9TH EUROPEAN TEACHING COURSE on NEUROREHABILITATION

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WELCOME ADDRESS

This event is organized by the Foundation of the Society for the Study of Neuroprotection and Neuroplasticity, together with the Romanian Society of Neurology and "Iuliu Hatieganu" University of Medicine and Pharmacy, Cluj-Napoca, Romania, and is endorsed, by the World Federation of Neurorehabilitation (WFNR), European Federation of Neurorehabilitation Societies (EFNRS) and European Academy of Neurology (EAN).

After eight successful past events, the meeting in Poiana Brasov will again present a platform for exchange of newest scientific information as well as providing space for teaching oriented workshops. Each year, we are reaching an audience with an interest in this steadily expanding and exciting field (physicians, nurses, therapists, basic scientists etc.).

A major topic will be to come to a resume where neurorehabilitation in Europe stands today and where future perspectives in science and education as well as in optimizing services shall go. The formats used in the meeting as well as the selected main thematic areas will certainly have a chance to be of interest to a wide audience.

DAFIN F. MUREȘANU

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Neurorehabilitation

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SCIENTIFIC PROGRAM

9TH EUROPEAN TEACHING COURSE on NEUROREHABILITATION

SATURDAY - JULY 6TH, 2019

SESSION 1 | CHAIRPERSONS : Leonard Sheung Wai Li (Hong Kong), David C. Good (USA)

16:00 – 16:30	Barriers in neurorehabilitation Adriana Sarah Nica (Romania)
16:30 – 17:00	Virtual Reality (VR) therapies in motor learning in children and young adults with brain lesions Kristina Müller (Germany)
17:00 – 17:30	Music as connecting link in neurorehabilitation Heinrich Binder (Austria)
17:30 – 18:00	COFFEE BREAK

SESSION 2 | CHAIRPERSONS: Kristina Müller (Germany), Heinrich Binder (Austria)

18:00 – 18:30	Robotic therapy, scientific data and clinical experience Leopold Saltuari (Austria)
18:30 – 19:00	Can we create "enriched environments" for severely affected patients? Volker Hömberg (Germany)
19:00 – 20:30	The art of neurological examination Volker Hömberg (Germany)

SUNDAY - JULY 7TH, 2019

08:50 – 09:00	**WELCOME ADDRESS**

SESSION 3 | CHAIRPERSONS: Nam-Jong Paik (South Korea), Alla Guekht (Russia)

09:00 – 09:30	Diagnosis and management of hemiplegic shoulder pain Leonard Li Sheung Wai (Hong Kong)
09:30 – 10:00	Biomarkers of rehabilitation after stroke Dafin F. Mureșanu (Romania)
10:00 – 10:30	Future of neurorehabilitation: focus on stroke David C. Good (USA)
10:30 – 11:00	Update on pharmacological treatments in neurorehabilitation Volker Hömberg (Germany)
11:00 – 11:30	COFFEE BREAK

SESSION 4 | CHAIRPERSONS: Leopold Saltuari (Austria), Volker Hömberg (Germany)

11:30 – 12:00	tPA fibrinolysis – still actual in modern treatment of acute ischemic stroke? Ovidiu Băjenaru (Romania)
12:00 – 12:30	Neuromodulation for stroke recovery Nam-Jong Paik (South Korea)
12:30 – 13:00	Clinical approach how to avoid the pitfalls of diagnostic of DOC Karin Diserens (Switzerland)
13:00 - 13:30	Post stroke cognitive impairment and dementia - treatment challenges Alla Guekht (Russia)
13:30 – 15:00	LUNCH BREAK

SESSION 5 | CHAIRPERSONS: Ovidiu Băjenaru (Romania), Thomas Platz (Germany)

15:00 – 15:30	Clinical research within the framework of evidence-based medicine - methodological challenges and advances Johannes Vester (Germany)
15:30 – 16:00	rTMS therapy after stroke: target syndromes, evidence review and recommendations Thomas Platz (Germany)
16:00 – 16:30	New advance in gait rehabilitation in Parkinson's disease Giorgio Sandrini (Italy)
16:30 – 17:00	Early rehabilitation of disorders of consciousness: management, neuropsychological evaluation and treatment Caterina Pistarini (Italy)
17:00 – 17:30	COFFEE BREAK

SESSION 6 | CHAIRPERSONS: Caterina Pistarini (Italy), Giorgio Sandrini (Italy)

17:30 – 18:00	Diagnostic and management of post stroke dysphagia Dana Boering (Germany)
18:00 – 18:30	Intrinsic capacity and frailty in neurorehabilitation in older people Gabriel Prada (Romania)
18:30 – 19:00	Leadership in medicine and management Codruța Bîrle (Romania)
19:00 - 19:10	CONCLUDING REMARKS

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ABSTRACTS

tPA FIBRINOLYSIS – STILL ACTUAL IN MODERN TREATMENT OF ACUTE ISCHEMIC STROKE ?

OVIDIU BĂJENARU
ANTOCHI F[2], TERECOASA E[1,2], RIBIGAN A[1,2], TIU C[1,2]
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2. University Emergency Hospital Bucharest – Dept. Neurology, Romania

During the last two decades, reperfusion therapy in acute ischemic stroke has significantly changed the evolution of patients with acute ischemic stroke; the most important limitations of reperfusion by fibrinolytic agents (rtPA) are the short duration of the therapeutic window for these drugs, their relative inefficiency in large arteries proximal occlusions and their potential adverse effects, mainly beyond this narrow therapeutic window. The development of the modern endovascular thrombectomy techniques have shown major advantages and improved clinical benefits in the acute ischemic stroke. Due to clinical reasons and limited accessibility to such endovascular treatments, the present international guidelines for acute ischemic stroke recommend as first line therapy still the tPA fibrinolysis if the patients are inside the therapeutic window, which may be followed by endovascular thrombectomy if there is no significant clinical improvement at the end of the infusion with tPA, due to the longer therapeutic window and higher complexity of the procedure for thrombectomy. The data from the scientific experimental research and clinical observations, including our clinical experience, support the idea that beyond the above mentioned reasons, there are also some delayed clinical benefits beyond immediate fibrinolysis of initial therapy with tPA, based probably on some pharmacologic and biologic properties of tPA and the individual particularities of the microvascular and collateral circulation in the brain of patients with acute ischemic stroke.

MUSIC AS A CONNECTING LINK IN NEUROREHABILITATION

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Music is in principle a sequence of sound events within the human audible range. Why should these abstract auditory patterns of no obvious contemporary biological value be so powerfully embedded in the mental life and neurobiology of our species? (Clark et al.; 2015). It shares mechanisms with speech, motion, stimulates cognitive abilities, reflects emotions and influences not at least also the autonomic system. And all this affects both the musician and the auditor.

Music and language shares many domains. This includes not alone rhythm, tonal organization but also affect syntatctic mechanisms drawing on at least some of the same cognitive ressources (Atherton et al, 2018). Each of them reveals a combination of cognitively general phenomena with phenomena special to music and language (Jackendoff, Lerdahl, 2005). Core structures of working memory are also involved in both tonal and verbal working memory (Schulze et al, 2010). Therefore musical training may lead to enhanced verbal abilities.

The essential connection between music and movement is rhythm as demonstrated through the widespread inclination to spontaneously move to music. Motor areas are found to be active when people listen to musical rhythms facilitated by rhythm perception through rich connectivity between cerebral auditory and motor systems as a 'backdoor' into the motor system, an essential point in motor (re-)learning. (Schaefer, 2014). Crucial point is the so called entrainment. It is defined by a temporal locking process in which one system's motion or signal frequency entrains the frequency of another system. Therefore rhythmic entrainment in rehabilitative setting was already established in the early 1990 by Thaut and colleagues. (Thaut et al. 1999; Thaut et al. 2015; Gordon et al. 2018)

It is well known that intense musical training leads to plastic changes in the developing brain as well as the adult brain (Gaser and Schlaug 2003; Hyde at al. 2009) Playing music implies a strong coupling of perception and action mediated by sensory, motor, and multimodal integrative regions distributed throughout the brain (Schlaug and others 2010, Wan and Schlaug 2010). Learning to play a musical instrument in childhood result in long-lasting changes in brain organization. Repeatedly practicing music strengthen connections between auditory and motor regions (e.g., arcuate fasciculus) as well as multimodal integration regions in consequence of the association of motor actions with specific sound and visual patterns (musical notation), while receiving continuous multisensory feedback. .(Schlaug 2015)

It is out of debate that listening music is tied to emotional participation. Our emotional evaluation of music depend on the dynamic interplay of distributed brain networks, including basal forebrain regions that encode biological drives and rewards, limbic regions that represent and evaluate emotional states, temporo-parietal cortical areas that represent structural harmonic and rhythmic properties of music, mesial temporal structures that support episodic memory and prefrontal areas that mediate psychological expectancy and social cognition processes (Zatorre and Salimpoor, 2013; Mas-Herrero et al., 2014).

Meanwhile music therapy is used throughout the whole field of neurologic rehabilitation. One must distinguish between neurological early rehabilitation with patients with coma and other disorders of consciousness and patients in subsequent states of rehabilitation. For the former music listening may be of therapeutic value as part of enriched environment. The latter require more and more "active" therapies rather playing than listening to music (Rollnik, Altenmüller, 2014).

LEADERSHIP IN MEDICINE AND MANAGEMENT

CODRUȚA BÎRLE
"RoNeuro" Institute for Neurological Research and Diagnostic, Cluj-Napoca, Romania

Leadership, as part of training in management, either in university or in MBA courses, is a relatively young discipline of specific focus while leadership in medicine is hardly ever taught in medical school.

However, the focus on leadership in management has increased especially in the time of a globalized economy as not only different leadership philosophies and their respective strengths and weaknesses are of interest but also specific characteristics expressed in different leadership models in various cultures or regions of the world.

In medicine leadership has traditionally been approached as the natural evolution of the most senior physician or most excellent surgeon also becoming the nominal leader of a medical department. But in modern times of close collaboration between hospital administration (especially the financial and human resource departments) well trained leaders with a medical background need to understand management and leadership concepts well in order to be equal partners to the leaders in hospital administration.

The lecture will introduce different leadership models and highlight also which of these concepts can be found predominantly in different global regions. The lecture will aim for the audience to think about leadership as an essential part of medical training in a world not ruled by medical possibilities but by economical necessities.

DIAGNOSTIC AND MANAGEMENT OF POST STROKE DYSPHAGIA

DANA BOERING
SRH Gesundheitszentrum Bad Wimpfen, Bad Wimpfen, Germany

Dysphagia affects more than 50% of stroke survivors and represents one of the first hurdles on the path of recovery after stroke, leading to a 17% increase of pulmonary infections and a 30% increase of mortality. Prompt evaluation and treatment of swallowing disorders can therefore mitigate the development of further secondary complications and foster social reintegration of stroke patients. The talk will give an overview of swallowing physiology and neural control, of bedside screening tests, of clinical and instrumental assessment methods, a brief insight in the mechanisms of postlesional plasticity in poststroke dysphagia and in the nutritional assessment and support of the patients. It will give a detailed presentation of the different compensatory and rehabilitative techniques pointing out new trends in dysphagia management and possible future developments of this rapidly evolving field.

