

## Training charter in pain surgery added competence

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## Introduction

After the successful completion of the Training Charter in Movement Disorders Surgery Added Competence and its publication in *Acta Neurochirurgica* (151:1505–1509, [1]) the ESSFN officers decided to tackle another core topic of functional and stereotactic surgery : the surgical treatment of chronic and refractory pain.

Again, the concept of the training charter will be in line with the UEMS charter on training of medical specialists in the EU, “The Neurosurgical Training Charter”, published by H. J. Reulen and K. W. Lindsay in *Acta Neurochirurgica* (149:843–855, [2]). The basic concept of the Pain Surgery training charter will be similar to the Movement Disorders Surgery training charter and to other charters that have been developed for other subspecialties in neurosurgery. In addition to specifying requirements, the individual should attain, the charter will **specify institutional requirements and requirements for the program director**, in order to improve the harmonization and the quality of pain surgery practice in the E.U and also to reinforce the existing centers. For that purpose, it will be unavoidable that wording in the training charter may be similar or even identical to other training charters concerning the general outlines.

## 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) [4].

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.

Surgical treatment of pain is an essential and integral part of functional and stereotactic neurosurgery since its inception. Its evolution is the result of several factors including an increasing knowledge of the intrinsic neurophysiologic control mechanisms (from the gate control theory to molecular pathology) and of the mechanisms resulting in chronic pain, the understanding of specific features of nociceptive and neuropathic pain, the benefits of contemporary multidisciplinary pain management and a considerable advance in medical biotechnology (implantable and programmable devices : neuropacemakers, pumps,...). It intervenes in the nervous system to improve chronic neuropathic and nociceptive pain, cranial and peripheral pain syndromes, and chronic headache. Medical and neurocognitive therapies have replaced many historically important neuroablative techniques, but there is still a place for such techniques for certain indications. Surgical treatment of pain uses a variety of techniques nowadays, including spinal cord and peripheral nerve stimulation, motor cortex stimulation, frame-based stereotactic neurosurgery for neuroablation and deep brain stimulation, central and peripheral injections and ablation techniques, but also microsurgical techniques such as microvascular decompression, and others such as cranial stereotactic radiosurgery, neuroaxial drug administration, spinal procedures, and neural transplantation.

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### Definition of additional competence training (formerly subspecialisation)

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 certification/ qualification in one of the countries of the EU to exert his 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 : WSSFN, AANS, IASP,..)

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 in pain surgery

Added competence training in pain 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).

Pain surgery must remain strongly centered on the surgical perspective of the treatment of pain syndromes. Pain neurosurgeons should take part in the evaluation of symptoms, in the selection of patients for surgery in a **multidisciplinary approach**. This should include care and responsibility for the follow-up and for handling surgical 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 experience and new cases to allow the institute to administer an additional competence training in pain surgery.

### Relations with the neurosurgical department

All subspecialities should remain part of the neurosurgical department. Separation in the sense of complete independence should be avoided. If possible the members of the subspeciality areas should continue to take part in the basic neurosurgery tasks and remain involved in the emergency treatment. The subspecialities 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 pain surgery should last **at least 1 year**.

These training periods must be made in appropriate institutions, in order to take part in all the different steps of the multidisciplinary management of the complex pathologies under treatment (multidisciplinary evaluation, pharmacological therapy, 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 pain surgery techniques and strategies, such as spinal cord stimulation, motor cortex and/or deep brain stimulation, peripheral techniques or microvascular decompression for cranial neuropathies, intrathecal drug delivery, neuroablative techniques such as DREZ, thermodenervation or cryodenervation of facet joints, and on appropriate occasions radiosurgery.

The Institution must be expert at making evaluation of the advantages and disadvantages of the different pain surgery alternatives, compared with the effects of medical treatments, in the context of resistance to drugs.

The institution's patient population must have a diversity of chronic pain syndromes from which a broad experience can be obtained.

There must be at least 50 new patients undergoing neuromodulation techniques for treatment of neuropathic or other severe intractable pain per year.

It is strongly advised that at least three out of the following procedures should also be conducted on a regular basis: facet joint denervation (thermocoeagulation or cryoablation), DREZotomy, cordotomy, peripheral or occipital nerve stimulation, motor cortex stimulation, deep brain stimulation, implantation of intrathecal drug delivery

systems for neuropathic or nociceptive pain, peripheral techniques (thermocoagulation, alcohol or glycerol injection, and/or balloon compression), or microvascular decompression for cranial neuropathies.

