



INTERNATIONAL NEUROTRAUMA Letter

Volume 3, No. 1, 2000

Jeffrey S. Kreutzer, PhD

Professor, Virginia Commonwealth University Medical College of Virginia Campus, with appointments in the Department of Physical Medicine and Rehabilitation and the Division of Neurological Surgery, and the Director of Rehabilitation, Psychology and Neuropsychology.

ZASLER: Dr. Kreutzer, I appreciate your willingness to talk with us today about some of the work you have been doing over the last number of years in the area of Rehabilitation Medicine and in particular Neuropsychology. What I would like to start with is a rather broad question on sharing with readers your work in outcome based research.

KREUTZER: Professionally, I began working in the field of clinical psychology where there were many well validated and reliable assessment tools. When I started working in rehabilitation, I was struck by the lack of psychometrically sound scales. I was impressed by the quality work that was published by people like Thomson in Denmark, Lezak in the United States, and Brooks in Glasgow. Their work seemed to be really thoughtful and they presented accurate descriptions of what it was like for people with brain injuries and their family members. We set out to develop reliable and valid outcome measures, tools that would enable us to characterize patients' and family members' emotional status, work adjustment, and neurobehavioral sequelae. What we really wanted to focus on and research were the psychosocial aspects of recovery.

ZASLER: As someone who has worked with you, I know that you have been pretty prolific as far as your publication record and have made numerous significant contributions to the field. If you were to look retrospectively at those contributions as far as looking at outcome measures in specific, what do

you feel the greatest contributions have been in terms of practical clinical management tools for patients with acquired brain injury?

KREUTZER: Trying to narrow down just a few things is hard, but worth a try. After more than a decade of development, the Psychological Corporation recently published one of our instruments, the Neurobehavioral Functioning Inventory. The inventory characterizes patients' moods and behavior, physical functioning, communication skills, and cognition. We standardized the measure on a large and diverse sample, factor analytically divided the items into six discrete scales, and showed that the scales are correlated with other psychometrically sound outcome measures. The measure was intended to replace more qualitative outcome measurement methods that relied on structured interviews. Our research shows that the inventory predicts family distress and vocational outcome. Because there are two parallel versions of the inventory, we can solicit both the patient's and relative's points of view about the patient's condition.

The Family Needs Questionnaire is another instrument we developed and consider to be an important research contribution. Much of our work has focused on families, how they are affected and how they cope with brain injury. The needs questionnaire has proven to be useful clinically and from a research point of view. We can use the Family Needs Questionnaire to reliably characterize family members' points of view regarding which of their needs are most important and which of their needs have not been met. Researchers in the United States, Canada, the United Kingdom and Australia have reported their findings with the questionnaire. We've been particularly pleased that our early findings were replicated and with reports that the questionnaire accurately reflects family members' points of view.

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ABSTRACTS OF CURRENT LITERATURE

Randomized Trial of Sildenafil for the Treatment of Erectile Dysfunction in Spinal Cord Injury. F Giuliano, C Hultling, WS El Masry, et al. The Sildenafil Study Group. *Ann Neurol* 46(1):15-21, 1999.

In recent years, treatment has shifted from survival to enhancing quality of life. Persons with spinal cord injury (SCI) tend to be young and active. A common complication of spinal cord trauma in men is erectile dysfunction (ED). Current treatment options for ED in patients with SCI is rarely ideal. Initial reports indicated oral sildenafil in patients with SCI was efficacious and well tolerated. The peripheral mode of action of the drug permits a restorative effect on erectile function for both reflexogenic (resulting from local penile stimulation) and psychogenic erections (via central activation of proerectile pathways). This report presents the results of a double-blind, placebo-controlled, two-way crossover study which assessed the efficacy and safety of oral sildenafil in men with ED caused by traumatic SCI. For six weeks, 178 men (mean age, 38 yrs) received placebo or sildenafil 1 hour before sexual activity. Following a 2-week washout period, the men received the alternate treatment for 6 weeks. Of those men with residual erectile function at baseline, 78% reported improved erections. For all men, 80% receiving sildenafil reported improved sexual intercourse compared to 10% reporting improvement with placebo. Efficacy assessed by using the International Index of Erectile Function (IIEF) questions also demonstrated significant improvement with sildenafil. Only 2% of the sildenafil group were discontinued due to treatment-related adverse events (vs 1% on placebo). The Study Group concluded that sildenafil is an effective and well-tolerated treatment for ED caused by SCI.