CLINICAL APPROACH HOW TO AVOID THE PITFALLS OF DIAGNOSTIC OF DOC

KARIN DISERENS
J. JÖHR
Acute Neurorehabilitation Unit, Neurology, Department of and Clinical Neurosciences, University Hospital of Lausanne, Lausanne, Switzerland

Disorders of Consciousness (DOC) result from focal to global brain injuries. They present a crucial challenge to neurologists and neuro-rehabilitation specialists in terms of accuracy of diagnosis, outcome prediction and appropriate treatment-plan development. In particular, it is difficult to properly detect conscious processing in non-communicating individuals and objectively recommend an optimal medical strategy, especially in the early phase. Currently, diagnosing consciousness relies on clinical examination at the bedside Widely used neurobehavioral rating

scales designed to detect behavioural signs of consciousness have been found to generally provide good reliability and validity. However, their interpretation depends on several subjective parameters and they can be critically constrained by patient-specific characteristics such as motor abilities, vigilance fluctuation or aphasia. Over the past decade, supplementary approaches using neuroimaging and electrophysiological techniques have been designed to detect conscious awareness when behavioural examination suggests absent or low-level consciousness, a phenomenon whose proposed name is cognitive-motor dissociation (CMD). Recent studies using these techniques have demonstrated that a significant number of acute and chronic patients misclassified as DOC may indeed present CMD; motor deficits mask the patients' ability to express language or respond purposefully to examiners at the bedside. It is primordial to integrate the differentiation of classification of patients into the therapeutic decision-making pathway. The aim of this teaching course is to give theoretical background about the classification of DOC and their neuro-physiological mechanisms and practical exercises to avoid the pitfalls of clinical evaluation.

FUTURE OF NEUROREHABILITATION: FOCUS ON STROKE

DAVID C. GOOD
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The rehabilitation of neurological conditions is an important addition to acute medical management and critical for improving functional abilities and quality of life. A reasonable definition of rehabilitation is: a process through which each disabled person reaches the maximum physical, functional, and psychosocial recovery possible within the limits of their disability. Rehabilitation is important for many neurological conditions including multiple sclerosis, Parkinson's disease, cerebral palsy, and neuromuscular disorders. However the "classic" conditions requiring neurorehabilitation are stroke, brain injury, and spinal cord injury. Each of these conditions presents special problems that can be addressed by rehabilitation. Stroke is one of the most common conditions encountered by neurologists and will be the focus of this presentation. We will briefly review current rehabilitation strategies and then focus on newer trends and predictions for future developments.

Stroke remains a major public health concern, and has serious ramifications for individuals who have suffered a stroke. Worldwide, stroke is the second most common cause of death and third leading cause of disability. While there has been a revolution in acute treatment of strokes (use of thrombolytic agents and

endovascular clot retrieval procedures), many patients are left with permanent disability. Much recovery of function in strokes is likely spontaneous. A major goal of stroke rehabilitation is to promote improvement beyond what would be expected from spontaneous recovery. The term "brain plasticity" is widely used to describe the intrinsic changes associated with recovery. These can range from molecular and cellular events to changes in network connectivity and behavior. How rehabilitation affects these various intrinsic events is unclear. Basic studies of the mechanisms that mediate recovery require animal models, but the appropriateness of some animal models make translation to the clinic problematic.

An important issue is that there is no general agreement about what constitutes "recovery". Much improvement following stroke rehabilitation is probably due to compensation. Whether rehabilitation truly promotes long-term restoration of neural function remains somewhat controversial. However, the importance of teaching compensatory techniques should not be underestimated, since this can have a major impact on function and quality of life. Rehabilitation can occur in different settings and intensities, but usually includes a multidisciplinary team of professionals, each of whom contributes a specific expertise to the rehabilitation program. Traditionally, it has been felt that rehabilitation should begin as soon as the patient is medically stable. However, the results of the AVERT trial suggest that intense early mobilization of stroke patients does not produce favorable outcomes compared to delaying rehabilitation a bit longer. This is still an area of active investigation. The intensity of rehabilitation and the optimal time period for rehabilitation remain controversial. There is some evidence that intense rehabilitation, no matter how it is delivered, is beneficial; but this may not be applicable to all individual patients. Recently, the concept of "proportional recovery" has gained increasing acceptance. This proposes that the majority of stroke patients reach 70% of the maximum possible improvement, often measured by a specific evaluation scale (for example the of the Fugl-Meyer scale for motor recovery). The majority of patients seem to reach this degree of recovery regardless of the type or intensity of rehabilitation services. This suggests that there may be fundamental biological limits for recovery. Recent studies have shown similar "proportional recovery" in animal models of stroke. Despite the "proportional recovery" rule, some patients do not make predicted recovery on long-term follow-up. Upon further evaluation, these patients have more damage to the corticospinal tract than those who recover. Various ways of evaluating the integrity of the corticospinal tract have been used including motor evoked potentials (MEP's) obtained by TMS and fractional anisotropy using Diffusion Tensor Imaging (DTI). From a clinical perspective, subjects who do not improve have findings at 72 hours which include no finger extension, facial palsy, severe impairment of lower extremity motor function,

and have large infarctions involving the anterior circulation, usually the middle cerebral artery. It has been suggested that patients who have a low potential for recovery should be taught compensation strategies rather than therapy focused on improving impairment. The proportional recovery principle may also apply to other stroke-related impairments, including language and visual spatial deficits.

The most common approaches to improve function, especially motor function, are training programs, especially physical and occupational therapy. However there has been a relative lack of research showing that these approaches are beneficial beyond promoting compensation. Therefore, a number of unique motor training programs have been tested experimentally in multicenter trials. These include the EXCITE trial of constraint induced movement therapy (CIMT), the ICARE trial studying accelerated skill acquisition, and trials of robotic assisted training. Although the EXCITE trial demonstrated modest improvement in motor function and ability to perform functional tests in the community, CIMT is not practical for many patients, and the study failed to provide a control group that had an equal amount of standard training. Other multicenter trials including ICARE and VA robot trial did not show any significant improvement in the experimental patients compared to control patients. The results of these trials have been disappointing, and there currently is a relative lack of enthusiasm for large, expensive multicenter motor training trials.

Rehabilitation is expensive and often labor-intensive. One alternative to traditional therapy-based rehabilitation is robot-assisted therapy. Using a robot, a patient can make about 1000 movements/ hour, about 31 times more than in traditional therapy-based treatment. Robots can be programmed to assist or resist movement. There are commercially available robots for the upper and lower extremities. There have been many published trials of robot-assisted rehabilitation. Results have been mixed. The VA robot trial showed that intensive physical therapy produced similar functional results as robot-assisted training. Several systematic reviews and meta-analyses showed significant but small improvements in motor control. One review showed an improvement in activities of daily living, but another did not. Curiously, one review showed improvement in chronic stroke patients, but not in subacute patients. In summary, robot-assisted therapy shows some promise in rehabilitation, but work remains to be done.

Other novel treatment approaches include virtual reality programs. These generally have involved training in a realistic simulated environment. While there have been modest successes, these have not been overwhelming. Mirror therapy, sensory stimulation paradigms, and motor imagery have also been tried.
There has been an explosion of interest in neurostimulation to enhance recovery post-stroke. The two most common noninvasive modalities to stimulate the

cortex directly are transcranial magnetic stimulation (TMS) and transcranial direct current stimulation (tDCS). The hope is that enhancing the excitability of corticospinal projections might facilitate functional recovery. The results of clinical trials have been mixed. One of the problems is that the location of simulation and the intensity of simulation have not been fully investigated. A variety of stimulation types have been used. A recent meta-analysis of randomized controlled trials of tDCS suggested that cathodal stimulation was the most promising treatment option. Direct brain stimulation is still undergoing investigation. Additional trials of various types of brain stimulation are expected in the future. A new approach is vagal nerve stimulation which showed improvement in motor function in a small number of chronic stroke patients.

The search for a drug that clearly enhances recovery from stroke has been an elusive goal for a number of years. A variety of agents have been proposed including noradrenergic agents, and dopaminergic agents. Generally, these studies have not shown any benefit. The timing of administration with relation to the stroke onset may be critical, and whether or not the drug should be linked with a therapeutic intervention remains to be seen. One of the most successful studies used fluoxetine to enhance motor recovery following ischemic stroke (the FLAME study). Other SSRI drugs have also been studied and may show modest improvement compared to control groups. Neurotrophic factors has been used in a number of countries. This is a mixture of low molecular–weight peptides and free amino acids.

Certainly routine rehabilitation approaches will continue to be important, especially as they relate to promoting adaptation, as well as providing education to patients and their families. Therapists also frequently recommend assistive devices.

Many "cutting-edge" approaches continue to be tested, including brain-machine interface devices. However this approach is not practical for most patients and requires sophisticated technology. Cell-transplantation has generated great interest. There are many potential sources of cells and many potential administration techniques. A recently published study using adult progenitor cells administered IV after stroke showed that these are well-tolerated but there is no significant improvement in neurological outcomes at 90 days. There has been a "boom" of new stem cell clinics in the U.S. in recent years. Most claims are for relief of orthopedic problems and pain, but treatment for Alzheimer's disease and Parkinson's disease has been advertised. The Food and Drug Administration has not approved cell transplantation for neurological diseases. Although cell transplantation is not ready for general use at this stage, research in this area continues. Another possible approach includes enhancing neurogenesis. Neural stem cells and precursor cells reside in the hippocampus and the subventricular

zone of the cerebral hemispheres. In animal models these can be induced to differentiate into neurons under certain circumstances and migrate into ischemic tissue. Whether this will ever be feasible in humans following stroke remains to be seen.

A major area for growth is home-based telerehabilitation. There are many possible approaches, from using cell phones to encourage patients and caregivers to boost practice, to providing video or spoken feedback to patients, to using regular communication to augment or supplant clinic visits. Another use of communication is sensor devices to collect information about walking or extremity movements. Research into the effectiveness of telerehabilitation is still relatively sparse, but early results suggest the importance of simplicity and interpersonal communication.

Stroke rehabilitation is an exciting area with many new approaches constantly being developed and tested. Unfortunately, one concern is that recovery might be "hardwired" and dependent on the integrity of the corticospinal tract, at least in terms of motor function. Similar limitations may be true for other stroke-related deficits including aphasia and visual-spatial dysfunction. Nonetheless, research interest seeking new approaches remains strong.

POST STROKE COGNITIVE IMPAIRMENT AND DEMENTIA - TREATMENT CHALLENGES

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Cognitive dysfunction frequently occurs following stroke and is an important cause of stroke-related morbidity. Post-stroke cognitive impairment (PSCI) contributes substantially to the burden of stroke worldwide. Incidence and prevalence of post-stroke cognitive impairment are being extensively investigated over the last years; however, the results of the studies vary for the difference between the countries, diagnostic criteria, time elapsed from stroke and other methodological issues. Three months after stroke the majority of studies reveal cognitive impairment in 30-60% of stroke survivors, though the range is from 17 to 92%. With changing population demographics, increased life expectancy and improved survival from stroke, the absolute numbers of patients with PSCI will increase.

The growing health, social and economic burden of PSCI is driving the demand for translational research and clinical studies that evaluate the benefits and risks of pharmacological and nonpharmacological therapies.

In terms of risk factors, biomarkers and mechanisms, there is an extensive overlap between vascular and degenerative mechanisms, when the tissue damage produced by vascular factors aggravates the damage produced by neurodegeneration and vice versa. These common pathways include excitotoxicity, neuroinflammation, oxidative stress, apoptosis, proteinopathies and neurotrophic alterations, leading to neurovascular damage and degeneration. A number of the cellular and molecular processes involved in dysfunction of neuro-vascular unit have been extensively studied over the last decade in terms of their role in the mechanisms of post-stroke cognitive decline. Some important lessons could be learnt from disease modification and prevention trials in the neighboring field of Alzheimer disease (AD). Assuming that the β-amyloid (Aβ) pathology is causally related to dementia in AD, anti-amyloid treatments (e.g., γ-secretase inhibitors, monoclonal antibodies) have been considered as disease-modifying agents par excellence, although a close relationship between amyloid and cognition has not been well established. Anti-Aβ immune therapy is still being tried in mild to moderate AD. Aβ is therefore still considered by some to be the right target, but the dementia stage of the disease may be beyond the window of opportunity.

