also must have your name and address on the outer envelope.



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## BOOK REVIEW:

# Orthopaedic Physical Therapy Secrets

Placzek JD, Boyce DA, eds. Philadelphia, PA, Hanley & Belfus, Inc, 2001, paperback, 492 pp, illus, ISBN: 1-56053-409-5

The purpose of the book, according to the editors, is to provide, “a quick yet comprehensive review for those taking their orthopaedic or manual therapy specialty board exams.” This book is much more. It is a readable, well referenced, treasure trove of valuable facts and insights. There is value in each chapter for the novice and seasoned clinician. The organization of the book is logical and user friendly. The topics covered range from the basic sciences to specific evaluation and treatment techniques. The text serves as an excellent starting point for clinicians investigating the evidence for specific orthopedic procedures. The references for each chapter are limited in number but high in quality, often times reflecting both the classic papers and the most recent peer reviewed articles on the topics discussed in the chapter.

Of special interest to Section on Clinical Electrophysiology members are the extensive contributions by section members. Contributors include: David Boyce (co-editor and author of multiple chapters); Art Nitz (Soft Tissue Injury and Repair, Bone injury and Repair); Kathleen Galloway (Cryotherapy and Moist Heat); Joseph Kahn (with Fredrick Pociask and Kathleen Galloway - Iontophoresis, Ultrasound

and Phonophoresis); Barry White (Clinical Electromyography and Nerve Conduction); Frank Underwood (Clinical Research and Data Analysis); Joseph McCulloch (Wound Healing and Management); Robert Sellin and Ed Schrank (Nerve Entrapments of the Shoulder Region); John Echternach (Nerve Entrapments of the Elbow and Forearm); John Palazzo and Lisa DePasquale (Nerve Entrapments of the Wrist and Hand); and, John Halle and David Greathouse (Nerve Entrapments of the Lower Extremity).

All of the chapters flow smoothly and are designed so the busy clinician or educator can quickly scan to their areas of interest. The chapters on Clinical Research and Data Analysis, and Evidence-based Practice, are especially timely and well written. The integration of neuroanatomy, neurophysiology, physical agents and electroneuromyography into an “orthopedic” text is especially noteworthy. The book is a must for students, clinicians and educators.

**Robert A. Sellin, PT, MS, ECS**

Program Chair, Master of Science degrees  
Rocky Mountain University of Health Professions

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## Electrophysiologic Abnormalities in a Patient with Porphyria: A Case Report

*John L. Echternach, PT, EdD, ECS, FAPTA*

The purpose in presenting this case is three fold. The first is a report on the electrophysiologic changes that occur in an individual with chronic neuropathic problems resulting from the porphyria. The second is to show how the electrophysiologic examination may help determine whether new symptoms are the result of recurring problems in the peripheral nervous system or continuing neuropathic changes. Lastly, a patient with chronic neuropathic changes presents problems related to aging that may not be addressed unless this factor is considered.

### Patient History and Current Complaint

The patient was a 67 year old female with complaints of increased numbness of the left

hand of recent onset. The patient stated she had increasing difficulties with performing simple tasks such as opening doors and turning on and off the sink faucet in the bathroom. The patient's past history revealed that she had become acutely ill in 1960 and was diagnosed with having porphyria of the acute intermittent type. The patient was hospitalized during this time for an extended period during which she had rapid progression of weakness and became unable to walk. The patient gradually improved over a two year period regaining the ability to ambulate while continuing with major weakness in all four extremities.

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BOOK REVIEW/CASE REPORT



## Case Report

*Continued from page 7*

### Current Status

The patient was referred by her primary care physician to a hand surgeon. The primary care physician told the patient that he felt her current problem were related to continued problems related to her neuropathic condition. He referred the patient to a hand surgeon to see if there was any possibility that there was a superimposed new problem on her current neuropathic problem. The hand surgeon's diagnosis was that the patient had an intrinsic minus hand secondary to polyneuropathy and acute porphyria and asked the question of whether the patient was having new symptoms based on compression of the media nerve at the wrist and the ulnar nerve either at the wrist and/or the elbow. The patient was then referred for clinical electrophysiologic testing

Physical examination revealed that in the patients upper extremities, she had intrinsic minus hands. Two point discrimination examination of the first through third digits was 5mm and on the forth and fifth digits was 6mm. The patient had a negative Tinel sign on the median and ulnar nerves of the wrist. The patient had a negative Phalens test on the median nerve at the wrist. On manual muscle testing the patient revealed 0/5 function in the abductor pollicis brevis and opponens pollicis and 2-/5 for the abductor digiti minimi and 1<sup>st</sup> dorsal interosus. The patient revealed marked atrophy of the intrinsic muscles of the hand which was especially noticeable over the thenar eminence

### Review of the Disease Processes in Porphyria.

Porphyria is a disease in which there are biochemical disturbances resulting in a fault in heme production<sup>5,13</sup>. The abnormalities in heme production cause effects both on the central nervous system and the peripheral nervous system<sup>14</sup>. The effects on the central nervous system may result in disorders in mentation and normal thought processes, psychotic disturbances and seizures as well as autonomic instability. Heme production disturbances have potentially serious consequences for energy production by way of metabolism of oxygen in mitochondria. This results in axonal dysfunction of a dying back nature<sup>2</sup>. Also the inability to detoxify various drugs in the liver causes secondary toxic effects on the nervous system<sup>13</sup>. The accumulation of metabolites along the heme pathway also has negatives effects on neural tissue. The exact mechanisms for these effects on the nervous system are

not clear.