Neuromagnetic Assessment of Pathophysiologic Brain Activity Induced by Minor Head Trauma. JD Lewine, JT Davis, JH Sloan, et al. *Am J Neuroradiol* 20(5): 857-866, 1999.

The need for improved diagnostic indicators is reflected in the fact that despite the absence of abnormalities on traditional neuroradiologic examinations or EEG, patients with mild traumatic brain injury (MTBI) often show significant neuropsychological dysfunction. Magnetic source imaging (MSI), a new diagnostic methodology which demonstrates the presence of excessive abnormal low frequency magnetic activity, combines MR imaging with magnetoencephalography. In this report the authors determine whether MSI is more sensitive than EEG and MR imaging in providing objective evi-

dence of mild brain injury by examining four subject groups: A) subjects without histories of head trauma, or normal controls (n=20); B) subjects with mild head trauma but no persistent symptoms (n=10); C) subjects with histories of mild head injury and persistent postconcussive symptoms (n=20); and of these D) subjects who underwent repeat examinations every 2 to 4 months (n=15). Whereas no MR abnormalities were found in the normal control group or the asymptomatic group, five patients with persistent concussive symptoms had abnormal MR findings. EEG findings revealed one abnormal subject among normal controls, one in the asymptomatic group, and five in the group with persistent postconcussive symptoms.

MSI was abnormal in one subject (5%) of the normal control group, one (10%) of the asymptomatic group, and 13 (65%) from the group with persistent postconcussive symptoms. Findings in the symptomatic head trauma group demonstrated a direct correlation between symptoms resolution and MSI findings. The authors concluded that MSI indicates brain dysfunction in significantly more patients with postconcussive symptoms than either EEG or MR imaging (p<0.01). MSI can provide objective evidence of brain injury in

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patients with postconcussive syndromes and correlates well with the degree of symptomatic recovery.

Does the Face Protect the Brain? A Case-Control Study of Traumatic Brain Injury and Facial Fractures. HT Keenan, SI Brundage, DC Thompson, et al. *Archives of Surgery* 124(1): 14-17, 1999.

This study investigates the relationship of facial fractures and traumatic brain injury, whether, as conflicting studies have shown, the presence of facial fractures offers protection or increased risk of brain injury. Cases and controls were obtained from subjects seen at seven hospital Emergency Departments (EDs) in the Seattle, Washington area between March 1, 1992 and August 31, 1994. The investigational group included 1602 cases with injuries to the head, face, and/or brain and 1540 control subjects seen in the ED. A total of 81 bicyclists sustained facial fractures, while 203 sustained traumatic brain injuries. Of the cyclists with a traumatic brain injury, 62 had an identifiable intracranial injury and 141 had sustained a concussion. The likelihood of increased injury/protective effect was determined by assessing the odds ratio (OR) for the risk of injury associated with a facial fracture. After adjustment for significant confounders, the OR for intracranial injury associated with facial fracture was 9.9 (95% confidence interval = 5.1-19.3). When including all traumatic brain injuries and concussion, facial fractures were less likely, but still had a significant effect, with an OR of 2.0 (95% confidence interval = 1.1 - 3.7). The authors concluded that the investigation demonstrated no evidence that facial fractures help prevent traumatic brain injury, but rather there is a greater likelihood of having a brain injury when the individual has sustained a facial fracture.

Residential and Home-Based Postacute Rehabilitation of Individuals with Traumatic Brain Injury: A Case Control Study. B Willer, J Button and R Rempel. *Archives of Physical Medicine & Rehabilitation* 80(4):399-406, 1999.