The multifactorial pathogenesis of PSCI and VCI needs to consider drug combinations or multimodal agents to change the course of the disease, as well as the search of selective ligands targeting distinctive cellular or molecular pathways. Beyond pharmacological agents, non-pharmacological approaches might also be included in this scenario. One of the promising strategies of the modifying therapies has been associated with the use of neurotrophic factors. There is an increasing evidence that alterations in the brain neurotrophic support and in particular BDNF and NGF expression and signaling might contribute to neurodegeneration.

The hypothesis was suggested on the principal involvement of stress response mechanisms (including interaction of released glucocorticoids with hippocampal receptors and subsequent inflammatory events) in the remote hippocampal damage underlying delayed dementia and depression induced by focal brain damage (e.g. post-stroke and post-traumatic) . The translational validity of this hypothesis comprising new approaches in preventing post-stroke and post-trauma depression and dementia can be confirmed in experimental and clinical studies.

The best way to prevent PSCI is to prevent stroke recurrence and stroke severity through optimal acute treatment and intensive secondary prevention. Better understanding of the risk factors and estimation of the risk scores for post-stroke cognitive impairment are important for development and assessment of preventive strategies (lifestyle modification, neuroprotective agents, cognitive rehabilitation, other interventions). The notion of disease modification should be explored, with the integration of pharmacological and non-pharmacological multimodal approaches, with pleiotropic effects targeting endothelial and brain–blood barrier dysfunction, neuronal death and axonal loss, cerebral plasticity and compensatory mechanisms; degenerative-related protein misfolding and other interventions.

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UPDATE ON PHARMACOLOGICAL TREATMENTS IN NEUROREHABILITATION

VOLKER HÖMBERG
Heinrich Heine University of Duesseldorf, Germany
SRH Health Center, Bad Wimpfen, Germany

Beside the use of training techniques and other behavioural interventions neurological rehabilitation might be augmented significantly by the use of pharmacological agents:

Beside the necessary pharmacological treatments for risk factors such as hypertension and hyperlipidemia and secondary prevention, drugs can also be used to facilitate brain recovery and reduce the level of impairment.
On the other hand certain drugs have to be avoided because they are known to impair brain repair mechanism.

This lecture will address the following issues:

1. A general pharmacological survey of substances impairing or facilitating brain recovery in animal experimentation

2. It is of critical importance to avoid so called "detrimental" drugs defined from animal experimental as well as from clinical catamnestic studies to interfere with brain plasticity. In contrast amphetamines and antidepressants may facilitate the effect of rehabilitative techniques.

3. The impact of the use of antidepressant drugs for brain recovery (SSRIs) in not depressed patient after stroke is exemplified by data from FLAME, TALOS and FOCUS and other not yet published trials in the pipeline.

4. A survey of the current status of drugs to influence states of diminished consciousness wiil be given.

5. The progress in use of multimodal action drugs in reducing impairment in the immediate postacute phase in stroke in combination with neuromotor training is demonstrated in the light of recent trials (Cars 1 and Cars 2) and their metaanalyses and the most recent results from CAPTAIN 1 and CAPTAIN 2 (RO) multimodal trials in TBI .

Suggested reading:

Volker Hömberg
Pharmacological aspects of neurorehabilitation
DOI http://dx.doi.org/10.1055/s-0043-116338 Neurology International Open 2017; 1: E247–E255 © Georg Thieme Verlag KG Stuttgart · New York ISSN 2511-1795

CAN WE CREATE "ENRICHED ENVIRONMENTS" FOR SEVERELY AFFECTED PATIENTS?

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We have been very enthusiastic in successfully adopting elementary rules derived from basic work on motor learning into motor rehab by optimizing trajectories in patients who have maintained the ability to move at all (at least a little bit) , but we don´t really know if such "task-specific" motor learning is effective in people who cannot move at all.

Are we really able to influence impairment?

First published in 2008 (Prabhakaran et al 2008) described an interesting phenomenon: The spontaneous impairment recovery after stroke at day 90 after the ictus (with or without treatment) for upper extremity was usually 70% oft he maximum possible difference between initial score and the maximum possible. There were outliers from this rule attributable to severe pathology in the primary descending motor tracts especially the corticospinal tract. In the meantime this "proportional recovery" rule was also demonstratesd to apply for impairments in non-motor domains as neglect and language abilities (Lazar et al 2010, Marchi et al 2017). If this 70% proportional spontaneous recovery is a universal rule and cannot be influenced , this of course would mean that impairment oriented rehab is not possible. The challenge is to change the slope (i.e.from 70% to 80%or more) or to make outliers inliers.

In animal experimentation so called „enriched environments" have been proven to facilitate brain repair. There has however been no translation from this experimental animal world to the clinical bedside.

So far only three major strategies have been shown to help decrease impairment in the subacute stage e.g. after stroke:

1. The forced use or constraint induced movement therapy approach has been proven to be effectve in the multicenter prospective EXCITE trial (Wolf et al 2008). The applicability is however restricted to patints with at least some preserved residual motor abilities. i.e. it is not usable in severely affected patients.

2. The use of pharmacological agents: antidepressants were shown to be effective in the FLAME trial with fluoxetine (Chollet et al 2011). This could however not be corroborated in subsequent trials with larger sample size using SSRIs as citalopram (TALOS trial) and fluoxetine again (FOCUS trial). Recently the CARS trial (Muresanu et al 2016) documented for the first time after decades of frustrane attempts to achieve some sort of neuroprotective and/or neurorestorative effects that a mutimodal drug can improve impairment after stroke . This was further corroborated in a consecutive trial (Guekht et al 2017) and further corroborated by a metaanalysis of stroke related trials with cerebrolysin (Bornstein et al 2018).The CAPTAIN trial looking at neurotrophic factors effects in TBI in a multidimensional approach also shows effectiveness of neurotrophic factors (not yet published).

3. Possible additional candidates for a true „impairment" oriented treatment approach are neuromodulatory techniques such as peripheral neuromuscular and/or sensory stimulation (eg. whole hand subliminal „mesh-glove" stimulation) and more and more also non invasive brain stimulation techniques such as repetitive transcranial magnetic stimulation and transcranial DC stimulation. Also the use of non fatiguable robotic devices to enable a high intensity massed movement treatment appear promising.

As treatment intensity is likely to be the key element for impairment reduction we have to find clever and affordable ways: to increase the daily treatment time of our patients. Today even during inpatient rehabilitation treatment times hardly exceed three hours a day i.e. that we use only a small percentage of waking hours leaving long "idling" time not field by any treatment.
In the lecture, possible ways to increase treatment intensity and to create sort of a true „enriched environment" for severely impaired patients (e.g. integration of nursing and therapy, combination with neuromodulatory techniques (robot use, peripheral and central stimulation, pharmaceuticals) will be discussed.

This should enable 6-8 hours of daytime treatment to avoid leaving our patients „inactive and alone" in future.

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THE ART OF NEUROLOGICAL EXAMINATION

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In this course the art of a rational neurological examination will be taught:
More than in any other clinical discipline the history and examination in neurology are the most informative source of information for the clinician. This is of course due to the fact that structure and function of central and peripheral nervous system are clear and informative.

Clinical skills for optimal examination of cranial nerves, motor and sensory functions and screening approaches for cognitive and linguistic analysis will be presented. So the students will soon learn that neurologic examination is much more than just looking at "reflexes".

Special emphasis will be on fields notoriously estimated as being difficult (such as eye movements, nystagmus ,diplopia etc.) which will be elucidated in an "easy to understand and remember" mode.

DIAGNOSIS AND MANAGEMENT OF HEMIPLEGIC SHOULDER PAIN

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Hemiplegic shoulder pain is not uncommon after stroke and has been reported in some literatures with incidence of up to 60% or so. The causes could be varied from local rotator cuff pathology to poststroke spasticity. Proper evaluation through clinical history, physical examination and radiological or ultrasonographic evaluation would be useful to identify the cause. Unusual cause such as heterotopic calcification requires high index of suspicion when there is pain, swelling, reduced passive range of movement of shoulder join with raised alkaline phosphatase. Once the underlying cause is identified, appropriate treatment could be delivered. Ultrasonography has enhanced the efficiency of diagnosis and management of musculoskeletal causes of hemiplegic shoulder pain by identifying tendonitis, bursitis or impingement syndrome with appropriate guided injection if needed. If spasticity is the cause, botulinum toxin injection could be useful to reduce pain and

enhance range of movement. However, for difficult muscle to be injected such as subscapularis, ultrasound together with EMG/nerve stimulation guided injection could optimize the results. Lastly, there could still be cases that underlying causes could not be identified after proper evaluation and pain persists despite medications and physical therapies. Ultrasound-guided suprascapular nerve block could be effective to reduce the hemiplegic shoulder pain.

VIRTUAL REALITY (VR) THERAPIES IN MOTOR LEARNING IN CHILDREN AND YOUNG ADULTS WITH BRAIN LESIONS

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The rationales for sensory-motor therapies in children with neurological diseases are most often based on neurobiological principles of motor learning.

Such strategies may lead to a longer lasting change in the quality of motor trajectories and improvement on the activity level. Following our current understanding of reorganisation of the CNS ,trajectory improvement is critically dependant on the amount of delivered therapy and high repetition rates.To achieve this patients need to be constantly motivated and the best way of doing this ist to make therapy gamel-ike and allow for as much fun as possible.

Due to the advancements in IT during the last years Virtual Reality (VR) applications have become available and affordable for clinical applications. The idea behind this is that VR applications are more appealing and motivating than conventional therapies . In addition in VR game and fun aspects can be more easily integrated than in „ real reality". Furthermore even challenging and thrilling scenarios ,too hazardous to be used in „ real life", can be applied. Using IT tools progress can be monitored more easily and feed back critically important for successful learning can be delivered in an elegant, game embedded way.

In the lecture the current state of evidence about the effects of VR therapy in patients with brain lesions is reviewed . It appears that VR is not only a toy to play with but offers useful add ons to conventional therapies.

BIOMARKERS OF STROKE RECOVERY

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'Iuliu Hatieganu' University of Medicine and Pharmacy, Cluj-Napoca, Romania

Stroke is a major global health problem and a leading cause of long-term adult disability worldwide.

Only a small proportion of stroke survivors (approximately 14%) achieve full recovery of activities of daily living, while 25–50% require some assistance, and approximately half experience long-term dependency.

A stroke recovery biomarker can be defined as an indicator of disease state that can be used as a measure of underlying molecular/cellular processes (that may be difficult to measure directly in humans) and structural and functional connectivity. These could be used to understand outcome, or predict recovery or treatment response.

In practical terms, biomarkers should improve our ability to predict long-term outcomes after stroke across multiple domains. This is beneficial for: patients, caregivers and clinicians; planning subsequent clinical pathways and goal setting; identifying whom and when to target, and in some instances at which dose, with interventions for promoting stroke recovery.

This presentation briefly reviews the current and future considerations on this therapeutic strategy.