This patient was diagnosed originally as having acute intermittent porphyria which during the acute stage has the following characteristics. Patients often present with acute abdominal distress and significant pain. Patients may also complain of being agitated and restless. Some patients will progress to having overt hallucinations and seizures. During this time, patients begin to have

lower extremity and/or back pain and motor weakness beginning proximally or distally with initially a pattern of symmetrical weakness. During this time, reflexes are altered, parathesias in peripheral nerve distributions are common. Patients may also have cranial nerve dysfunction, particularly of the facial nerve. In addition, patients complain of urination difficulties, tachycardia and may also demonstrate hypertension. Diagnosis is made by evaluation of urine for accumulation for intermediate precursors of heme. If treatment is instituted rapidly, patients have a chance of good recovery. Rapid institution of treatment helps to control axonal damage<sup>4,5,13</sup>.

Electrophysiologic findings in these patients include the following elements. Sensory conduction is usually preserved however, there is a decrease in amplitude and distal latencies may be prolonged. Motor conduction reveals normal or mildly reduced velocities with prolonged distal latencies<sup>1-3,6,8,9,11,14</sup>. There is reduction of the amplitude of the muscle action potential by up to 50%. In the acute stage on EMG, the patient will show a decrease number of motor unit potentials and during their first 4-6 weeks, patients will show spontaneous activity (fibrillation potentials positive sharp waves) in the affected muscles both proximal and distal. Paraspinal muscles may also be involved. The nature of the disease is the patients sometimes have multiple attacks and during each attack there is a tendency for a pattern of denervation followed by reinnervation to occur. In chronic patients there are the typically findings of motor unit remodeling with increased duration of motor unit potentials. Fasciculations occur during the reinnervation period and some patients will show complex repetitive discharges.

### Results of the Electrophysiologic Testing

The patient was quick to state that she only wanted the minimum amount of testing done to determine whether her problem was her continuing neuropathy or whether there were new problems such as nerve compression lesions in her upper extremity. Therefore, only the patient's left upper extremity was tested since this

was her symptomatic extremity. See Table 1 for nerve conduction

On stimulating the media nerve at the wrist, no response could be recorded from the abductor pollicis brevis. When stimulating the media nerve at the elbow, a response could be recorded to the flexor digitorum longus with a slightly prolonged distal latency. Amplitude of response was judged to be normal. Conduction velocity on the median nerve from upper arm to elbow was 46 meters per second. Sensory testing of the median nerve revealed a border line prolonged distal latency. Amplitude at the second digit was 9 microvolts and at the third digit 12 microvolt. At the fourth digit, median sensory portion was 9 microvolt. These could be considered in the normal range for a 67 year old individual.

The ulnar nerve showed prolonged distal motor and sensory latencies. Amplitude of the motor response were normal, however, sensory amplitudes were present but hard to evaluate in terms of normal amplitude. Sensory amplitude to the fourth digit, the ulnar nerve portion was 3 micro volts which seems decreased. Conduction velocities on the ulnar nerve were: from upper arm to above elbow, 45 meters per second, above elbow to below elbow was 43 meters per second and below elbow to wrist was 40 meters per second. These are all slow conduction velocities.

Results of the EMG examination can be seen in Table 2. No spontaneous activity was found in any of the muscles examined. This not terribly surprising given the patients nearly 40 year history of the disease of porphyria and the resulting polyneuropathies. The abductor pollicis brevis revealed no activity spontaneously or on volition. The flexor pollicis longus revealed that the patient on volition had only 1 or 2 highly polyphasic potentials and the patient could only generate a single motor unit pattern. The flexor carpi radialis revealed normal motor units, most of which were large, up to 5Mvolts in size. The patient could not recruit small motor units and the interference pattern was never better than 2/3 of normal. In the 1<sup>st</sup> dorsal interosseous the patient generated a few motor units however most were very large, 10-12Mvolts in size. The patient could not generate any small motor units and the interference pattern was a single motor unit pattern. The abductor digit minimi revealed a similar pattern. In the forearm, the flexor carpi ulnaris also revealed very large motor units, 6-10 Mvolts in size. Patient could not produce small motor units and the interference pattern was 2/3 of normal. Assessment of

*Continued on page 9*



**Case Report**

*Continued from page 8*

the nerve conduction velocity and EMG findings was that the responses of the median nerve examination could be attributed to the patients severe neuropathic changes and there is no evidence to support that the patient was showing compression of the media nerve at the wrist. A similar conclusion was reached for the ulnar nerve. The patients responses on examination of the ulnar nerve seemed to be related to her severe neuropathic changes. There was no evidence that she was showing compression of the ulnar nerve that was new or recent at the wrist or at the elbow. Obviously we did not have other EMG or nerve conduction tests to compare the patients current status to.