Where can a patient with a severe brain injury receive the most effective rehabilitation after acute hospitalization? Will return to a familiar environment coupled with home-based services or outpatient services bring the greatest benefit when compared to that obtained in a postacute residential rehabilitation program? This controlled study, employing a matched design in a before-and-after trial (using a 1-year follow-up), was designed to answer these critical questions. The treatment group consisted of 23 persons with severe brain injuries admitted consecutively for rehabilitation in the postacute residential program over a 3-year period. A systematic

procedure for matching treatment persons was used to select individuals from a roster of a support group using variables of gender, age, length of coma, time since injury, and level of disability, matching subjects on an individual basis. Instruments for assessment included a modified Health and Activity Limitations Survey (HALS) and the Community Integration Questionnaire (CIQ). The authors concluded that postacute rehabilitation appears to be effective in improving function for individuals with severe brain injury. Greater functional improvement was evidenced by residential-based services, while home-based services were more effective at maintaining community integration.

Pre-Injury Substance Abuse Among Persons with Brain Injury and Persons with Spinal Cord Injury. SA Kolakowsky-Hayner, EV Gourley, JS Kreutzer, et al. *Brain Injury* 13(8): 571-581, 1999.

Although a number of studies have addressed alcohol and drug use prior to traumatic injury, this is the first study to compare populations of persons with brain and spinal cord injuries. This investigation was conducted at an urban, level one trauma center federally designated as model systems of comprehensive rehabilitative services for persons with SCI and patients with TBI. A group of 26 consecutively admitted patients with traumatic spinal cord injury, admitted for interdisciplinary rehabilitation between October 1995 and September 1997 were identified. A comparison group of 26 age, gender, mechanism of injury and ethnicity matched patients with traumatic brain injury were selected from 484 consecutive admissions between 1987 and 1997 that consented to participate. Pre-injury patterns of alcohol and illicit drug use were compared in these 52 patients with SCI or TBI. For both groups, participants were unmarried (81%) males (92%) between 30 and 39 years of age (42%), having been involved in traffic or transport accidents (49%). At the time of injury, most had completed high school (52%) and were employed (86%). The study found that 81% of patients with TBI and 96% of patients with SCI reported pre-injury alcohol use. In addition, 42% of patients with TBI and 57% of persons with SCI were heavy drinkers. The authors discuss implications for risk identification and provision of specialized interventions to improve recovery.

Predicting Recovery After Spinal Cord Injury: A Rehabilitation Imperative. [The Stanley Coulter Lecture]. JF Ditunno. *Arch Phys Med Rehabil* 80(4):361-364, 1999.

In this summary of The Stanley Coulter Lecture, the

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Abstracts, continued from page 2

author shares a review of investigations on predicting recovery, emphasizing an early prognosis of function (within 1 week), based on motor strength and recovery patterns and a clearer understanding of the underlying mechanisms of this recovery, to provide treatment strategies for the future. Three steps are emphasized as important to the prediction of function: 1) performing an accurate neurologic assessment for the spinal cord injured person; 2) prediction of motor recovery on evidence-based data; and 3) correlation of the motor strength of a given neurologic level with functional activities for that level. Our understanding of the correlation of motor recovery with improved feeding and self-care functions has improved. Although our understanding of patterns of recovery has increased, Dr. Ditunno emphasizes that the mechanisms of recovery are much more difficult to appreciate. Lower extremity motor recovery, walking and ambulation are also discussed, based on the patterns of anatomic lesions, lower extremity motor scores and the time course of motor recovery in lower extremities. The author discusses future considerations in treatment and research including neuropharmacological agents, physical training, electrical stimulation, transection of the spinal cord and transplantation. New understanding of when, how, and why the strength of muscles recover, should enable us to develop better interventions to restore self-care and walking function.

Meeting the Training Needs of Community-Based Service Personnel in Africa Through Video-Based Training Courses. S Holloway, L Lee, and R McConkey. *Disability and Rehabilitation* 21(9): 448-454, 1999.