BARRIERS IN NEUROREHABILITATION

ADRIANA SARAH NICA
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Whether is the situation of a patient with peripheral or central neurological suffering, in the subacute or chronic phase, associated with the clinical and functional examination, we try to identify the subjective and objective barriers in Neurorehabilitation (NR) both in the correct and complete diagnosis and in the realistic and adapted therapeutic decision for the patient. Starting from the clinical-functional evaluation and the analysis of the psycho-behavioral context, we have

to continuously analyze the complementary but specific aspects of the patients. The analysis of this information complements or helps solving NR cases, especially when the patient and his / her family have a partial or incorrect image of the patient's biological, clinical, somatic and psycho-behavioral illness and availability, and looks forward to the rapid resolution of the case. While respecting the ethical aspects of patient dialogue, we need to look at the particularities and potential barriers in NR that can be influenced by:

- epidemiological characteristics: age, sex, profession;
- social status, role and determination of the family in the NR program;
- psycho-behavioral status, habits, exercise of communication.

For the implementation of NR programs, specific equipment, facilities and facilitation devices are provided that are adapted to the specific clinical and functional situations specific to the hemiplegic post-stroke patient, para or tetraplegic, MS, or other clinical conditions. This specific context is wanted managed by a recovery team in which each partner, from physician recovery, physiotherapist, nurse and caregiver, to psychologist-speech therapist, occupational therapy specialist. All of these data must be monitored and introduced into a core, corrective and improvement program for the prevention and rehabilitation of the neurological patient.

NEUROMODULATION FOR STROKE RECOVERY

NAM-JONG PAIK
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Neuroplasiticy plays a major role during the recovery process of motor impairment, aphasia, dysphagia and other symptoms after stroke. Non-invasive brain stimulation, such as repetitive transcranial magnetic stimulation (rTMS) and transcranial direct current stimulation (tDCS), has gained growing importance in the field of stroke rehabilitation, and provides a mean to modulate brain cortical activity in a specific brain region and induces plasticity or long-lasting facilitative effect of the network that has been stimulated. Using their after-effects, we can potentially facilitate motor, cognitive and language recovery after stroke.

According to available literatures on the effect of non-invasive brain stimulation for stroke recovery, this modality demonstrated conflicting results, but still has a potential to be used as an adjuvant therapy for stroke rehabilitation when

appropriately combined with behavioral therapy. However, further establishment of stimulation protocols maximizing the beneficial effect of interventions in terms of optimal target population, delivery timing, and stimulation parameters should further be pursued. Up to now, brain stimulation for stroke rehabilitation is off label, and needs a large-scale phase III clinical trials, with eventually proof of effectiveness in a meta-analysis study.

EARLY REHABILITATION OF DISORDERS OF CONSCIOUSNESS: MANAGEMENT, NEUROPSYCHOLOGICAL EVALUATION AND TREATMENT

CATERINA PISTARINI
Director of Scientific Institute of Rehabilitation ICS Maugeri, Genova, Italy

In recent years, improvements in emergency services, neurosurgery,and intensive care medicine have led to survival of patients with very severe brain injuries and disorders of consciousness (DOCs) of varying severity and progression. Nevertheless most of these patients exhibit a multitude of medical problems and long-term complications. The severity of interconnected medical problems of the early phase after severe brain injury often requires long-term hospitalization,in acute setting . These medical problems may prevent the course of recovery and the neurorehabilitative treatment and potentially may lead to a poorer clinical outcome. However ,in the last decade many studies demonstrated that most patients with severe head injuries show an improvement in consciousness with time.

In order to ensure the best possible outcome for these patients , optimal early rehabilitation management is fundamental. Recent studies demonstrated that starting as soon as possible with rehabilitation treatment allows better outcome. Rehabilitation specialists began applying a systematic approach to the rehabilitation of patients with DOC planned on a comprehensive roadmap including a correct diagnosis, accurate assessment of the patient's state of alertness and the main comorbidities, appropriate neurophysiological and neuroradiology examinations, and education of the caregiver and family so that they can provide the best assistance.

Still today many problems remain unsolved: the rate of misdiagnosis is still high, and recommendations about the most appropriate rehabilitation are lacking, both as regards the timing of interventions and what the best techniques to use. In a medical setting where nosography has changed over the last decade and where

the documented evidence, though increasing, still remains insufficient, we discuss the main assessment tools and disability scales to use and the key issues that need to be considered when a patient with DOC is admitted to the rehabilitation unit and decisions about the early rehabilitation plan are made.

rTMS THERAPY AFTER STROKE: TARGET SYNDROMES, EVIDENCE REVIEW AND RECOMMENDATIONS

THOMAS PLATZ

Germany BDH-Klinik Greifswald, Centre for Neurorehabilitation, Intensive and Ventilation Care, Spinal Cord Injury Unit, University of Greifswald, Greifswald, Germany

Objective:
Therapeutic repetitive transcranial stimulation (rTMS) can focally and thus specifically alter brain network excitability in stroke survivors and thereby induce or facilitate functional changes and recovery. Accumulating evidence from clinical trials lead to more precise estimates of any therapeutic benefit (or harm) by meta-analyses.

Methods:
The lecture is based on a systematic review and evidence-to-decision process (status February 2019: work in progress) that searched for systematic reviews (SR) with meta-analyses addressing the therapeutic effects of rTMS applications for stroke sequealae such as dysphagia, upper limb motor function, walking and balance, spasticity, central post stroke pain, dysarthria, neglect, aphasia, cognition and depression. Effect sizes achieved by rTMS interventions in these target domains as documented by recent meta-analyses are presented together with a critical appraisal of the trials' and reviews' methodological quality. The relevance of the findings for clinical practice is discussed.

Results and (preliminary) conclusions:
Across SRs acceptability rates for rTMS therapy had been high when reported, together with only few mild adverse events; thus the risk of harm by rTMS therapy in stroke survivors seems low when international safety standards are complied with. The strongest evidence is available for the treatment of arm paresis with consistent both short- and long-term effects both after contralesional (cl) low frequency (LF) rTMS or ipsilesional (il) high frequency (HF) rTMS; accordingly, it can be recommended for its clinical use.
The broadest evidence base for rTMS has been reported in post stroke depression (PSD) (dorsolateral prefrontal cortex rTMS: HF left, or LF right or bilateral) with

positive immediate and uncertain long-term effects after series of treatment over a couple of weeks. Due to substantial unexplained heterogeneity across trials it is considered an option to treat PSD on an individual basis while the evidence does not favour a formal recommendation for its broader use in routine clinical practice. A clinically relevant positive benefit-risk ratio of rTMS has also been shown for dysphagia, walking speed, aphasia, and neglect. With the evidence and/or methodological quality still being limited they qualify as therapeutic options only. Currently the least evidence is available for dysathria, arm spasticity, post stroke pain, and cognitive impairment; routine use of rTMS for these conditions is currently discouraged.

INTRINSIC CAPACITY AND FRAILTY IN NEUROREHABILITATION IN OLDER PEOPLE

GABRIEL PRADA

National Institute of Gerontology and Geriatrics "Ana Aslan", Bucharest, Romania
University of Medicine and Pharmacy "Carol Davila", Bucharest, Romania

Older people with frailty syndrome are those with increased vulnerability to risk factors when compared to their counterparts in the same age group. American Medical Association estimates that 40% of people beyond the age of 80 years demonstrate this syndrome with various degrees of severity. Older people with stroke have a decreased functional capacity, an important feature of frailty. Moreover, pre-stroke function plays an important role in this category of patients, especially the presence of multiple comorbidities and long-term conditions, including complex coexisting medical, functional, psychological and social aspects, all contributing to increased pre-stroke vulnerability. They complicate the acute event and raise specific difficulties during neurorehabilitation. Functional outcome following a neurorehabilitation program in old age is interplay amongst chronological age, frailty syndrome, comorbidities and stroke. There is a debate whether chronological age, that seems to have highest impact on neurorehabilitation outcome, is actually a surrogate marker for the presence of comorbidities, less aggressive rehabilitation, lower expectations and earlier discharge due to lower goals for advanced age patients. Intrinsic capacity in older people establishes the link between frailty syndrome and resilience, the latter meaning the capacity to recover functional competence. Intrinsic capacity in old age is defined as the composite of all the physical and mental (including psychosocial) capacities that an individual can draw on at any point in time. This intrinsic capacity can offer an image regarding future outcome of neurorehabilitation in older patients especially if the information is corroborated with the degree of frailty present in a particular subject.

ROBOTIC THERAPY, SCIENTIFIC DATA AND CLINICAL EXPERIENCE

LEOPOLD SALTUARI
Neurological Department Hochzirl, Austria

The neurophysiological background of Robotics in Neurorehabilitation is the evidence that intensive training (frequency and duration) and task-specific training improves significantly the neurological outcome. There are several Robotic devices on the market, more or less complex, for upper and lower limbs, with different approaches (Exosceleton, Endeffector System). Although several critical reports the robotic training seems at least equal to intensive conventional rehabilitative therapy.

In our Rehabilitation Department we started to use Robotic gait training since 2002 and we developed different devices to improve muscle tone and motor control of upper limbs and the trunk. The clinical experience and the data will be discussed.

NEW ADVANCE IN GAIT REHABILITATION IN PARKINSON DISEASE

GIORGIO SANDRINI
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Gait disorders represent disabling symptoms in Parkinson's Disease (PD).
Recently, innovative approach to the rehabilitation of this disorder were proposed, in particular using new technologies. The effectiveness of rehabilitation treatment with Body Weight Support Treadmill Training (BWSTT) has been demonstrated in patients with stroke and spinal cord injuries, but limited data is available in PD.

BWSTT and traditional rehabilitation treatment are both effective in improving clinical motor functions and kinematic gait parameters. BWSTT may represent an option in PD patients with specific symptoms that limit traditional overground gait training, e.g. severe postural instability, balance disorder, orthostatic hypotension. BWSTT is generally well tolerated, though caution is needed in subjects with chronic pain or with anxious symptoms.

The role of perturbation during treadmill training in improving gait in PD is yet argument of debate. Recently, it was suggested that balance training (standing on a moving platform and traditional balance exercise) can significantly improve gait in PD patients.
Also action observation in postural control and gait can produce positive effects.
It is well known that freezing of gait represent a relevant problem in late phase of disease and different strategies to antagonize this disorder were proposed.

Recently, a cognitive approach to the problem was demonstrated to induce an improvement in freezing of gait. Also the use of cues (acoustic, visual, in particular) can improve gait in PD patients.

Finally, dance and musicoterapy can be useful in particular in the early phase of the disease.

CLINICAL RESEARCH WITHIN THE FRAMEWORK OF EVIDENCE-BASED MEDICINE - METHODOLOGICAL CHALLENGES AND ADVANCES

JOHANNES VESTER
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Evidence-based practice knocks on the door of clinical research in neurorehabilitation. The clinical trial is the mechanism for comparing and testing therapeutic interventions to determine their effect in human subjects and thus their value in rehabilitation practice (Terrin, 2003, Behrman 2013). But how are the chances to improve therapeutic concepts within the demanding framework of evidenced-based medicine (EBM)?

Up to now, neurorehabilitation plays a rather orphan role within the framework of EBM. There is need to introduce EBM principles to neurorehab and to open neurorehab to EBM. Recent reports from interdisciplinary working groups consisting mostly from neurologists, neurosurgeons, neuropsychologists, and biostatisticians, state that to create improvements in neurorehabilitation clinical research, important methodological lessons from the past must be taken into account. Is neurorehab clinical research stifled by backward oriented designs? An evaluation of neuroprotection intervention studies conducted in the last 30 years has determined that methodological design flaws are among the major reasons why pharmacological agents fail to demonstrate efficacy.

Many inconclusive studies used, e.g., a single outcome measure approach based on dichotomization of full scales, such as the modified Rankin scale (mRS) or the Glascow outcome scale. As highlighted by leading researchers and methodologists, dichotomization of a full scale is burdened with loss of power and arbitrary choice of cutoffs, allowing only limited statements on treatment effects. The result of the ECASS II stroke trial provides an excellent example for the associated risk of bias: while dichotomization using mRS 0-1 resulted in P = 0.277, dichotomization using mRS 0-2 resulted in P = 0.024, i.e. in two opposite conclusions on evidence.