**Outcome**

The hand surgeon, after examining the electrophysiologic test results and the patients clinical condition, came to the conclusion that there was no evidence of compression changes of a recent nature superimposed on the patients neuropathic changes. The patient expressed concern about the fact that her symptoms had been of a recurring nature in the past for her porphyria and was advised by the hand surgeon and by her family physician to obtain follow up for this condition through a specialist available through the local medical school.

**Discussion**

This patient was a 67 year old female who had had neuropathic changes with a 40 year history of these neuropathic changes with periodic recurrence of symptoms and worsening of her neuropathic condition. One of the unanswered questions that was not addressed in this patients management was whether aging in itself was causing some of her recent complaints of increased weakness in her extremities, particularly her left upper extremity.

One of the consequences of aging is to have reduction in number of motor units and reduction of size of motor units over time<sup>12</sup>. The post-polio literature would seem to indicate that patients who have weakness sometimes become progressive weaker and lose function as simply a result of aging. It seems worthwhile to ask whether patients with severe neuropathic changes should not be followed more closely to help the patient manage changes that take place in their functional status due to changes related to aging. Such management might improve the patients understanding of future function as well as help to preserve function longer<sup>7,10</sup>. I'll have to admit that the time I was see-

ing this patient for their electrophysiologic testing, I did not consider this issue except retrospectively. My retrospective consideration is what has led me to present this case because I have seen very little attention in the literature paid to the effects of aging on management of patients with polyneuropathies.

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**Table 1 - NERVE CONDUCTION TEST RESULTS  
MEDIAN NERVE**

Site	Latency	Amplitude	Velocity
Wrist	—	—	
Elbow	5.5 ms	5 Mv	
U Arm	10.5 ms	6 Mv	46 M/Sec
Sensory II	3.6 ms	9 iv	
Sensory III	3.6 ms	12 iv	
Sensory IV	3.6 ms	9 iv	

**ULNAR NERVE**

Wrist	4.4 ms	7.3 Mv	
Be	10.4 ms	7.3 Mv	40 M/Sec
Ae	13.2 ms	6.7 Mv	43 M/Sec
U Arm	15.6 ms	6.3 Mv	45 M/Sec
1 <sup>st</sup> Dorsal Interosseous	5.3 ms	1.6 Mv	
Sensory V	3.8 ms	8 iv	

**Table 2 - EMG RESULTS**

Muscle	Spontaneous Activity	Motor Units	Interference Pattern
Abductor Pollicis Brevis	0	0	0
Flexor Carpi Radialis	0	Large (5Mv)	2/3 Normal
1 <sup>st</sup> Dorsal Interosseous	0	Large (10 Mv)	Single Motor Unit
Abductor Digniti Minimi	0	Large (6-12 Mv)	2/3 Normal
Flexor Carpi Ulnaris	0	Large (6012 Mv)	2/3 Normal

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# Quality Assurance for Electrophysiologic Evaluation

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## Introduction

Quality assurance as defined by Merriam-Webster's Collegiate Dictionary is "a program for the systematic monitoring and evaluation of the various aspects of a project, service, or facility to ensure that standards of quality are being met."<sup>1</sup> Quality assurance for healthcare means a commitment to excellence in all aspects of practice.

The American Physical Therapy Association encourages physical therapists to voluntarily participate in quality assurance and performance improvement activities. American Physical Therapy Association policy states "The commitment to quality assurance and performance improvement is primarily a professional responsibility and is to be promoted and fostered by Association members through individual and collective efforts."<sup>2</sup> Participation in a quality assurance program in itself is a promotion of performance improvement.

The ultimate goal of quality assurance is to increase the value of healthcare through continuous improvement and providing it at a reasonable cost. One aspect of quality assurance is an analysis of the cost-benefit ratio. The cost-benefit ratio is an economic analysis that assigns a numerical value to the cost-effectiveness of procedure or a program.<sup>1</sup> The cost-benefit ratio of health care services in the United States has been a dominant concern of the public, healthcare payers, regulatory agencies, and legislative bodies for more than two decades.<sup>3</sup> Is the service worth the price?