Meeting the needs for innovative training methods in parts of the world where rehabilitation services are not locally available is sure to be the health education need of the next two decades. This report describes training for "community-based" rehabilitation services, that is, training family members and health workers within local communities. The training course involves, first, the training of local tutors to prepare them for community-based training sessions. This training model, in which people learn through seeing and doing, is open to everyone. The emphasis is on information which is practical and relevant. A package of video and workbooks is designed to allow information to be presented by previously trained local tutors.

This model was used in an eight-unit course on work-

ing with children who have cerebral palsy (CP). It was presented by 19 pre-trained tutors in 13 locations in four southern African countries. Video programs were recorded on location in family homes and community locations. More than 150 participants went through the community-based service course within a 6-month period. With most of the actual teaching done by viewing the video or practical activities, the main role of the tutors was to host and facilitate group-work. Available local persons act as course tutors rather than requiring the participation of highly trained medical personnel. The authors reported that few of the participants had previously had any opportunity to learn about children with CP, and hence, the course appeared to be equally effective with participants from a range of backgrounds. Given the millions of children with neurological injuries throughout the developing nations, a model such as this could be used by national and international agencies to create and sustain community-based services to assist local staff and families.


Substance Abuse, Violence and Outcome After Traumatic Spinal Cord Injury. WO McKinley, SA Kolakowsky and JS Kreutzer. *Am J Phys Med Rehabil* 78(4): 306-312, 1999.

Substance abuse is a well known and long accepted mediator of outcome in persons with traumatic brain injury, affecting survival, recovery and rehabilitation, as well as long term outcome. There is, however, little information available on individuals with traumatic SCI, describing incidence at time of injury and post injury, outcomes and mediating effects of substance abuse. Traumatic SCI was defined here as a spinal cord insult and neurologic compromise as a result of violence-related (gunshot wound or assault) or non-violence-related (motor vehicle accident, fall or sports injury) cause. Admission toxicology screens were collected on 87 consecutive rehabilitation medicine patients with a diagnosis of acute traumatic spinal cord injury. Forty-six patients (53%) presented with positive screens, including 44% positive for alcohol only, 30% positive for drugs only and 26% positive for both alcohol and drugs. Overall, persons with violence-related causes of injury were more likely to have positive screens. No significant differences in LOS (days), Functional Assessment Measurement items (admission and discharge FIM subscale, total, change, discharge and efficiency scores). Significant differences were seen in discharge emotional adjustment ($p < 0.05$) and safety judgment ($p < 0.050$) between persons with positive and negative toxicology screens, as

well as between persons with positive and negative intoxication screens. Likewise, discharge emotional adjustment (as well as adjustment to limitations ($p < 0.05$)) differed significantly ($p < 0.05$) between persons with positive and negative illicit drug screens. In summary, when patients are classified by whether there was any alcohol in the bloodstream, no differences in outcome were detected; however, when grouped by intoxication level, there appear to be identifiable differences in outcome. The authors concluded that despite increased costs, admission screening of SCI patients for alcohol and illicit drugs is important for delivering optimal long-term care.

Neuropsychology of Sports Related Head Injury: Dementia Pugilistica to Post Concussion Syndrome. DM Erlanger, KC Kutner, JT Barth, and R Barnes. *The Clinical Neuropsychologist* 13(2): 193-209, 1999.

