



## Training chart in movement disorders surgery added competence

As approved by the ESSFN and UEMS Section of Neurosurgery (March 2009)

J. K. Krauss · B. Broggi · H. J. Reulen ·  
T. Trojanowski · Y. Lazorthes

Published online: 20 October 2009

---

J. K. Krauss  
Department of Neurosurgery, Medical University of Hannover,  
Hannover, Germany

B. Broggi  
Department of Neurosurgery, Instituto Carlo Besta,  
Milan, Italy

H. J. Reulen  
Department of Neurosurgery,  
Ludwig-Maximilians University Munich,  
Munich, Germany

T. Trojanowski  
Department of Neurosurgery, University Medical School,  
Lublin, Poland

Y. Lazorthes  
Department of Neurosurgery, University Paul Sabatier,  
Toulouse, France

H. J. Reulen (emerited) (✉)  
Neurosurgical Department, Klinikum Grosshadern,  
c/o Ilona Anders, Marchioninstr. 15,  
81377 Munich, Germany  
e-mail: Ilona.Anders@med.uni-muenchen.de

**Keywords** Training · Movement disorder surgery · Added competence

## Introduction

On Wednesday, December 5, 2007, European Society for Stereotactic and Functional Neurosurgery (ESSFN) officers Yves Lazorthes, Giovanni Broggi, and Joachim K. Krauss had a meeting with Hans J. Reulen, President, Section of Neurosurgery, Union Européenne des Médecins Spécialistes (UEMS), in Munich Airport. Upon this opportunity, it was decided, after an extensive discussion, to lay the foundation for a Training Chart in Movement Disorders Surgery Added Competence as a first step to guide education and quality control concepts in functional and stereotactic neurosurgery. The concept of the training chart will be in line with the UEMS charter on training of medical specialists in the European Union (EU), “The Neurosurgical Training Charter,” published by H. J. Reulen and K. W. Lindsay in *Acta Neurochirurgica* (149:843-855, 2007) [2].

The training chart will be similar to other charts that have been developed for other subspecialties in neurosurgery, that is, it will specify institutional requirements and individual requirements for the program director in order to improve the harmonization and the quality of movement disorder surgery practice in the EU and also to reinforce the existing centers. For that purpose, wording in the training chart may be similar or even identical to other training charts concerning the general outlines.

It was decided to found an ad hoc “Task Force on Movement Disorders Surgery Added Competence” consisting of representatives from the ESSFN officers, ESSFN membership, and UEMS representatives. The provisional membership is: Hans J. Reulen (UEMS), Manuel Cunha e Sa (UEMS), Yves Lazorthes (Toulouse, France), Giovanni Broggi (Milano, Italy), Joachim K. Krauss (Hannover, Germany), Marwan Hariz (London, UK), Rick Schuurmann (Amsterdam, The Netherlands), and Jorge Guridi (Pamplona, Spain).

As a first step, Joachim K. Krauss, the secretary of the ESSFN, prepared a preliminary draft in December 2007, which served as the backbone for task force members to work on. Joachim K. Krauss also contacted Drs. Hariz, Schuurmann, and Guridi and invited them to participate. European Association of Neurosurgical Societies (EANS) representatives and in particular, the current EANS president, J. Schramm, were invited, in addition, to join this intersocietal task force.

The Task Force has prepared the draft “Training Chart in Movement Disorders Surgery Added Competence,” presented by the president of the ESSFN, Yves Lazorthes, at the EANS winter meeting in Trondheim, Norway. The revised version 2.1 was presented during the meeting of the

UEMS section of neurosurgery, June 26, 2008, in Brussels. The next versions, particularly, specified the institutional and individual requirements and the repartitions of procedures the trainee has to perform.

Version 4.0 (present final version) was prepared and edited by Joachim K. Krauss and Yves Lazorthes after presentation of the training chart to the UEMS committee in Marseilles, March 2009, by Yves Lazorthes and Giovanni Broggi. Upon this occasion, the training chart was accepted as a common document of the ESSFN and the UEMS.

## Preamble

Stereotactic and Functional Neurosurgery is a branch of neurosurgery that utilizes dedicated structural and functional neuroimaging to identify and target discrete areas of the nervous system and to perform specific interventions (for example neuroablation, neurostimulation, neuromodulation, neurotransplantation, and others) using dedicated instruments and machinery in order to relieve a variety of symptoms of neurological and other disorders and to improve function of both the structurally normal and abnormal nervous system. (The definition is a synthesis of propositions from Lozano, Hariz, Gildenberg, Krauss, Blond, Broggi and Lazorthes—as published in the second edition of the Textbook of Stereotactic and Functional Neurosurgery) [1].