One main issue is the lack of scientific evidence documenting the efficacy of most health care practices and services.<sup>3</sup> In addition, there is significant variation in health care procedures that can promote inefficiency including overuse, underuse, and misuse.<sup>3, 4</sup> A key health care component that can address the issue of cost-benefit as part of a quality assurance program is the development of clinical practice guidelines or practice parameters.<sup>4, 5</sup> Methods have been established on a national level for the development of clinical practice guidelines or practice parameters.<sup>4, 5</sup> These guidelines can be used for education, reim-

bursement, quality improvement, and research purposes.<sup>3</sup>

The American Medical Association Department of Clinical Quality integrates clinical practice guidelines or practice parameters, performance measurement, and outcome analysis.<sup>4, 5</sup> This clinical integration can explain and reduce the variations in health care practice.<sup>4</sup> It can lower costs, improve quality, and validate accountability.<sup>4, 5</sup> Evidence-based reports derived from well-designed studies are used to establish clinical practice guidelines or practice parameters.<sup>4</sup> Performance measures of medical interventions include translating the guidelines into review criteria and tools. Clinical outcome measures demonstrate the relationship between clinical guidelines and performance measures. Clinical outcome measurements can determine the best patient care results for specific clinical conditions. They are associated with specific processes of care, which can redefine the original clinical practice guidelines. Hence the process of clinical quality comes full circle.<sup>4</sup>

The purpose of this report is to describe the process of quality assurance as it relates to the practice of electrophysiologic evaluation.

## Literature Review

### *Clinical Practice Guidelines*

Clinical practice guidelines or practice parameters derived from evidence-based reports are proposed and developed by national medical specialty societies and other physician organizations.<sup>4, 5</sup>

The Institute of Medicine defined clinical practice guidelines as "systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances".<sup>6</sup> These guidelines recommend a course of intervention albeit diagnostic, therapeutic, or preventive, but must not be considered fixed protocols.<sup>5</sup> The guidelines are not completely inclusive or exclusive in describing a recommended course of intervention. The health care practitioner must use his or her own

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professional expertise and judgement along with the guideline information to address the unique needs of each patient including the available resources. Digression from the guidelines can be acceptable depending upon the individual circumstances.

Eight attributes of clinical practice guidelines or practice parameters are identified.<sup>7</sup> They include validity, reliability, clinical applicability, clinical flexibility, clarity, multidisciplinary process, scheduled review, and documentation.

Shekelle, et al<sup>8</sup> noted that most of the previous work on guideline development focused on validity. They conducted a randomized controlled study that evaluated the clinical applicability and clarity of two forms (specific and nonspecific) of clinical practice guidelines with a control (no guidelines) group for use with electrodiagnostic tests for patients with low back pain. They conducted a survey to assess self-reported test ordering behavior in response to hypothetical clinical vignettes. They assessed the proportion of appropriate and inappropriate number of electrodiagnostic tests ordered for each vignette. They found that specific guidelines changed decision-making behavior in a positive manner while the nonspecific guidelines changed decision-making behavior for the worse. They concluded that while validity was similar for the two guidelines, clinical applicability and clarity are also important in developing clinical practice guidelines.

### Practice Parameters for Upper Extremity Conditions

The American Association of Electrodiagnostic Medicine (AAEM), the American Academy of Neurology (AAN), and the American Academy of Physical Medicine and Rehabilitation (AAPM&R) published summary statements describing the practice parameters for electrodiagnostic (EDX) studies in carpal tunnel syndrome, ulnar neuropathy at the elbow, and cervical radiculopathy.<sup>9</sup> These three documents were based on a specified critical review of the literature. Six literature classification criteria were defined. Evidence classifications were established as Class A (studies that met all six criteria), Class B (studies that met four or five criteria), or Class C (studies that met three or fewer criteria). Conclusions on sensitivity and specificity were drawn. Practice parameters were developed. The practice parameter strengths were defined as standards (based on Class A evidence), guidelines (based on Class B evidence), and options (based on Class C evidence). They also made recommendations on the criteria for future research and that these parameter reports be updated every five

years for each of the clinical conditions.

### Practice Parameter on the EDX Studies for Carpal Tunnel Syndrome

The practice parameter on the EDX studies for carpal tunnel syndrome was described.<sup>10</sup> The six literature classification criteria were: 1) a prospective study 2) clinical diagnosis was independent of the EDX studies 3) sufficient detail describing the stimulating and recording methods was provided 4) limb temperature was recorded 5) reference values were provided and 6) the criteria for abnormal findings was described. Five out of 166 articles reviewed met six out of six criteria. Fourteen articles met five out of six criteria. Nineteen articles met four out of six criteria. They concluded that nerve conduction studies confirm the diagnosis of carpal tunnel syndrome with a high degree of sensitivity (49%-84%) and specificity (95% or greater). The literature review provided evidence that median motor and sensory nerve conduction studies are valid and reliable. Median sensory nerve conduction studies confirm the diagnosis of carpal tunnel syndrome more often than motor studies. Short segment (<8 cm) median sensory nerve conduction across the wrist and comparing the median nerve sensory conduction across the wrist to the ulnar or radial nerve values in the same hand are more sensitive than long segment (13-14 cm) median sensory nerve conduction across the wrist. Based on this evidence the AAEM recommended that health care providers and insurers accept these parameters as valid and reproducible techniques when evaluating for carpal tunnel syndrome.