The problem of sports injuries has become so serious that in many parts of the world, as authors emphasize, for children under 15 years of age, sports accidents are the **leading cause** of medically attended head injury, exceeding motor vehicle crashes more than twofold. In this report the authors give an overview of the neuropsychology literature dealing with Dementia Pugilistica, Concussion, Post Concussion Syndrome, and Second Impact Syndrome. The methods of assessment of severity of concussion to determine fitness for return-to-play are discussed, including the practice parameters by the American Academy of Neurology, the Standardized Assessment of Concussion (SAC), and the Sideline Concussion Checklist (SCC) which utilizes strategies immediately relevant to the player's situation. A return-to-play decision which includes use of one of these formats is recommended. Because sports-related concussions are typically the result of low velocity impact, episodes of confusion and disorientation are more common than the loss of consciousness associated with more severe concussions. Standardized neuropsychological assessment of the immediate effects of concussion may prove useful in identifying symptom patterns and predisposing risk factors. The risk of Second Impact Syndrome (SIS) is discussed, occurring when an athlete who sustains a head injury, returns to play before full resolution of the first symptoms, and receives a second head injury (which may appear to be minor), but shortly thereafter may collapse, go into respiratory arrest, and die. Young players (≤ 21 years) may be at high risk for SIS; thus it is critical that they not be allowed to return to play until they are asymptomatic. Preseason baseline neurological tests are recommended

for active boxers and all other athletes. The authors recommend that neuropsychological test data should become a standard component of return-to-play decision-making in contact sports. 

BOOK REVIEW

Fundamentals of Functional Brain Imaging: A Guide to the Methods and their Applications to Psychology and Behavioral Neuroscience.

Andrew Papanicolaou, PhD.
Swets and Zeitlinger, 1998.
ISBN: 90 265 1528.

This book fills the existing gap in literature on functional neuroimaging. It is a basic and clear book that should be studied by everyone who would like to enter the amazing area of cerebral functioning. The fundamentals and technical aspects of each neuroimaging technique that are usually very complicated to understand, are explained with a simplicity and clarity that makes this the perfect introduction to related material. The author has decided to help non-specialists appreciate the magnitude of these advances and allow the reader to evaluate the affirmations made by the experts on the present and potential impact of neuroimaging.

The book is divided into three important parts. The first is dedicated to basic concepts. The author discusses cerebral activation beginning with an explanation of the relation the images have with reality, how the images of activation should be obtained and on the fidelity of the measurements. The chapter on the relation of the activation patterns with function is also very important.

The second part of the book is dedicated to three of the existing methods for obtaining images of cerebral activation: magnetoencephalography (MEG), functional Magnetic Resonance (fMRI) and Positron Emission Tomography (PET).

The third part of the book is dedicated to establishing correspondence with the activation patterns and behavioral functions. This part is particularly of interest to clinicians in close contact with neurotraumatological patients. It covers sensorial and motor functions, higher functions and other applications in the areas of aging, dementia, psychiatric disorders, neuropharmacology, etc.

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International Spinal Research Trust Clinical Initiative

Various strategies for treating spinal cord injuries in experimental animals have recently been successful in axon regeneration with return of function. These studies point the way towards the first arrivals of treatment in human patients. The International Spinal Research Trust Clinical Initiative (ISRT) wishes to put in place the assessment strategies that will be needed to determine the results of human spinal cord repair treatments.

Treatment of spinal cord injury will almost certainly involve implantation of cells into the lesion site, and to this will be added infusions of growth factors and blockers of inhibitory molecules. Because of the necessity for direct intervention at the lesion site it is essential that the first treatments are delivered to a region of the cord where any collateral damage from the surgery will not have significant adverse effects on the patient. This makes it unlikely that the first treatments could be delivered to patients with cervical cord lesions. ISRT considers that the most favorable group of patients for a safe trial of the first treatments will be those with functionally complete lesions in the lower part of the thoracic cord.

Although axon treatment in spinal cord injuries in animal models has been successful in lesions less than 3 cm, it may be that regeneration in larger instances will be seen in larger animals, but it is necessary to plan on the basis that the first treatments in humans will produce axon regeneration over this distance. This amount of regeneration would produce readily detectable functional changes in the cervical cord, but functional effects will be more difficult to assess in thoracic cord.