The practice of Stereotactic and Functional Neurosurgery mainly extends into the fields of movement disorders, pain, epilepsy, psychoaffective disorders, neoplastic diseases of the nervous system, and the restoration of function in degenerative disorders.

Movement disorders surgery constitutes an integral part of functional and stereotactic neurosurgery. It intervenes in the nervous system to improve abnormal movement in disorders such as Parkinson’s disease, dystonia, tremor, spasticity, and others. It uses a variety of techniques nowadays, in particular, frame-based stereotactic neurosurgery for neuroablation and neurostimulation but also microsurgical techniques and others such as cranial stereotactic radiosurgery, neuroaxial drug administration, spinal procedures, and neural transplantation.

## Definition of added competence training (formerly subspecialization)

The present European Training Program in Neurosurgery (the European Neurosurgery Training) is based on a systematic and broad-based acquisition of knowledge and surgical skills in all essential areas of the speciality and should finish with a high-standard board examination. This allows a neurosurgeon who has received his/her certifica-

tion/qualification in one of the countries of the EU to exert his/her professional activities in the whole area of classical neurosurgery.

Extended skills and knowledge in more complex procedures and techniques, which are beyond this broad-based training, should not be learned by trial and error but by systematic, supervised acquisition of additional competence through hands-on experience and also critical assessment and appraisal of the relevant literature in such particular areas of the speciality after having finished regular training (or towards the end of regular training). This can be provided by additional training in appropriate institutions and also during specialized hands-on workshops (ESSFN, or equivalent training programs).

Such systematic, supervised acquisition of additional competence is in the interest of our patients and provides a clear and graduated system of competence training in neurosurgery.

### Standards for added competence training

Added competence training for movement disorders surgery shall not only be an increase in the sheer number of cases operated. The purpose of this added training period is that of enlarging the experience acquired during residency training in the acquisition of more advanced and multidisciplinary diagnostic and surgical skills (which remain outside the scope of the regular training program).

Movement disorders surgery must remain strongly centered on the surgical perspective of the treatment of these diseases so as to avoid deluting and effacing the edge neurosurgery offers in this multidisciplinary field of medical intervention. In other words, movement disorders neurosurgeons should not become pure technicians working for other disciplines, but they have to be part in the selection of patients and evaluation of symptoms during surgery, and they have to take care and responsibility for the follow-up and for handling complications.

Added competence training in the particular area can only be provided in an institution if it does not compromise the regular training program. This means that there must be enough cases to allow instituting additional competence training.

### Relations with the neurosurgical department

All subspecialties should remain part of the neurosurgical department. Separation in the sense of complete independence should be avoided. If possible, the members of the subspecialty areas should continue to take

part in the basic neurosurgery tasks and remain involved in the emergency treatment. The subspecialties must take part in the regular training program and participate in the training of residents, in particular, during rotation periods.

### Duration of fellowship

The training period for movement disorders surgery should last at least 1 year. These training periods must be spent in appropriate institutions in order to take part in all the different steps of the management of the complex pathologies under treatment (multidisciplinary evaluation, pharmacological therapy, targeting—imaging and planning, intraoperative electrophysiology, electrode implantation or radiofrequency lesioning, post-operative follow-up).

### Institutional requirements

- The training program must offer teaching and clinical experience which encompasses a wide spectrum of movement disorders surgery, such as deep brain stimulation in different targets and for various diagnoses (PD, dystonia, essential tremor, etc.) and on appropriate occasions stereotactic lesioning (radiofrequency or radiosurgery).
- The institution's patient population must have a diversity of illness from which a broad experience can be obtained.
- There must be at least 20 patients undergoing deep brain stimulation per year including Parkinson's disease, dystonia, and tremor.
- It is strongly advised that a least one out of the following procedures should also be conducted on a regular basis: lesioning procedures (thalamotomy or pallidotomy; radiofrequency or radiosurgery), peripheral denervation and myotomy/myectomy for cervical dystonia, intradural rhizotomy for spasticity, implantation of intrathecal drug delivery systems for spasticity or dystonia, or decompression for hemifacial spasm.
- There must be complete diagnostic and surgical facilities including workstation-based target calculation, intraoperative neurophysiology (optionally microelectrode recording), clinical testing and stimulation, macrostimulation, and/ or recording of local field potentials. Quality control must include postoperative confirmation of the accuracy of targeting—preferably by stereotactic methods.
- There must be common conferences and multidisciplinary consultations for movement disorder specialists from neurology, neurosurgery and if available, clinical neurophysiology. Patients should undergo standardized

assessment preoperatively and at defined postoperative intervals by the team members.

- There must be access to a scientific library and to the internet.
- There must be documented regular review of mortality and morbidity related to the performance of movement disorders surgery.
- Fellows should be encouraged to attend and participate in national and international meetings and practical postgraduate courses.