Appropriate full scale analyses, multidimensional approaches, meta-analytic pooling across baseline severity strata represent promising pathways to improve assay sensitivity within the framework of evidence-based medicine.

In this lecture, the basic concept of evidence-based medicine, most common traps, classic and modern approaches to study design are discussed with examples from different fields of neurorehabiliation.

CURRICULUM VITAE

OVIDIU BĂJENARU
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- Graduate of the Faculty of Medicine – University of Medicine and Pharmacy (UMF) „Carol
- Davila" Bucharest (1983)
- Specialist in Neurology (1989), Senior Neurologist (1994); competence in MRI
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- PhD (1993) - UMF „Carol Davila" Bucharest
- 2006: Doctor Honoris Causa –University „Ovidius" – Constanta
- Postdoctoral specialization at the University „René Descartes" (Paris) during 1993-
- 1994, in clinical Neurology (CHU „Saint-Anne" and „Kremlin-Bicetre") and research
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- 2001-2013: President of the Romanian Society of Neurology
- Since 2013: Honorary President ad vitam of the Romanian Society of Neurology
- Since 2001: Coordinator and Chairman of all annual National Congresses of the
- Romanian Society of Neurology and many other scientific events and teaching courses organized for neurologists in Romania
- Visiting Professor in Vietnam (2013) and Kazakhstan (2015), on behalf of WFN
- Member of the Executive Committee of ENS (European Society of Neurology)

between 2005-2009, of the Scientific Committee of ECTRIMS (2004-2009)

- Member of European Academy of Neurology (since 2014), American Academy of Neurology, International Parkinson's Disease and Movement Disorders Society,
- European Stroke Organisation, Danube Neurological Association (member of the Scientific Board and Deputy Secretary General), and others
- Since 2008: official representative of Romania for UEMS - European Board of Neurology (secretary of the Executive Committee between 2010-2015) and member of the examination board for the title of European Neurologist
- Author of more than 1000 scientific papers reported and published in scientific journals, among 147 cited in ISI Web of Science (Hirsch index 22) and Pubmed. Author of chapters in 2 international books of neurology and author and co-author in more than 15 medical books published in Romania.
- Coordinator of the National Diagnostic and Treatment Guidelines in Neurological Disorders
- National Principal Investigator and Investigator in more than 50 international, multicentric, controlled clinical trials in: stroke, Parkinson's disease and movement disorders, multiple sclerosis, dementia, epilepsy, and others.
- Director of more national research grants
- 9 awards of excellency in medicine from different socio-professional national and international organizations, the Romanian Ministery of Health and the Romanian Orthodox Patriarchate
- Initiator and coordinator of the National Medical Programs of the Ministery of Health and National Health Insurance System for the treatment of: acute stroke, multiple sclerosis, rare neurological diseases, advanced Parkinson's disease (1999 – 2015)
- President of Consultative Commision of Neurology of the Ministery of Health and National Health Insurance System (2008 – 2015)

HEINRICH BINDER
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Professor Binder was born in 1947. 1972 He completed his medical training at the Vienna medical university. After that he started his residency training at the Vienna neurological clinic guided by Franz Gerstenbrand. He received a comprehensive training including also pediatric neurology. But from the beginning, the training focus was on intensive care medicine and and rehabilitation of the most serious brain damaged patients.

1978 he completed his residency training. After that he was employed as senior physician at the Vienna Neurological clinic. Research priorities have been neurological intensive care and early rehabilitation. Therefore he was charged with ongoing services of all intensive care units of the Vienna medical university. By the way from 1975 he was also involved on constitution of the computertomographic unit there. Additionally as consultant he was in charge for 5 Viennese pediatric hospitals and one orthopedic hospital till the early 90s.

1982 because of several years of research at a high level 1982 venia decondi as a process called habilitation comparable an associate professor in North America was confered. The heading of his habilitation dissertation was "Coma hepaticum". 1988 he was invested with the university professorship. The heading of his habilitation dissertation was "Coma hepaticum". 1984 as senior staff member he established the first neurological ICU at the Viennese neurological clinic.

Unrewarding organization and general lack of knowledge about the need for neurological rehabilitation led to the founding of the ÖGNR together with Franz Gerstenbrand 1985. Afterwards until 2008 he was secretary general and from 2008 to 2015 he was president and up to now he is board member of the society in charge of education. During this time he represented the OEGNR in the WFNR and took over the chairmanship of the SIG for spinal cord which he has rescinded in the meantime and the SIG for early rehabilitation. 2010 he organized the 6th WCNR in Vienna with over 1600 professional attendants from 71 countries. 1989 as chief physician he took over the management of the Neurologic Hospital "Maria Theresien Schlössel" in Vienna - a Rothschild foundation. From then on the former general neurologic/psychiatric hospital developed into a rehabilitation clinic with main focus on rehabilitation of long lasting severe disorders of consciousness. 2002 under his leadership the Hospital was expanded and affiliated as neurological center in the huge Otto Wagner Hospital. 2016 he has retired.

In the early nineties of last century a hard case of high spinal cord injury special case of high

traumatic cross-section was the reason for additional intensive engagement in rehabilitation of spinal cord injuries. And this why it came to contact and further cooperation with Milan Dimitrijevic. from Baylor College of Medicine in Houston. At that time Dimitrijevic was not only a specialist in spinal cord injury but also a pioneer of restorative neurology. 1994 together with Franz Gerstenbrand they founded in threes the Ludwig Boltzmann Institute for restorative Neurology and Neuromodulation which Binder chaired until 2007. During this time, an increasingly intensive cooperation among the Institute as well as the neurological center and the Center for Medical Physics and Biomedical Engineering (Prof. Drexler) and the Institute of Analysis and Scientific Computing (Prof Rattay) of the Technical University Vienna developed till this day. This was the reason why spinal cord was the research focus at last.

2006 during the WCNR in Hongkong for the first time under debate with Mike Barnes president of WFNR, the idea of an international specialized training in neurorehabilitation emerged. This topic was taken up by the then WFNR general secretary Volker Hömberg. With his support after intensive deliberation, the EFNR was founded by Binder and Gerstenbrand in 2009. Binder took over the presidency from 2009 till 2014 and organized the 3rd ECNR 2015. During this time the main task was the development and implementation of a European curriculum in Neurorehabilitation. In Austria the training according to the curriculum was introduced during his presidency. Also in Romania it was immediately implemented by Prof. Dafin Muresanu in annual teaching courses which Binder regularly participates in lecturing. Binder is member of the management board of WFNR, EFNR, OEGNR, the managing board of the International Danube Symposium. He is also chairman of the SIG "early rehabilitation" of WFNR. He lectures regularly at WCNR, EFNR and congresses or workshops with topics from his special field of research. He has published more than 140 articles about neurological intensive care and neurorehabilitation in brain and spinal cord injury. Below of them are 30 chapters in textbooks and handbooks.

CODRUȚA BÎRLE
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Dr. Codruța Bîrle works as a senior neurologist at "RONEURO" Institute for Neurological Research and Diagnostic and as an associated assistant at the Department of Neurology of the University of Medicine and Pharmacy "Iuliu Hațieganu" Cluj-Napoca. She started her residency in neurology in 2005 at the Emergency County Hospital ,Cluj-Napoca, until 2010 when she received her degree as a neurologist. In 2018 she became a senior neurologist. She is also a PhD student at the University of Medicine and Pharmacy "Iuliu Hațieganu" Cluj-Napoca, studying the role of neurotrophic factors in acute traumatic brain injuries. Dr. Bîrle is a member of the European Stroke Organization and attended the European Master in Stroke Medicine in Krems, Austria.She is a certified neurosonologist and her main interests are cerebrovascular diseases and traumatic brain injuries. She was an investigator in several clinical studies, including phase II studies, related to stroke, multiple sclerosis and traumatic brain injury.

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St. Mauritius Therapieklinik Meerbusch 2002-2016
SRH Gesundheitszentrum Bad Wimpfen since 2016

PROFESSIONAL APPOINTMENTS, SCIENTIFICAL ACTIVITIES:
1994-2002 Collaboration with the University of Essen in the field of plasticity after stroke, with an emphasis on the role of the cerebellum in motoric learning tasks
Since 2002 Collaboration with the University of Düsseldorf in the field of plasticity after stroke
Since 2009 Collaboration with the Coma Science Group Liege BelgiumMember of the DOC special interest group of the IBIA

KARIN DISERENS
SWITZERLAND

Specialist in neurology, physical medicine and rehabilitation. Co-creator of the Swiss Society of Neurology, head of the post-acute neurorehabiliation clinics44 (1996-2005), before leading a mobile team of neurorehabilitation in the University Hospital (2006-2009) and becoming head of the Transversal Acute Neurorehabilitation Unit of the division of Neurology, Department of Clinical Neurosciences, University Hospital in Lausanne. After contributing to quality criteria of acute and post-acute neurorehabilitaiton in Switzerland, my current research goals concern the evaluation of diagnosis of disorders of consciousness and the effect of neurosensorial stimulation and hyper-acute mobilization using robotic mobilization via a brain-computer interface in the acute phase. As a Private Docent created the teaching program in this domain for the pre-graduate and post-graduate training of medical students and interdisciplinary professionals. Cognitive approaches to creation and emotion is a central focus of my research for development of treatment techniques and motivation of the acute neurorehabilitation teams. -

EDUCATION

2014-present	CHUV, Lausanne: Médecin adjoint, Department of Clinical Neurosciences (Prof.cR.Frackowiak,2016 Prof Ph Ryvlin) /Neurology (2016 Prof R du Pasquier)
2009 – 2014:	CHUV, Lausanne : Médecin associé, Department of Clinical Neurosciencesc(Prof. Frackowiak)

2006 – 2008:	CHUV, Lausanne : Médecin associé, Maître de Recherche et Enseignement,cMER I, Neurology (Prof. Bogousslavsky, Prof. a.i.) Neuropsychology andcNeurorehabilitation (Prof. Clarke)
2002 – 2005:	«Centre Neurologique Plein Soleil », Lausanne: Médecin chef
2002 – 2005:	CHUV, Médecin associé, Neurology, "FNR" (Filière de Neuroréhabilition) (Prof.cBogousslavsky, Prof. Clarke, Prof. So)
2001 – 2002:	ResHO, Centre de Neuroréhabilitation, Orbe : Médecin-chef adjoint
2001 – 2002:	CHUV, Lausanne (Médecin associé) and HUG, Geneva (Medecin adjoint)
:	Project Manager forthe creation of a neuro re-eduction itinerary in hospitals (CHUV) and for out-patients (Geneva)
1996 – 2000:	Clinique Valmont, Glion s/Montreux : Médecin chef and medical director
1995 – 1996:	HUG, Geneva, Neurology Department (Prof. Landis) : chef de clinique adjoint