ISRT wishes to find studies that will lead to the development of techniques for detecting functional, physiological and structural changes over two or three spinal segments following spinal repairs, and for high resolution imaging of the progress of lesions and the behaviour of implanted cells. Assessment techniques with the necessary resolution are not presently available in routine clinical practice, and their development will therefore require collaboration between technical departments and clinical or basic science departments. These techniques will initially be directed towards thoracic lesions, but it is important that they also be applicable to lesions in other parts of the cord. In order to develop the necessary techniques ISRT wishes to fund longitudinal studies of recently injured patients,

which focus on detailed functional, physiological and structured events in the intermediate vicinity of the lesion.

ISRT invites applications from multidisciplinary teams. Teams should include one or more spinal injury centres in the UK, sensory and motor physiology, autonomic physiology and imaging. Bladder and bowel physiology may also be relevant. The anticipated level of funding is four or possibly five salaries with costs and the duration three years in the first cycle.

The application procedure is in two steps. First, ISRT invites letters of intent with a maximum length of four pages. The letter should detail the logistics of the study, with plans for access to patients and for their treatment and physiotherapy. The assessment techniques that will be studied should be described and their rationale explained. The staff specialists employed on the study, the places where they will work and the plans for their supervision should be detailed. A provisional rough estimate of budget should be attached. ISRT will assess the preliminary applications, and may invite detailed proposals immediately, or may enter into dialogue with applicants to refine the letters of intent before inviting detailed applications.

For application forms, and to discuss details contact Peter Banyard or John Cavanagh at International Research Trust, Tel: 01483 898786; Fax: 01483 898763; Email: research@spinal-research.org. **NIL**

Literature Review, continued from page 5

The book is amply and well illustrated with color images that make it easy to follow the theoretical and practical specifications associated with the techniques of functional neuroimaging. It is a book that takes a highly technical subject and makes it easy for those who want to better understand the technical and theoretical fundamentals to their applications. Therefore it is useful for those who have begun to look into this area as well as those who already know it and wish to clarify all of its aspects. From the point of view of the methodology of these techniques, as well as their applications, this book is excellent and is highly recommended to those who wish to be up to date on the advances in the study of cognition and human behavior.

*Review by José León-Carrión, Prof. Ph.D.
University of Seville, Spain* **NIL**

Interview with Dr. Kreutzer, continued from page 1

ZASLER: As someone who is familiar with that literature, I know that one of the areas that you explored at one time with Dr. Paul Wehman was a parameter to gauge as an outcome measure the ability of the person to return to work. Do you remember that?

KREUTZER: What we used was called the Monthly Employment Ratio, and it basically was a ratio, reflecting the amount of time that a person actually worked, on at least a part-time basis, and the amount of time that a person was out of the hospital and available to work. We developed that measure to try to characterize employment stability over time.

ZASLER: The issue of job maintenance, if you will.

KREUTZER: Right. We've known people who have held as many as 12 jobs in less than two years. On average, they are unable to hold a job for more than two or three months. Many people wouldn't consider holding so many jobs in a short time period an indication of "success." We found that the employment ratio provided a better gauge of employment stability than, for example, the more standard practice of contacting people every 6 or 12 months and simply asking them if they were working.

ZASLER: Can you share with the readers some of the work that you are doing with regards to dissemination of information. I know that you have been publishing both in peer reviewed articles as well as a number of textbooks, but one of the things that I think is most exciting is the use of the Internet as a dissemination tool.

KREUTZER: Well, the exciting thing about our dissemination efforts now relates to our most recent dissemination efforts on the Internet. With telecommunications advances we now have an opportunity to provide free information access to anybody in the World who has access to the Internet. We've been really impressed with the number of inquiries we get at our web site, The National Resource Center for Traumatic Brain Injury. We've received inquiries and "visits" from people in countries as far as Japan, Australia and China.

ZASLER: Regarding acquired brain injury?

KREUTZER: Yes, we've been very pleased with the number of international visitors to our web site. Visi-

tors have come recently from Israel, Norway, Belgium, The Netherlands, Argentina, Ireland, Taiwan, Switzerland and Thailand.

ZASLER: Are you getting responses or inquiries mainly from professionals or also from survivors and family members?