The practice parameters for EDX of carpal tunnel syndrome are: 1) Standard: A median sensory nerve conduction study across the wrist with one other sensory nerve conduction in the same hand only if results are abnormal. 2) Standard: If the original median sensory nerve conduction study across the wrist is greater than eight centimeters and its results are normal, then included either a) a median nerve sensory conduction study across the wrist in a short segment (<8 cm) or b) compare to a radial or ulnar sensory nerve conduction study across the wrist in the same hand. 3) Guideline: Median motor nerve conduction study recording from the thenar muscle and one other motor nerve conduction study in the same hand to include the distal latency measurement. 4) Option: Needle electromyography sampling muscles innervated by the C5 to T1 spinal roots in the symptomatic limb including a thenar muscle.

### Practice Parameter on the EDX Studies in Ulnar Neuropathy at the Elbow

The practice parameter on the EDX

studies in ulnar neuropathy at the elbow was described.<sup>11</sup> The six literature classification criteria were: 1) a prospective study 2) clinical diagnosis was independent of the EDX studies 3) sufficient detail described in order to replicate the methods including a description of the elbow position 4) limb temperature was recorded 5) reference values were provided and 6) the criteria for abnormal findings was described. Six out of 398 articles reviewed met six out of six literature classification criteria. Eight articles met five out of six criteria. Another eight articles met four out of six criteria. They concluded that EDX studies confirm the diagnosis of ulnar neuropathy at the elbow with a sensitivity range from 37% to 86% and specificity at 95% or greater. Based on this evidence the AAEM recommended that health care providers and insurers accept these parameters as valid and reproducible techniques when evaluating for ulnar neuropathy at the elbow.

The practice parameters for EDX of ulnar neuropathy at the elbow are: 1) Standard: Ulnar motor and sensory nerve conduction studies should be performed with surface stimulating and recording electrodes and limb temperature should be monitored. 2) Standard: If the ulnar motor and sensory nerve conduction study are abnormal, then further EDX studies should be performed to exclude a more diffuse condition. 3) Standard: Ulnar motor and sensory nerve conduction studies should specify and maintain the same elbow position for the entire procedure. 4) Guideline: Moderate elbow flexion position maintained at 70° to 90°. 5) Guideline: Across the elbow distance between stimulation sites of 10 cm. 6) Guideline: Stimulation site more than 3 cm distal to the medial epicondyle should be avoided. 7a) Guideline: An absolute motor nerve conduction velocity across the elbow less than 50 meters per second (M/S) is considered an abnormal finding. 7b) Guideline: Abnormal is greater than 10 M/S slowing of the motor nerve conduction velocity across the elbow compared to the forearm segment. 7c) Guideline: Abnormal is greater than 20% decrease in compound muscle action potential (CMAP) amplitude of the above elbow stimulation site compared to the below elbow stimulation site (assuming no anomalous innervation is present). 7d) Guideline: Abnormal is a significant change in the CMAP configuration of the above elbow stimulation site compared to the below elbow stimulation site (assuming no anomalous innervation is present). 7e). Guideline: An abnormal ulnar sensory nerve conduction study is nonspecific and nonlocalizing for EDX diagnosis of ulnar neuropathy at the elbow. 8) If ulnar motor nerve conduction studies are inconclusive with recording

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from the abductor digiti minimi muscle then 8a) Guideline: Use first dorsal interosseous muscle for recording site. 8b) Guideline: Use an inching technique using 1 or 2 cm segments. 8c) Option: Comparison of ulnar motor nerve conduction velocity across the elbow to upper arm segment. 8d) Option: Use a forearm ulnar innervated muscle for the recording site. 8e) Guideline: Needle electromyography of the first dorsal interosseous and a forearm ulnar innervated muscle. If either is abnormal, then include other non-ulnar innervated muscles to evaluate for a more proximal condition.

### Practice Parameter on the EDX Studies for Cervical Radiculopathy

The practice parameter on the EDX studies for cervical radiculopathy was described.<sup>12</sup> The six literature classification criteria were: 1) a prospective study 2) clinical diagnosis was independent of the EDX studies 3) exclusion of other upper extremity pathology that could confound the EDX results 4) sufficient detail of the EDX procedure 5) clear criteria and 6) sensitivity and specificity determined. One out of 46 articles reviewed met six out of six criteria. Eight articles met four or five out of six criteria. Thirteen articles met two or three out of six criteria. They concluded that needle electromyography had a moderate degree of sensitivity (50%-71%) and a high specificity (65%-85%) in establishing the diagnosis of cervical radiculopathy. The literature review provided evidence that the needle electromyogram was almost always abnormal in patients with motor deficits and was seldom abnormal in the absence of motor deficits. There was a good correlation between needle electromyography and radiological findings. Based on this evidence the AAEM recommended that health care providers and insurers accept these parameters as valid and reproducible techniques when evaluating for cervical radiculopathy.