PROFESSIONAL AND ACADEMIC EXPERIENCE

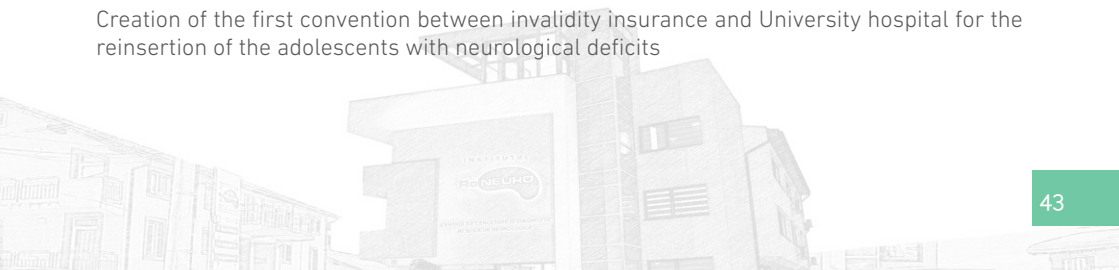
ACADEMIC DEGREES
PD, Privat Docent, 2015 (University of Lausanne)
Maître d'Enseignement et Recherche, 2005 (University of Lausanne)
Doctorate, 1984 (University of Mainz, Germany)
Federal Diploma of Medicine, 1985 (University of Lausanne)
Diploma of Medicine, 1984 (University of Mainz, Germany)

SPECIALIST QUALIFICATIONS
Board Certification Swiss Medical Society (FMH): Neurology, 1994; Physical Medicine and Rehabilitation, 2002; Certificate in Electrophysiology (EMG)

DISTINGUISHED MEMBERSHIPS
Since 2016 Co-chair of Coma Panel EAN
2015 Committee member of EFNR
November 2014 member of the Academy for Multidisciplinary Neurotraumatology
Committee of Neurological Behaviour Society

GOVERNING ACTIVITIES
Co- creator of the Swiss Neurorehabilitation Society (1997)
Co-creator of the quality organisation in this domain (APEQ, KIQ)
Expert in the Swiss National group on acute neurorehabilitation, DRG in Bern: definition of standards and acceptance of "Acute Neurorehabilitation" in the University Hospital of Lausanne as quality reference to analyse the cost weight of "acute neurological and neurosurgery rehabilitation"

Creation of the first convention between invalidity insurance and University hospital for the reinsertion of the adolescents with neurological deficits



DAVID C. GOOD
USA

Dr. David Charles Good is Professor and Founding Chair of Neurology at the Milton S. Hershey Medical Center of the Penn State College of Medicine. Dr. Good received a Bachelor of Science degree in biochemistry and a Doctor of Medicine degree from the University of Wisconsin at Madison. Dr. Good performed an internship in Internal Medicine at the Hennepin County Medical Center and University of Minnesota Hospital and a completed residency in Neurology and a stroke fellowship at the University of Minnesota Hospital, Minneapolis.

Dr. Good has been the director of rehabilitation at Southern Illinois University School of Medicine in Springfield, Illinois and Wake Forest University Baptist Medical Center in Winston-Salem, North Carolina. He accepted a position at Penn State in 2005 as the first chair of Neurology. He has held leadership positions at his institution, nationally, and internationally. He is a fellow of the American Academy of Neurology and the American Neurological Association. He is a charter member of the American Society of Neurorehabilitation, and has served in a number of capacities in the ASNR including President of the organization. He is past chairman of the Neurorehabilitation and Neuro Repair section of the American Academy of Neurology. He previously chaired the Accreditation Council of the United Council for Neurological Subspecialties. He served on the National Advisory Board for Medical Rehabilitation Research at the NIH. He has served on a number of study sections and has been an ad-hoc reviewer for a number of journals. He is the president–elect of the World Federation for Neurological Rehabilitation, serves on the Presidium, and is the regional vice president for North America. His research interests in recent years have focused on motor recovery in stroke, especially the role of the unaffected hemisphere in stroke recovery.

In addition to many presentations nationally and internationally, Dr. Good is widely published, with three books, multiple book chapters, peer-reviewed papers, and abstracts to his credit.

ALLA GUEKHT
RUSSIA

Professor Guekht's research interests are in epilepsy, cognition, stroke and neuroepidemiology. She obtained the M.D. degree at the 2nd Moscow Medical Institute and completed residency in Neurology in the same Institute; she was then trained in neuropsychology and neurophysiology, participated in the training/fellow programs in the Munster University, University of Homburg/Saar (Germany), Thomas Jefferson Hospital and Philadelphia Comprehensive Epilepsy Center (USA). She received the PhD Diploma for the dissertation on EEG monitoring in carotid surgery and the Doctor of Medical Sciences Diploma for the dissertation on Brain plasticity and restoration after stroke. Currently she is the Professor of the Department of Neurology, Neurosurgery and Genetics, Russian National Research Medical University, Director of Moscow Research and Clinical Center for Neuropsychiatry of the Healthcare Department of Moscow and Head of the Neurology Clinic of the Buyanov City Hospital in Moscow.

Prof. Guekht is the recipient of several prestigious international and national awards in medicine, including the Bruce S. Schoenberg International Award and lecture in Neuroepidemiology (American Academy of Neurology) , European Educational Award on Epileptology and the Ambassador for Epilepsy Award from ILAE and the IBE, "Honored Physician of the Russian Federation" Award of the Government of Russia; "Priznanie" (Recognition) Award of the Russian Federation for multidisciplinary research in restoration after stroke and the award of the Major of Moscow.

She is the author of more than over 200 articles focusing on epilepsy, stroke (plasticity and restoration), dementia/cognitive decline after stroke, Parkinson's disease, including over 60 papers in peer-reviewed international journals and book chapters, 18 books (in Russian), including Manual in Neurology and National Guidelines in Neurology, 6 patents of the Russian Federation in the field of stroke, epilepsy, neurophysiology . She is the mentor to many young neurologists with over 25 completed PhD and 4 doctoral dissertations.

She served in the Editorial Boards of Epilepsia, Epileptic Disorders; currently – in the Editorial Boards of the Journal of Neurological Sciences, Acta Neurologica Scandinavica, European Stroke Journal, Korsakov Journal of Neurology and Psychiatry. She acts as a regular reviewer for many international journals.

Alla Guekht served as the Member of the International Organizing/ Scientific Committee for many International /European Congresses, invited speaker at the Congresses of the

WFN, EAN, EFNS, ESOC, European and International Epilepsy Congresses, CONy, Vascular Dementia Congress, World Congress on neurorehabilitation, other international and national conferences in neurology, epilepsy, stroke, rehabilitation.

She is currently the Vice-President-elect of the International League again epilepsy, member of the WFN Committee of Education, Steering Committee for the Action Plan for Stroke in Europe, Secretary of the Russian Society of Neurologists.

VOLKER HÖMBERG
GERMANY

Prof. Hömberg had his medical education at the Universities of Düssel-dorf, Freiburg and Boston Massachusetts. After spending electives in Neurology at Boston City Hospital and the National Hospital for Nerv-ous Diseases Queens Square London he was a research fellow at the C. and O. Vogt Institute for Brain Research in Düsseldorf. In 1981 he started a residency in neurology with Prof. Hans Freund at Heinrich Heine University Düsseldorf. In 1987 he was appointed Director of the Neurological Therapy Centre (NTC) a newly founded Institute at Hein-rich Heine University in Düsseldorf. He was also founding Director of the NTC in Cologne . He was involved in the setup of many in-and out-patient rehabilitation hospitals in Germany and abroad . In 2001he started the St. Mauritius Therapy Clinic in Meerbusch near Düsseldorf and since 2011 he is Medical Director and Head of Neurology of the Dept. of Neurology at the Gesundheitszentrum Bad Wimpfen and works as senior neurology advisor for the SRH-Group ,one of the biggest hospital groups in Germany.

He was founder, president and vice president of the German Society for Neurorehabilitation for many years. He serves as Secretary Gen-eral for the World Federation of Neurorehabilitation (WFNR)for more than 15 years and is Vice President oft the European Federation of Neurorehabilitation Societies. (EFNR). He received an honorary doctor-ate from the Medical University of Cluj in 2017.

He is regular reviewer and co-editor of many international peer review-ing journals.

LEONARD SHEUNG WAI LI
HONG KONG

Prof. Leonard S.W. Li is the President of World Federation for NeuroRehabilitation. He works in Hong Kong as Director of Neurological Rehabilitation Centre of Virtus Medical Group. He is also taking position as Honorary Clinical Professor of Department of Medicine, University of Hong Kong and Adjunct Professor of Department of Rehabilitation Sciences of Hong Kong Polytechnic University. He graduated from the University of New South Wales in Sydney, Australia and then was trained and accredited in both Neurology and Rehabilitation Medicine. He held Presidency of Hong Kong Neurological Society and Hong Kong Association of Rehabilitation Medicine in the past. Currently, he is also the President-elect of International Society of Physical and Rehabilitation Medicine, and in the Advisory Board of Cochrane Rehabilitation. He has over 100 publications in peer review journals. He sits in the Editorial Board of Neurorehabilitation and Nerve Repair, Journal of International Society of Physical and Rehabilitation Medicine and Chinese Journal of Rehabilitation Medicine.

KRISTINA MÜLLER
GERMANY

since July 1984:	Training in General Pediatrics in the Department of Pediatrics at the „Heinrich-Heine"-Universität Düsseldorf, Specialization in Pediatric Neurology (Prof. H.-G. Lenard)
Jan. 89 - Dec. 90:	Research Project about "Motor development in children " sponsored by the Ministry of Research and Technology of Germany.
November 1991:	Board Qualification in Pediatrics
January 1992:	Senior Registrar at the Department of Pediatrics of the „Heinrich-Heine"-Universität, Düsseldorf

Oct. 92- April 93:	Fellowship at the Hospital for Sick Children, Department of Neuropaediatrics (Prof. B. Neville) , Great Ormond Street , London
February 93:	Habilitation
May 93-Nov. 93:	Training in Neurology in the Department of Neurology „Heinrich-Heine"-Universität Düsseldorf (Prof. Dr.H-J Freund)
since May 93	Consultant at the Department of Pediatrics at the „Heinrich-Heine-Universität" Düsseldorf
Feb - Dec 99	Research Project: Locomotion in Children with mit Cerebral Palsy

March – June 2000	Work at the Rehabilitation Institute of Chicago (Chicago, USA) on special aspects of neuro-rehabilitation for children
Since October 2000:	Head of Neuropediatrics at St Mauritius Therapy Clinic in Meerbusch-Osterath (www.stmtk.de)
March 2007	Additional designation for the field of Rehabilitation
January 2018	Partner in the Interreg NWEurope Research project VR4Rehab
Special interest:	Motor rehabilitation of children

DAFIN F. MUREȘANU
ROMANIA

Professor of Neurology, Senior Neurologist, Chairman of the Neurosciences Department, Faculty of Medicine, "Iuliu Hatieganu" University of Medicine and Pharmacy Cluj-Napoca, President of the European Federation of Neurorehabilitation Societies (EFNR), Co-Chair EAN Scientific Panel Neurorehabilitation, Past President of the Romanian Society of Neurology, President of the Society for the Study of Neuroprotection and Neuroplasticity (SSNN), Member of the Romanian Academy, Member of the Academy of Medical Sciences, Romania, secretary of its Cluj Branch. He is member of 17 scientific international societies (being Member of the American Neurological Association (ANA) - Fellow of ANA (FANA) since 2012) and 10 national ones, being part of the executive board of most of these societies.