KREUTZER: Most of our inquiries come from people with brain injury and family members, though many professionals visit as well. One of the sections of our web site is called Frequently Asked Questions. Here we have nationally recognized experts address questions posed by family members, people with brain injury and professionals. A broad range of topics is included, for example, balance problems, cognitive disorders, seizures, medications and pediatric injury. When we get a lot of similar questions e-mailed to us on a topic then what we do is contact one of our volunteer experts. We are, in fact, very grateful to you Nathan, having authored several answers that now appear at our web site. In some cases, we have actually had several experts answer the same question. Sometimes their answers are similar, sometimes they're not. Our goal is to make information about the most commonly asked issues available to a worldwide audience. Right now, we actually have more than 100 answers to questions posted on our web site.

ZASLER: Would you share with the readers the web address for your site.

KREUTZER: Our web address is WWW.NEURO.PMR.VCU.EDU. Visitors to the web site will also find reference lists, links to other web sites, and a "column" called *Chat with Pat* that's oriented more toward social and interpersonal problems. Here, an experienced member of our staff answers questions about topics like dating, getting along with others, awkward social situations.

ZASLER: Well, I think it's some valuable research. Hopefully educating people regarding such topics will result in more timely dissemination of new information. I want to again thank you on behalf of our newsletter readers for time you took out of your busy schedule for doing this interview, and we will look forward to more productive research from you over the ensuing years.

KREUTZER: Thanks very much for inviting me.

Jeffrey S. Kreutzer is a Professor with appointments in

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Call For Papers

The International Joint Congress of European Brain Injury Society (EBIS), Euroacademia Multidisciplinaria Neurotraumatologica (EMN) and France Traumatisme Cranien, with the participation of IBIA, WHO and SOFMERR, has announced a Call for Papers for the September Congress to be held in Paris.

Abstracts must:

- Be written in good English or French.
- Be structured (i.e., contain an introduction, goals, methods, results, discussion, and conclusion).
- Contain data and a brief, clear statement of conclusions.
- Single case reports will only be considered if they are based on special methodological advances.

Abstracts should be 200 words or less, excluding the title, authors and references.

Submission:

There are two ways to submit an abstract:

1. Regular mail: Send the original abstract (plus three copies to: Prof. J.L. Truelle, Servie de Neurologie, Hopital FOCH, BP 36, F 92151 SURESNES CEDEX FRANCE.
2. Electronic Mail: Reference EBIS-EMN Congress on TBI, September 2000 PARIS, to b-c-a@worldnet.fr.

Abstracts sent by fax will not be accepted. Selection will be made by the Congress Programme Committee through June 1, 2000. Selected abstracts will be assembled in a book and distributed to Congress participants. Papers will be published on the Internet and in the *Journal of Neurology, Neurosurgery and Psychiatry*. The deadline for submission is April 15, 2000. **NIL**

Interview with Dr. Kreutzer, continued from page 7

the Department of Physical Medicine and Rehabilitation (PM&R) and the Division of Neurological Surgery at Virginia Commonwealth University's Medical College of Virginia Campus in Richmond. Within the Department of PM&R, he serves as Director of *Rehabilitation Psychology and Neuropsychology* and serves as Vice Chairman of the *Research Division*. With an active clinical practice, Dr. Kreutzer coordinates the delivery of psychological and neuropsychological services to both inpatients and outpatients who have a wide variety of neurological disabilities. Board certified in rehabilitation psychology, he has nearly two decades of clinical experience as a specialist in brain injury rehabilitation. Dr. Kreutzer's practice emphasizes holistic rehabilitation, self-advocacy, long-term needs, psychotherapy, helping persons return to work, and family intervention.

NIL

International Conferences and Meetings

March 2000

19-24, 21ST ANNUAL SCIENTIFIC MEETING OF THE AUSTRALIAN PAIN SOCIETY: THE PROGRESS OF PAIN: BEFORE, BETWEEN, & BEYOND, The Hotel Sofitel, Melbourne, Victoria, Australia. Contact: Diana Crebbin, Conference Manager, E-mail: dcon@tmx.com.au; Tel. 61-2-9439-6744.