The practice parameters for EDX of cervical radiculopathy are: 1) Guideline: Needle electromyography of at least one muscle innervated by the C5, C6, C7, C8, and T1 spinal roots in the involved limb performed and interpreted by a specially trained physician. One or more levels of cervical paraspinal muscles examined, except when there was a prior posterior cervical laminectomy. Additional studies if abnormalities are seen on the initial exam: 1a) one or two more muscles innervated by the suspected root and a different peripheral nerve 1b) demonstration of normal muscles above and below the involved root. 2) Guideline: At least one motor and one sensory nerve conduction study

performed in the involved limb. Median or ulnar nerves should be evaluated if carpal tunnel syndrome or ulnar neuropathy at the elbow is suggested. If one or more nerve conduction studies are abnormal or if polyneuropathy is suggested clinically, then other nerves in the ipsilateral and contralateral limbs may be studied in order to define the abnormalities. 3) Options: If needle electromyography is abnormal, then a study of one or more muscles on the contralateral side may be studied to exclude a bilateral radiculopathy or differentiate from other conditions (e.g., polyneuropathy, motor neuron disease). 4) Option: Median and/or ulnar F waves when a C8 or T1 radiculopathy is suspected. Compare to the contralateral side if necessary. 5) Option: Perform cervical nerve root stimulation. 6) Option: Perform H Reflex study of the flexor carpi radialis for assessment of the C6 and C7 nerve roots.

### Performance Measurements

Measuring actual performance is necessary in order to evaluate whether or not the clinical practice guideline or practice parameter produced the intended outcome.<sup>4</sup>

Corwin and Kasdan<sup>13</sup> conducted a retrospective analysis on how often electrodiagnostic reports adhered to the practice parameters published for the electrodiagnosis of carpal tunnel syndrome. The practice parameters used for this study were from a previous version published in 1993. They calculated the percentages of omissions in reports from the recommended practice parameter key indicators in 100 electrodiagnostic reports. They found the percentages of omissions of key indicators ranged from 3%-77%. They concluded that there is variability in respect to the thoroughness and the quality of the information in the electrodiagnostic reports. They were concerned about the possibility of overdiagnosis of carpal tunnel syndrome from electrodiagnostic reports with practice parameter omissions. Overdiagnosis could result in the negative consequences of misguided surgical intervention or delayed treatment of another upper extremity problem.

There have been published reports assessing the variation in the different aspects of electromyographic practice. Johnsen, et al<sup>14</sup> in 1995 reported on the variation in interpretation of electromyographic results. Seven physicians from six European laboratories interpreted the results of 81 electromyographic studies without considering clinical information. Findings showed mostly that the inter- and intraobserver variations on the interpretation of the data were low. When there was higher variation in the interobserver findings, it was mostly with disagreement on whether the findings in-

dicated the specific pathophysiologic changes of demyelination. Intraobserver variations were noted to have a trend towards more cautious interpretations of the data over time during the study. They concluded that there is a need for clear consensus on the definitions of the pathophysiologic interpretations. Also, it may be possible to improve on the consistency of interpretation of findings, because experienced physicians changed their ways over time with practice.

Fuglsang-Frederiksen, et al<sup>15</sup> in 1995 reported on the variation in the performance of electromyography. The number of muscles and nerves examined per patient were evaluated for 595 patients with a specific diagnosis from six European laboratories. Findings showed the average number of muscles and nerves examined varied from laboratory to laboratory for each diagnosis. For example, the number of muscles examined ranged from 3 to 11 in patients with anterior horn cell disease. The number of sensory nerves examined ranged from 3 to 9 in patients with polyneuropathy. They concluded that this wide variation in electromyographic performance could impact the development of guidelines and quality assurance.

Finnerup, et al<sup>16</sup> in 1998 reported on the effect of several years of mutual influence among physicians using medical audit on electromyographic practice. Seven physicians from six European laboratories collected 940 random samples of their electromyographic (EMG) examinations over a seven-year period. From these samples, only those with a diagnosis of polyneuropathy were considered. The first and the last 12 EMG studies from this time period for each physician were analyzed. The physicians independently interpreted these EMG studies using a medical audit process to determine the electromyographic diagnosis (without considering clinical information). Information on the average number of tests per patient, percentage of sensory nerve conduction studies performed with needle recording, and the percentage of muscles studied with quantitative technique was collected. If there was disagreement on the electromyographic diagnosis then the physicians discussed each study until a consensus was reached. The findings showed a large variation in practice among the physicians, which confirmed the Fuglsang-Frederiksen<sup>15</sup> 1995 study. There was a change in motor nerve and F waves studies to become more uniform. Sensory nerve studies and muscle studies showed essentially no change. There was a decrease in the more time consuming techniques such as nerve-nerve studies and quantitative studies over time. They concluded that physician behavior can change to a more uniform practice over time with an active modification process. They sug-

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gested that there isn't sufficient evidence to recommend procedures in guidelines because of the differences in techniques.