Professor Dafin F. Muresanu is a specialist in Leadership and Management of Research and Health Care Systems (specialization in Management and Leadership, Arthur Anderson Institute, Illinois, USA, 1998 and several international courses and training stages in Neurology, research, management and leadership). Professor Dafin F. Muresanu is coordinator in international educational programs of European Master (i.e. European Master in Stroke Medicine, University of Krems), organizer and co-organizer of many educational projects: European and international schools and courses (International School of Neurology, European Stroke Organisation summer School, Danubian Neurological Society Teaching Courses, Seminars - Department of Neurosciences, European Teaching Courses on Neurorehabilitation) and scientific events: congresses, conferences, symposia (International Congresses of the Society for the Study of Neuroprotection and Neuroplasticity (SSNN), International Association of Neurorestoratology (IANR) & Global College for Neuroprotection and Neuroregeneration (GCNN) Conferences, Vascular Dementia Congresses (VaD), World Congresses on Controversies in Neurology (CONy), Danube Society Neurology Congresses, World Academy for Multidisciplinary Neurotraumatolgy (AMN) Congresses, Congresses of European Society for Clinical Neuropharmacology, European Congresses of Neurorehabilitation). His activity includes involvement in many national and international clinical studies and research projects, over 400 scientific participations as "invited speaker" in national and international scientific events, a significant portfolio of scientific articles (193 papers indexed on Web of Science-ISI, H-index: 21) as well as contributions in monographs and books published by prestigious international publishing houses.

Prof. Dr. Dafin F. Muresanu has been honoured with: „Dimitrie Cantemir" Medal of the Academy of The Republic of Moldova in 2018, Ana Aslan Award 2018 - "Performance in the study of active aging and neuroscience", for the contribution to the development of Romanian

medicine, National Order "Faithful Service" awarded by the President of Romania in 2017; "Iuliu Hatieganu" University of Medicine and Pharmacy Cluj-Napoca, Faculty of Medicine, the "Iuliu Hatieganu Great Award 2016" for the best educational project in the last five years; the Academy of Romanian Scientists, "Carol Davila Award for Medical Sciences / 2011", for the contribution to the Neurosurgery book "Tratat de Neurochirurgie" (vol.2), Editura Medicala, Bucuresti, 2011; the Faculty of Medicine, "Iuliu Hatieganu" University of Medicine and Pharmacy Cluj-Napoca "Octavian Fodor Award" for the best scientific activity of the year 2010 and the 2009 Romanian Academy "Gheorghe Marinescu Award" for advanced contributions in Neuroprotection and Neuroplasticity.

ADRIANA SARAH NICA
ROMANIA

CURRENT POSITION
- Professor in Physical Medicine, Rehabilitation and Balneoclimatology at the University of Medicine "Carol Davila", Bucharest
- Head of Rehabilitation Department - University of Medicine "Carol Davila", Bucharest
- PhD
- Chief of University Rehabilitation Department III – National Institute of Rehabilitation, Physical Medicine and Balneoclimatology
- European Board certified in PRM
- Senior consultant in Physical Medicine and Rehabilitation
- EFIC Councelor (Romania), IASP Champions 2019
- Specialist in Sports Medicine

Author of 7 books, 9 chapters, author or coauthor of more than 200 papers published in national and international issues; project manager in 10 national projects, partner in 1 internat.project

COMPETENCE: „Pain Therapy" (2001), „Paliative Medicine", CARF – The Rehab. Accreditation Commission LUND, Sweden (1999), „Biostimulation of Laser Therapy„ ,« ReeducationFonctionelle » Postgraduate training in Rehab, December 1991 – March 1992, Secretariat d'Etat Aux Handicapes et Accidentes de la Vie, Nancy, France, "New Priorities for Health Care"– Management in Heath Sciences, Salzburg, June 1991, "Homeopathy" (1987), "Acupuncture" (1983)

FIELDS OF INTEREST AND INVITED SPEAKER: Neuro-Rehabilitation School, Myofascial therapy, Pain Therapy - International Pain School (Klagenfurt), ICF Workshop. 2011,Notvill, Switzerland; Musculoskeletal Ultrasound Course, "ISCD Bone Densitometry Course & Workshop"(2007), "Project Management in Clinical Research", Wien (2007), "Introduction to Good Clinical Practice", Wien, " EMG Course", "UMF Carol Davila", "Research in Robotics Technology and Virtual Reality Applyed in Physiotherapy", "Hospital Management", ,, International Course for Hand Surgery and Hand Therapy", ,,Medical Hydrology and Climatology", ,,Post-graduated training and fields of interest in scientific research,,

Activity as expert and auditor: Evaluator Expert ARACIS (2011), External Auditor - Sistem of Quality Management SR EN ISO 9001/2001, SR EN ISO 19011/2003", Bucharest – SIMTEX, (2006), "Internal Auditor- Sistem of Quality Management SR EN ISO 9001/2001, SR EN ISO 19011/2003", Bucharest – SIMTEX, (2005), "Management of Educational Project", Ministry of Health– CNPPMFA, (2003), ,,Trainers and Evaluators for Testingand Checking Laboratories", (2003) – Certificate of Training RENAR

NAM-JONG PAIK
SOUTH KOREA

Nam-Jong Paik is a tenured professor at the Seoul National University, Seoul, Korea and serving as the first president of the Asia-Oceanian Society for NeuroRehabilitation (AOSNR), and as the member-at-large of the World Federation for NeuroRehabilitation (WFNR). He is also the Chairman-Elect of the Korean Society for NeuroRehabilitation.

He is now the Chief Strategy and Finance Officer for the Seoul National University Bundang Hospital. He is a member of National Academy of Medicine of Korea, and board of directors for several Korean societies including the Korean Society for NeuroRehabilitation, the Korean Geriatric Society and the Korean Dysphagia Society.

He is a recipient of the 2014 Scientific Award from the Korean Academy of Rehabilitation Medicine, the 2007 Fletcher H. McDowell Award from the American Society for Neurorehabilitation in 2007. He is also received a prize award from the Korean Minister of Health and Welfare in 2017 and from the Governor of Gyeonggi Province in 2015.

CATERINA PISTARINI
ITALY

Occupation or position held:
Director of Scientific Istitute of Rehabilitation ICS Maugeri Genova Italy- Via Missolungi 14
Director of Coma Unit Director of Spinal Cord Unit Fondazione Salvatore Maugeri Via Salvatore Maugeri, 10 27100 Pavia

Education and training

Dates	1974-1980
Title of qualification awarded	Degree in Medicine
Name and type of organisation providing education and training	University of Pavia
Dates	1980-1984
Title of qualification awarded	Postgraduate degree in Neurology
Name and type of organisation providing education and training	University of Pavia
Dates	1984-1987
Title of qualification awarded	Postgraduate degree in Physical and Rehabilitation Medicine
Name and type of organisation providing education and training	University of Pavia
Dates	2002
Title of qualification awarded	Healthcare Management qualification Course
Name and type of organisation providing education and training	IREF (Institute of Research, Statistics and Training) School of Health Management Milan - Italy
Dates	2011
Title of qualification awarded	Healthcare Management re-qualification Course
Name and type of organisation providing education and training	IREF (Institute of Research, Statistics and Training) School of Health Management Milan - Italy

Principal subjects/ occupational skills covered:

Stroke; Traumatic Brain Injury and Spinal Cord Injury Rehabilitation.

Theoretical and practical competences according to specific criteria for the best knowledge and experience in Neuro-Rehabilitation:

- Knowledges on Rehabilitation treatments programs;
- Knowledges on Clinical and functional assessment of patients with neurological disabilities;
- Application of Specific Rehabilitation Treatments on Brain injury, Spinal Cord Injury and Stroke (Rehabilitation of motor and cognitive functions, Neuro-rehabilitation in paediatric conditions, Urological and Sexual Rehabilitation of old People, Pain management) following National and International Guidelines.

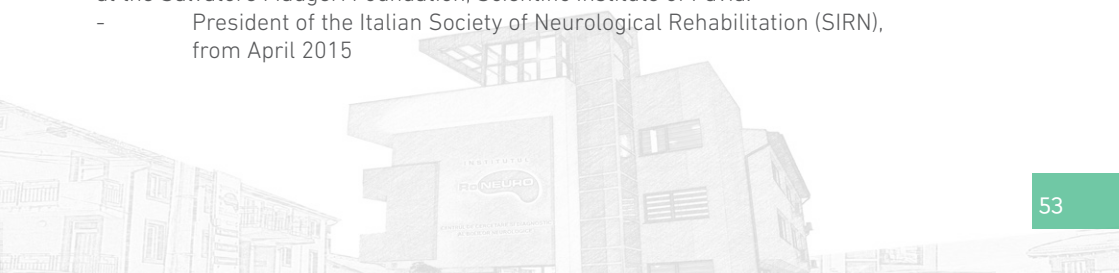
Since 1984, participation to Congresses and national/international rehabilitation Courses on the above mentioned topics and presentation of many scientific contributions.

Organizator and promoter of national/international Congresses on the topics on neurological rehabilitation.
Promoter and partecipant to national and european research projects in particular on Acquired Brain Injury Neuro-rehabilitation and Telerehabilitation.
Professor in Physiotherapy Disciplines at the University of Pavia.
Professor in Occupational Therapy Disciplines at the University of Pavia
Professor in training of Doctors for the degree in Medicine Science
Professor in training of Doctors for the post graduate degree in the discipline of Physical and Rehabilitation Medicine
Professor in training of the Physiotherapists for the degree in Physiotherapy Professor in training of the Occupational Therapists for the degree in Occupational Therapy.
Associated Editor of International journal "Functional Neurology"
Qualification to the role of associate professor of Neurology by the National Ministry of the University
Collaboration in drawing formal national documents on the best practice's clinical and organizational criteria.
Definition of Rehabilitation Guidelines for Health Professional practice on behalf of National Ministry of Health (both for general rehabilitation activities and for rehabilitation activities in VS and MCS patients).

Organisational skills and competences:

Since 2000 to 2017, Director of Spinal Cord Injury, Neurorehabilitation and Post-coma Units at the Salvatore Maugeri Foundation, Scientific Institute of Pavia.

- President of the Italian Society of Neurological Rehabilitation (SIRN), from April 2015



- Past President of the Italian Society of Rehabilitation of High Specialization (SIRAS). (President 2008-2011)
- Coordinator of the International Rehabilitation Network Development Education Network (REHADE) (since 2011)
- Associated Member of the European Neurotraumatologic Academy (EMNR) (since 2010)
- Chair of the World Federation of Neuro Rehabilitation (WFNR) 's Special Interest Group on Mild/ Severe Brain Injury (since 2008)
- Founding member of the Robotic and Rehabilitation Interest Group (RoRIG) (since 2007) - Member of Physical Medicine and Rehabilitation Italian Society (SIMFER) (since 1984) Since 2017 Director of Scientific Istitute of Rehabilitation ICS Maugeri Genova

Technical skills and competences:

- Member at large of WFNR (since 2016)
  Within the post acute Neuro-Rehabiitation department:
- Definition of operating and organizational protocols for care activitiy.
- Definition of clinical goals of the rehabilitation treatments.
- Definition of clinical guidelines for health professionals' practice, with respect to their own autonomy and specialist competences.
- Coordination of multidisciplinary team activities.
- Responsible for the organization and the management of clinical reports.
- Public relations management.
- Service quality control.
- Work Health and Safety control for the department, in respect to the Law 626/94.
- Involvement in Cheat Council and Institute Steering Committee.
- Definition of research projects aiming at the implementation of scientific and clinical findings. -Conducting several clinical trials (phase II and III) according to GCP (the last one from 2008 to 2011)

Additional Information

Tot. Publications : n 205
(including Publications in Scientific Journals, Books and book chapters and Contributions in National and International Congress Acts)
H Citation Index calculed by WEB on SCIENCE = 11

THOMAS PLATZ
GERMANY

Prof. Dr. med. Thomas Platz was educated at the medical school Heidelberg/Mannheim, Germany, including a clinical academic year at the Duke University Medical Center, Durham, U.S.A.