April 2000

27-30, 2ND ANNUAL CONFERENCE OF THE INTERNATIONAL SOCIETY FOR PSYCHIATRIC-MENTAL HEALTH NURSES, Miami, Florida, USA. Contact: (800) 826-9250.

May 2000

24-27, 4TH EUROPEAN CONFERENCE OF THE FEDERATION OF EUROPEAN PSYCHOPHYSIOLOGY SOCIETIES, Amsterdam, The Netherlands. Contact: Professor Jacob F. Orlebeke, Vrije Universiteit by e-mail: jf.orlebeke@psy.vu.nl; Tel. +31-20-444-8787.

June 2000

13-17, 35th MEETING OF THE CANADIAN CONGRESS OF NEUROLOGICAL SCIENCES, Ottawa, Canada. Contact: CCNS 2000 Secretariat, E-mail: congress@venuewest.com; Tel. (604) 681-5226.

18-22, 10TH MEETING OF THE EUROPEAN NEUROLOGICAL SOCIETY, Jerusalem, Israel. Contact: Administrative Secretariat ENS 2000; E-mail: info@akm.ch; Tel. +44 61 686 77 11.

29-1 July, REHABILITATION AND RHEUMATOLOGY 2000: UNLOCKING THE DOOR OF DISABILITY, Bath, England. Contact: Janet Crompton, The Old White Hart, North Nibley, Dursley, Glos GL11 6DS, UK. Tel. +44(0)1453 549929; Fax. +44(0)1453 548919; Email: janetcrompton@compuserve.com.

August 2000

1 - 6, 11TH WORLD CONGRESS OF THE INTERNATIONAL ASSOCIATION FOR THE SCIENTIFIC STUDY OF INTELLECTUAL DISABILITIES, Seattle, Washington. Contact: N Ross, Villepinte, France at njross@compuserve.com, Tel. (33 1) 4385 1206.

26 - 1 September, 26TH INTERNATIONAL CONGRESS ON OCCUPATIONAL HEALTH, Singapore. Contact ICOH-2000 Secretariat, Dept of COFM, National University of Singapore, +65 8744963 or email: ICOH2000@post1.com

27-1 September, 1ST INTERDISCIPLINARY CONGRESS ON SPINAL SURGERY (WORLD SPINE 1), Berlin, Germany. Contact: Mario Brock, Tel. 49-30-8445 2531; Fax 49-30-8445 3569.

27-31, 1ST INTERNATIONAL BRAIN EXPOSITION AND CONGRESS BRAIN 2000, Congress Centrum Hamburg, Hamburg, Germany, sponsored by the International Academy on Brain and Nervous System Health and the World Health Organization. Contact www.Brain2000.org.

September 2000

3-6, 14TH INTERNATIONAL CONGRESS OF NEUROPATHOLOGY: NEUROPATHOLOGY 2000: International Convention Centre, Birmingham, England. Contact: A Muir on the web: <http://www.neuropathology2000.co.uk>, Tel. +44 (0) 141 201 2113.

13-16, THE YEAR 2000 CONFERENCE ON BRAIN INJURY, Sarah Brasilia Hospital, Brasilia, Brazil, sponsored by the International Brain Injury Association, Pan American Health Organization, Brazilian Brain Injury Association and Sarah Network of Hospitals. Contact: www.sarah.br/brain2000, email: braininjury@bsbsarah.br, Tel. (804) 296-IBIA.

20-23, TRAUMATIC BRAIN INJURY: INTERNATIONAL JOINT CONGRESS OF EBIS, EMN and FRANCE TRAUMATISM CRANIEN WITH PARTICIPATION OF IBIA, WHO and SOFMERR, Paris, France. Contact: Prof. J.L. Truelle, Hopital Foch - BP 36 - F 92151 SURESNES, Cedex, France.