In 1999 Fuglsang-Frederiksen, et al<sup>17</sup> studied the variation in diagnostic strategy for electromyography. Diagnostic strategy was measured by analyzing the variation of techniques, the selection of nerves and muscles to study, and the diagnostic criteria of 940 patients from six European laboratories. Findings showed the diagnostic strategy varied greatly in patients as a whole group and in a subset of patients with a diagnosis of polyneuropathy. One explanation for the variation could be the increased sensitivity of different techniques. Another explanation is the possible variation in diagnostic criteria. Yet another explanation for the variation is the educational differences between the physicians. And finally, the variation may reflect an uncertainty in the scientific basis for diagnostic strategy. They conclude that when developing standards and guidelines the variation in diagnostic strategy among physicians is taken into account along with information on techniques and disorders.

Braillar<sup>18</sup> reported on the use and misuse of electromyography in peripheral nerve injuries. He explained the neurophysiology of electromyography including nerve conduction velocity testing. He based his report on the topic of misuse on anecdotal personal observations from his experience as a referring orthopedic surgeon. He scoffed at the notion of a physical therapist performing electromyography. Yet, one of his references was an article in the journal *Physical Therapy* on nerve conduction velocity authored by two physical therapists. He concluded that the most important variable was the knowledge and skill of the electromyographer performing the study and cautioned the reader to chose carefully.

## Outcome Analysis

Clinical outcomes are considered the ultimate test of healthcare.<sup>4</sup> The patient care outcome is measured as a clinical result (e.g. percentage of immunized children), functional status (e.g., percentage independent ambulatory status after acute stroke), patient satisfaction, and cost (e.g., number of visits/RVU).<sup>4</sup> Outcome measures can be used to judge episodes of care. They can also be used to refine the original clinical practice guidelines.<sup>4, 5</sup> However, all of these types of outcome measures can be influenced by outside factors such as patient compliance or comorbidities.

A quality assurance guideline has been published for the electrodiagnostic laboratory.<sup>19</sup> Measuring key indicators for

patient satisfaction is recommended. Also, monitoring electrodiagnostic testing performance is suggested to improve patient care. Key indicators for measuring performance are: 1) Development of a provisional diagnosis based on the history and physical examination 2) Testing the appropriate nerves and muscles 3) Interpreting the findings of the test 4) Educating the patient on the diagnosis, treatment options, and prognosis and 5) Reporting the results to the referring physician in a timely manor.

## Discussion

Why measure electrophysiologic evaluation performance? It is one way to evaluate whether or not a healthcare provider is performing an electrophysiologic evaluation with a satisfactory set of knowledge, skills, and abilities. Performance measurements are part of a quality assurance program that generate information on how care is provided.<sup>4</sup> Most national healthcare professional organizations have policy statements that direct their members to voluntarily participate in a quality assurance process.<sup>2, 5, 9</sup> Federal agencies such as the Agency for Healthcare Research and Quality (Washington, DC) are charged to provide evidence-based research findings for other medical societies to use for developing their own specialty clinical practice guidelines.<sup>4</sup> Many accreditation bodies such as the Joint Commission on Accreditation of Healthcare Organizations (Oakbrook Terrace, IL) and the National Committee for Quality Assurance (Washington, DC) rely on self-reported quality assurance programs to evaluate and compare a provider or health care system to peer groups. This information is then made available to patients and purchasers of healthcare.

How is performance of electrophysiologic evaluation measured? One way is to grade performance against clinical practice guidelines or practice parameters established from evidenced-based reports derived from well designed studies.<sup>3, 5</sup> Another way to measure electrophysiologic evaluation performance is by established consensus from group expert opinion and discussion.<sup>14, 17</sup> Yet, another way to measure electrophysiologic evaluation performance is by a referral source opinion (customer satisfaction) on quality.<sup>18</sup>

Which method is best for measuring electrophysiologic evaluation performance? The first method using clinical practice guidelines as benchmarks from which to grade performance appears the best choice. Evidence-based medicine is the driving force behind delivery of healthcare today. Common elements for developing clinical practice guidelines have been standardized.<sup>4, 5</sup> These elements include: evidence-based on the literature,

developed for the benefit of other specialties and patients, incorporates all relevant skills and art, one disease per guideline with short, focused descriptions, references, consultation and consensus of experts after detailed review, revised at stated intervals, and sponsored by medical societies.<sup>4, 5</sup> The practice parameters summary statements for the three upper extremity conditions is a good example of meeting all of these requirements.<sup>10-12</sup> In addition, the practice parameter summary statements<sup>10-12</sup> appear to be specific enough to address clarity and clinical applicability as well as validity.<sup>8</sup> However, there have been no published reports that evaluate any of these attributes. Reasons for clinical practice guideline noncompliance also needs evaluation. It may be an issue of lack of healthcare provider education<sup>3</sup> or perhaps due to provider variations in practice.<sup>13, 15</sup>