There must be complete diagnostic and surgical facilities including intraoperative neurophysiology (optionally microelectrode recording when appropriate), clinical testing and stimulation, macrostimulation, and/ or recording of somesthetic evoked potentials or local field potentials. In addition, image-guided neuronavigation should be available. Quality control must include postoperative confirmation of the site of electrode implantation in cases in whom stimulation techniques are used.

There must be regular conferences and **multidisciplinary consultations** to discuss severe and unusual cases. 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 pain surgery.

Fellows should be encouraged to attend and participate in national and international meetings and practical postgraduate courses.

### Individual requirements

Pain surgery requires the following special training and skills:

- 1 —be involved in a multidisciplinary pain evaluation and be familiar with the signs and symptoms of pain syndromes, the various diagnoses, and their specific medical treatment
- 2 —conduct thorough and accurate neurologic examinations to evaluate patients with pain syndromes
- 3 —understand the pathophysiology and natural history of these disorders
- 4 —be familiar with pain conduction pathways and central pain processing
- 5 —be able to identify the physiological mechanism(s) of chronic pain syndromes
- 6 —be able to confirm the failure of non-surgical treatments (pharmacological and/ or other conservative strategies) in order to verify the diagnosis of chronic and intractable pain

- 7 —know about the general principles of stereotactic and functional neurosurgery
- 8 —know indications and contraindications for the treatment of different pain syndromes (ablation vs. stimulation, choice of specific targets, etc)
- 9 —be able to develop a stepwise strategy with regard both to the pathophysiological mechanisms of the pain syndrome, the state of the health of the patient and the objectives of quality of life.
- 10 —be skilled in the technical aspects of these procedures, including intraoperative imaging
- 11 —know the basics of neuroimaging and the details in procedural planning
- 12 —be familiar and skilled with appropriate percutaneous screening tests
- 13 —be skilled with the techniques of electrode implantation in different locations (peripheral nerve, spinal cord, cortex and deep brain)
- 14 —know the side effects and complications of the procedures and how to avoid and rectify them
- 15 —know the indications for and possible complications of microvascular decompression, in order to send the patient to an appropriately experienced neurosurgeon
- 16 —be familiar with other therapeutic alternatives in relation to pain treatment
- 17 —be able to assess the results critically according to the principles of Evidence Based Medicine

### Operative totals for pain surgery

The trainee should be involved in a minimum of 40 specific surgical procedures for treatment of pain.

The level of involvement is defined by the following criteria:

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 “Organisation of surgical training in neurosurgery”: HJ Reulen, PA Winkler—Romanian neurosurgery, XIV, 2 : 4–14, [3])

The following repartitions of procedures are recommended, respectively (see above):

Procedures	T	TS	C	A	Total
Spinal cord stimulation	2	2	3	5	12
Trigeminal nerve surgery	1	1	2	4	8
Other neuromodulation/ablative techniques	2	3	6	9	20

### Program director and faculty

The program director must be certified in neurosurgery.

He or she must have a special expertise in pain evaluation and management. He or she must have conducted a minimum of the following operations :

#### Neuromodulation techniques:

Chronic spinal cord stimulation	100
Motor cortex and/or deep brain stimulation	20
Intrathecal drug administration	10

#### Cranial nerve surgery

Microvascular decompression, percutaneous techniques and/or radiosurgery	75
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#### Neuroablative techniques

DREZ-otomy, facet joint or peripheral nerve lesions and/or other neuroablative techniques	100
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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 pain surgery and also non-surgical alternatives.

### 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, at least 1 oral presentation (or 2 posters) at national and international conferences. It is strongly advised to publish at least 1 manuscript concerning the subject.

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

### 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.

**Conflicts of interest** None.

### Appendix

Vs.1.0 prepared by Joachim K. Krauss

Vs. 2.0 prepared by Yves Lazorthes, Serge Blond, and Joachim Krauss

Vs. 3.0 prepared by Bart Nuttin and Giovanni Broggi  
Vs. 3.1 prepared by Yves Lazorthes, Joachim Krauss,  
Damianos Sakas, Bart Nuttin  
Vs. 4.0 prepared by Yves Lazorthes, Bart Nuttin

## References

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