Thomas Platz received his doctoral degree in medicine (Dr. med.) from the University of Heidelberg in 1990. He started his residency in neurology in Berlin, Germany. In 1995 he received the Feodor-Lynen fellowship of the Alexander von Humboldt-Stiftung for a research position at the Institute of Neurology, Queen Square, London, UK, when he was also honorary clinical resident at the National Hospital for Neurology and Neurosurgery (service of Professor Marsden). In 1997 he received the diploma in epidemiology and biostatistics from the McGill University in Montreal, Canada and became board certified neurologist and clinical geriatrist consultant in Berlin, Germany. He received the Rehabilitation Science Award by the Kuratorium ZNS and the Hannelore Kohl-Stiftung in 2001 and finished his habilitation in neurological rehabilitation at the University hospital Charité in Berlin, Germany in 2002 Priv.-Doz. Dr. med. habil.). In the next years he gained further qualification in rehabilitation (2002) and medical quality management (2006).

In 2006 he became head of the department of neurohabilitation at the BDH Klinik Greifswald and head of the associated "An-Institut" of the Ernst-Moritz-Arndt-University, Greifswald, Germany. Since 2009 he acted as medical director of that hospital and was head of department of both the neurorehabilitation centre and the spinal cord injury unit. He received the Venia legendi for neurological rehabilitation at the Ernst-Moritz-Arndt-University in 2007 and a personal professorship in 2009 (Prof. Dr. med). Since 2018 he acts as medical director research (BDH) and head of the "An-Institut" of the University of Greifswald, the academic education and research part of the BDH-Klinik. He is member of various national and international neurological and neurorehabilitation societies, and head of the Educational Committee and of the Special Interest Group Clinical Pathways of the World Federation for NeuroRehabilitation, WFNR. In addition, he organises collaborative work with Cochrane Rehabilitation for the WFNR.

His scientific interests concentrate on issues related to neurorehabilitation including clinical epidemiology with systematic evidence-to-decision and guideline development projects as well as electrophysiology (focus on rTMS), brain imaging, assessment, and training.

GABRIEL PRADA
ROMANIA

Gabriel-Ioan Prada, MD, PhD, graduated medical school at "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania in 1984 and after two years of internship at "Fundeni" Clinical Hospital in Bucharest, started his activity as a junior scientist at "Ana Aslan" National Institute of Gerontology and Geriatrics in Bucharest since 1986. Currently he is senior specialist in Geriatric Medicine and Gerontology and also in Internal Medicine. Dr.Prada has a Diploma in Gerontology at International Institute on Ageing - United Nations and a Master of Science Degree in the Faculty of Medicine, Department of Geriatric Medicine, "Victoria" University of Manchester, United Kingdom under the supervision of Prof.Raymond Tallis, editor of Brocklehurst's Textbook of Geriatric Medicine and Gerontology. Dr.Prada also has a PhD degree in medical sciences at "Carol Davila" University of Medicine and Pharmacy, Bucharest. Currently, Dr.Prada is head of Clinical Department 4 at "Ana Aslan" National Institute of Gerontology and Geriatrics and also Professor of Geriatrics and Gerontology, head of the Chair of Geriatrics and Gerontology, Department 5, Faculty of Medicine, "Carol Davila" University of Medicine and Pharmacy, Bucharest. He is author of 15 books and book-chapters, national and international editions, and over 350 papers published or presented at national and international scientific meetings. Dr.Prada has been involved in several international and national research projects, including HYVET (Hypertension in the Very Elderly Trial), PREDICT (Increasing the PaRticipation of the ElDerly in Clinical Trials), ERA-AGE 2 (European Research Area in Ageing) and FUTURAGE - A Roadmap for Ageing. He is also full member of the Boards of UEMS-Geriatric Medicine Section (European Union of Medical Specialists), EUGMS (European Union of Geriatric Medicine Societies), IAGG (International Association of Gerontology and Geriatrics) and IAGG-ER Clinical Section.

LEOPOLD SALTUARI
AUSTRIA

After completing his study of Medicine in Innsbruck, Austria, he was a resident in the speciality of Neurology at the University of Pavia, Italy, from 1978 to 1983. Further study in the specialization of Physical Medicine and Rehabilitation was completed in 1986.
From 1983 to 1995 Dr. Saltuari was Head of Department on the Neurology Ward IIS/IV at the University Clinic in Innsbruck, specializing in post-acute rehabilitation for stroke and brain-injury patients. During this period, eight physicians completed their residency in Neurorehabilitation under his tutelage
Dr. Saltuari introduced new rehabilitation techniques such as cortical facilitation in Austria and developed new therapeutic techniques, e.g. intrathecal application of Baclofen in patients with supraspinal spasticity.
The government of South Tyrol (Italy) appointed Dr. Saltuari in 1985 to the Commission for Development of National Laws for Rehabilitation.
From 1988-1995 he served as Director of Therapy (Physical, Occupational, and Speech Therapy) in the Department for Neurology in the University Clinic in Innsbruck.
In 1988 Dr. Saltuari was appointed as Medical Director of the School for Occupational Therapy, where he introduced new functional aspects to the educational course. He was active in the "Project Group for Neurological Rehabilitation", reporting to the government of Tyrol in 1992.
Between 1988 and 1995 he was Director of the Laboratory for Evoked Potentials at the University of Innsbruck.
In 1987 and in 1988 he was in residence for several months at Baylor College of Medicine in Houston, Texas. The main area of this research assignment was the treatment of spasticity and pain in hemiplegic and spinal cord injured patients, as well as the treatment of pain by techniques of restorative neurology.
In 1992 Dr. Saltuari was awarded the Venia legendi in Neurology with the theme "Baclofen in Spasticity", in which the efficacy of intrathecal application of Baclofen in cases of supraspinal spasticity was described for the first time.

Dr. Saltuari has been Medical Director of the Department of Neurology in the Hochzirl Hospital since 1995. He is also Vicepresident of the Austrian Neuromodulation Society – AUNS.)
From 1988 – 2015 he has been active in the further education for Physical Therapists in Neurorehabilitation at the Scientific Academy of Lower Austria. He was elected President of the Austrian Society for Neurorehabilitation in 2002.
Dr. Saltuari has submitted over 200 publications dealing with neurorehabilitative subjects as well as with acute neurological topics.

Since 1986 Dr. Saltuari has been Lecturer for Neurorehabilitation and Evoked Potentials at the University for Medicine in Innsbruck and since 1995 on the staff of the Institute for Sport Science. Since October 2009 he is the Director of the Research Department for Neurorehabilitation South Tyrol, Bolzano, Italy.
Since 2012 Prof. Saltuari is member of the Editorial Board of Functional Neurology and since December 2015 he is the President of the European Society for Neurorehabilitation.

GIORGIO SANDRINI
ITALY

Giorgio Sandrini was Full Professor of Neurology in the University of Pavia, , Italy and he developed his clinical activity mainly as Chairman of the Department of Neurology and Neurorehabilitation at the Institute of Neurology, "C. Mondino" Foundation,until 1st October 2018.

The main fields of his research are neurorehabilitation,headache and neurophysiology of pain.He published more than 300 articles concerning these topics.

He promoted several research and Congresses as President of the European Federation of the Neuro-Rehabilitation Societies and as President of the Italian Society of Neurorehabilitation. In particular,he was Chairman of an European Committee on Curriculum in Neurorehabilitation.

He is Editor-in-chief of Frontiers in Neurology,Section in Neurorehabilitation.

About the field of headache,he was Director of University Centre for Adaptive Disorders and Headache (UCADH) and Chairman of the International Headache Society Italian Linguistic Special Interest Group and Co-Chairman with Prof.L.Friberg of the European Federation of Neurological Societies Task Force on Neurophysiological Tests and Neuroimaging Procedures in Non-acute Headache.

JOHANNES VESTER
GERMANY

Born, 1952, he specialized in Veterinary Medicine between 1971 and 1974 at the University in Munich, then changed to the University in Cologne in 1974 and specialized in Human Medicine from 1974 to 1980. In 1976 to 1979, he additionally completed the curriculum on biostatistics for pharmacology and clinical research at the Institute for Data Analysis and Study Planning in Munich.

While studying human medicine, he completed research work on pattern recognition in the visual brain and developed a pharmacodynamic Neuron Simulation Model at the Institute for Medical Documentation and Statistics of the University at Cologne.
Since 1982 he holds > 100 advanced training courses on biometry for professionals in clinical research as well as teaching courses for universitary institutions and international societies.

From 1985 to 1995, he was member of the Ultrahigh Dexamethasone Head Injury Study Group and the leading biometrician of the German GUDHIS trial in Traumatic Brain Injury.
Since 1995 he is Senior Consultant for Biometry & Clinical Research at the Institute for Data Analysis and Study Planning (IDV). He planned and evaluated about 150 randomized clinical studies worldwide and is member of various international Advisory Boards and Steering Committees including participation as biometric expert in regulatory authority panels, in FDA, EMA, and BfArM hearings, and in workshops of the International Biometric Society (IBS).

Statistical peer reviewer for leading medical journals such as Stroke (American Heart Association).
Since 2013 Statistical Expert and Elected Member of the International Scientific Committee of the Society for the Study of Neuroprotection and Neuroplasticity (SSNN).
Since 2013 Statistical Expert and Elected Member of the World Academy for Multidisciplinary Neurotraumatology (AMN).
Since 2015 Member of the PhD Neuroscience International Faculty, "Iuliu Hatieganu" University of Medicine and Pharmacy, Cluj-Napoca, Romania.
Since 2017 Invited Associate Professor, Department of Neuroscience, "Iuliu Hatieganu" University of Medicine and Pharmacy, Cluj-Napoca, Romania.
Since 2018 Co-Chair EAN Guideline Task Force Neurorehabilitation.
Since 2018 Head Biometry & Clinical Research at the Institute for Data Analysis and Study Planning (IDV).
Since 2018 President of the Academy for Multidisciplinary Neurotraumatology (AMN).

GENERAL INFORMATION

COURSE VENUE

Hotel ALPIN - Poiana Brasov

Phone: +40 268 262 343, fax: +40 268 262 435
500001 Poiana Brasov, Brasov, Romania

Scientific Secretariat

Registration Desk

All materials and documentation will be available at the registration desk located at SSNN booth. The staff will be pleased to help you with all enquiries regarding registration, materials and program. Please do not hesitate to contact the staff members if there is something they can do to make your stay more enjoyable.

LOGISTIC PARTNER:

SYNAPSE
TRAVEL

Synapse Travel

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Foundation for the
Society for the Study of
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Mr. Ovidiu Selejan: +40745255311
E-mail:office@ssnn.ro

Contact Details

Mrs. Doria Constantinescu,
mobile: +40757096111
doria@synapsetravel.ro

LANGUAGE

The official language is English. Simultaneous translation will not be provided.

CHANGES IN PROGRAM

The organizers cannot assume liability for any changes in the program due to external or unforeseen circumstances.

NAME BADGES

Participants are kindly requested to wear their name badge at all times. The badge enables admission to the scientific sessions and dinners.

FINAL PROGRAM & ABSTRACT BOOK

The participants documents include the program and abstract book which will be handed out at the registration counter.

COFFEE BREAKS

Coffee, tea and water are served during morning coffee breaks and are free of charge to all registered participants.

MOBILE PHONES

Participants are kindly requested to keep their mobile phones turned off while attending the scientific sessions in the meeting rooms.

CURRENCY

The official currency in Romania is RON.

ELECTRICITY

Electrical power is 220 volts, 50 Hz. Two-prong plugs are standard.

TIME

The time in Romania is Eastern European Time (GMT+2).

THIS MEETING HAS BEEN ENDORSED BY:

EFNR The European Federation of NeuroRehabilitation Societies

WFNR
World Federation for NeuroRehabilitation

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ORGANIZERS

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www.roneuro.ro

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www.medandlife.org

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www.umfcluj.ro

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