Expert consensus developed clinical practice guidelines are less than ideal. Perhaps the best known consensus-based medical practice method was the letting of blood for nearly all patients with bedridden ailments until the late 1800's.<sup>1</sup> Consensus-based guidelines can often use vague or ambiguous terms and are too simplistic to be meaningful.<sup>3</sup> Most consensus processes are unscientific without an adequate summary of the literature review. It is difficult to use scientific methodology to replicate the consensus process. There is a great deal of healthcare provider variation between personal preferences, geographic areas, education backgrounds, and specialty areas.<sup>3</sup> In addition, there is variation in electromyographic examination interpretation, performance, and diagnostic strategies.<sup>14, 15, 17</sup>

Referral source opinion on the quality of electrophysiologic evaluation performance is a measure of customer satisfaction. There is value in having the user of the service be satisfied with the quality of the product received. However, this is more reflective of an outcome measure rather than a performance measure.<sup>4</sup> Also, personal opinion is not usually supported by scientific methodology. Bralliar<sup>18</sup> concluded that the most important variable was the knowledge and skill of the electromyographer performing the study and cautioned the reader to chose carefully. There lacked any scientific evidence to support his conclusion.

Both expert consensus and referral source opinion on the development of clinical practice guidelines may contain medical specialty bias. This type of professional degree bias is commonly reported in the literature without any scientific support. Bralliar's scoff at physical therapists performing electrophysiologic evaluations is an example.<sup>18</sup> Another is the requirement of a specially trained physician

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to perform and interpret the needle electromyography examination in the practice parameter for cervical radiculopathy.<sup>12</sup> This is an overt attempt by certain medical organizations to prevent physical therapists from performing needle electromyography. There is nothing in the literature to support these biased claims. This line of thought implies only physicians should perform venipuncture, give intramuscular injections, or perform neuromuscular examinations. Various disciplines in medicine often have overlapping areas in their respective scopes of practice.

## Conclusion

Voluntary participation by health-care providers in a quality assurance process is highly recommended. National medical societies, governmental agencies, and accreditation organizations develop and use clinical practices guidelines for measuring performance. Clinical practice guidelines called practice parameters are published for electrophysiologic evaluation of the specific upper extremity conditions of carpal tunnel syndrome, ulnar neuropathy at the elbow, and cervical radiculopathy. They were constructed by following the recommended elements for the development of clinical practice guidelines. The AAEM concluded that based on the evidence these three practice parameters are valid and reproducible. Their clinical application, clarity, and outcome studies of the harms, benefits, and costs have not been determined. These practice parameters appear to be the best choice for measuring performance of electrophysiologic evaluation.

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<sup>1</sup> If the patient recovered, it was assumed the bloodletting was performed on time. If the patient died the bloodletting was administered too late or not properly administered.

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#### FACULTY

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#### Starting Date for Year 2001

September 15-16, 2001

#### Further Information please write to:

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# WMSIG President's Message...

I would like to thank the WMSIG members for their vote of support with my reelection as WMSIG president. It has been a privilege to work with strong and capable individuals. Because of this support and cooperation we have made progress in our membership, recognition of the WMSIG, and additional guides for physical therapy wound management. I am pleased with the WMSIG members who have been willing to take on section responsibilities as well. I would encourage more of the WMSIG members to become involved with opportunities in our section and the WMSIG.

Our education chair, Pam Unger, is working to develop education offerings at the next CSM. With encouragement from the section President, Andrew Robinson, Pam is working to provide educational offerings from all areas of the section; electrotherapy, electrophysiological testing, and wound management. This format will provide more Section/SIG members an opportunity for educational presentations at CSM. Because of the high quality of members in the WMSIG, this will be an excellent showcase for us. Besides the education efforts the SIG is doing, we will be extending a stronger effort for membership to

the WMSIG. Therefore, I have set a goal of 100 new members by next CSM. Some might think this is a lofty or unattainable goal. It is not. If every member of the WMSIG would invite, and bring a new member to the WMSIG we would more than reach this number. Plans are being developed to help our members highlight the WMSIG. As you know, there are some strong and dynamic members of the WMSIG. Others in our profession who are not WMSIG members but with strong wound management skills, could contribute to the SIG and our profession. I am asking you, as members of the Section and SIG, to extend a hand of friendship and welcome to your colleagues to join us in the WMSIG.

The APTA is holding CSM in Boston Mass. CSM will run February 21-24, 2002. They schedule one-day pre-conference courses to be held on February 20, 2002. Please mark your calendars and plan to join us in Boston. We will also plan to have a social gathering in Boston, similar to the ones in New Orleans and San Antonio. We really want to get to know each of you better. Please feel free to forward any suggestion or ideas for the WMSIG to me at [ldcatkin@ihc.com](mailto:ldcatkin@ihc.com).

## Section on Clinical Electrophysiology

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