### Individual requirements

Movement disorders surgery requires the following special training and skills

- being familiar with the signs and symptoms of movement disorders, the various diagnoses, and their specific medical treatment
- conducting thorough and accurate neurologic examinations to evaluate patients with movement disorders
- understanding the pathophysiology and natural history of these disorders
- being familiar with basal ganglia neuroanatomy and relevant target coordinates
- knowing about stereotactic general principles and atlases for stereotactic surgery
- knowing indications and contraindications for the different movement disorders (ablation vs. stimulation, choice of specific targets, etc)
- being skilled in the technical aspects of these procedures, including imaging
- knowing the basics of neuroimaging and the details in planning of the target and the trajectory
- being skilled with the techniques of electrode implantation and fixation and/or radiofrequency lesioning
- knowing the side effects and complications of the procedures and how to avoid and rectify them
- being familiar with other therapeutic alternatives
- being able to assess the results critically according to the principles of evidence-based medicine

Operative totals for deep brain stimulation (DBS)/radiofrequency lesioning

The trainee should be involved in 20 functional stereotactic procedures—DBS surgery or radiofrequency lesioning within the following categories:

T = The trainee has done the operation. The supervising consultant must not have made a decision/practical

maneuver significantly affecting the execution of the operation

TS = The trainee has done the operation but the supervising consultant has made a significant decision/practical maneuver during the operation

C = The trainee has performed component parts during the operation under supervision of a senior surgeon: positioning, operative approach (i.e., craniotomy, opening), closure, drainage, draping instructions for postoperative care.

A = The trainee is the principal assistant during the operation.

(Definitions from “The Neurosurgical Training Charter,” published in the *Acta Neurochirurgica* (149:843-855, 2007) [2])

The following repartition of procedures is recommended: T=2, TS=4, C=6, and A=8.

### Program director and faculty

The program director must be certified in neurosurgery.

He or she must have a special expertise in movement disorders surgery and must have conducted a minimum of the following operations: deep brain stimulation and/or radiofrequency lesions in at least 200 patients.

The program director is responsible for developing and updating a written curriculum. He should seek accreditation of the program by an external authority. At least annually, fellows must be given the opportunity to evaluate the fellowship program in written form.

The program director is responsible for updating the curriculum.

### Educational program

The training program must offer teaching and clinical experience which encompasses a wide spectrum of movement disorders surgery.

### Educational program options

In addition to participating in the educational program curriculum, trainees should take part in academic activities related to the field, that is, participation in scientific projects (clinical and/or experimental basic science), participation in national and international conferences, presentation of papers or posters at national and international conferences, and publication of manuscripts concerning the subject.

Trainees should attend or have attended specific courses and/or hands-on workshops on movement disorders surgery of their national societies or of the ESSFN or other internationally operating well-recognized societies (for example, the WSSFN and the Movement Disorders Society).

### **Evaluation and qualification**

Qualification is granted to all trainees having successfully completed their additional competence training. The evaluation of the training is the responsibility of the program director.

### **Continuous quality control**

Quality control concepts should be developed for the future to ensure that the standards are being applied by the training centers and to allow continuous improvement of quality control algorithms.

### **Transitional regulations**

There are many neurosurgeons who have acquired a high competence in this field in the past. They should have the opportunity to receive an individual recognition of competence.

### **Appendix**

Vs 4.0 (present final version) prepared and edited by Joachim K. Krauss and Yves Lazorthes after the presentation of the Training Chart to the UEMS committee in March 2009, by Yves Lazorthes and Giovanni Broggi and its approval.

Vs 3.2 prepared by Yves Lazorthes and Joachim K. Krauss containing the corrected required numbers for the fellow's involvement in operations.

Vs 3.0 prepared by Yves Lazorthes, Joachim K. Krauss, and Bart Nuttin with the additional input of Drs. Reulen and Schuurman after presentation of Vs 2.1 at the UEMS meeting.

Vs 2.1 prepared by Yves Lazorthes and Joachim K. Krauss with the additional input of Drs. Broggi, Sakas, and Nuttin.

Vs 2.0 prepared by Yves Lazorthes and Joachim K. Krauss with the additional input of Drs. Hariz, Guridi, Schuurman, and Broggi.

Vs 1.0 prepared by Joachim K. Krauss.

### **References**

1. Gildenberg PL, Krauss JK (2009) History of stereotactic neurosurgery. In: Lozano AM, Gildenberg PL, Tasker RR (eds) Textbook of stereotactic and functional neurosurgery. Springer, New York
2. Reulen HJ, Lindsay KW (2007) The neurosurgical training charter. *Acta Neurochir* 149:843–855