

Neurosurgical Training
**UEMS charter on training of medical specialists
in the EU – the neurosurgical training charter (as of February 2007)**

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Introduction

In the directive 93/16 EEC of 5.04.1993, the European Commission laid down the general guidelines for the training of medical specialists in the member states of the EU, EFTA and associated member states. On the European level, the UEMS (European Union of Medical Specialists) is responsible for harmonisation and improvement of the quality of medical specialist practice in the EU. Its statutory purpose is the formulation of a common policy in the field of training.

In 1995 the “Chapter on Training of Medical Specialists in the European Community” was published, outlining the general requirements and guidelines of postgraduate training as well as the special requirements for the various medical specialities including neurosurgery (www.uems.be → Training/Formation). Responsible national organisations have strongly been recommended to implement these requirements and guidelines in their national training programmes.

On request of the UEMS, a novellation was formulated in 2002–2005 for all medical specialities which is

now available also for the field of neurosurgery. It describes more precisely than so far the structures of neurosurgical training including the external audits required now as well as the operative figures at the end of training. This first version was published by J. Steers, H.-J. Reulen, and K. W. Lindsay in *Acta Neurochirurgica* vol. 146, no. 12, 2004. The second version has now been developed by the UEMS Section of Neurosurgery and received final approval from the delegates on February 23, 2007.

The Neurosurgical Training Charter will be the working basis for the JRAAC and above all for the national societies and national authorities.

It will be the professional position paper needed by the European Commission when further EU directives in the field of medical specialist practice are being contemplated.

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President EANS

Charter on training of medical specialists in the EU – requirements for the speciality of neurosurgery (as of February, 2007) (UEMS Specialist Section of Neurosurgery)

Foreword

This document sets out standards and guidelines for neurosurgical residency training and for approval of training programmes in the countries of the EU/EFTA and associated member states. It is recognised that there are a number of structural and operational differences in the health care systems, appointment procedures and training systems in these different countries. This document provides the basis for the development of a harmonised, comprehensive, structured and balanced training programme in Neurosurgery.

The future of European neurosurgery will depend on the quality of training offered to our trainees. Apprentice style training, which has been at the heart of traditional training, is increasingly being threatened by regulation and legislation. Hours of work for both trainers and trainees is coming under increasing pressure from many competing demands, many of which further fragment the training opportunities available.

Goal of training programme

The primary goal of a training programme is to provide the trainee with a broad knowledge base, the necessary operative and procedural skills and experience as well as professional judgement for independent neurosurgical practice; a further goal is to teach him/her self-criticism, critical assessment of his/her results, the ability to self-directed learning which will eventually lead to continued growth, expert practice and professionalism.

Definition of speciality

Neurosurgery is a discipline that provides the diagnosis, the operative, and non-operative management (i.e. prevention, diagnosis, evaluation, treatment, intensive care, and rehabilitation) of patients with pathological processes

that affect the central, peripheral (and autonomic) nervous system, including their supporting structures and vascular supply as well as the operative and non-operative management of pain. This encompasses the modern treatment of disorders of the brain, meninges, skull and their blood supply including the extracranial carotid and vertebral arteries; disorders of the pituitary gland, disorders of the cranial, spinal nerves, peripheral nerves and disorders of the autonomic nervous systems, disorders of the spinal cord, meninges and spine including those which may require treatment by spinal fusion or instrumentation.

Article 1: General rules on monitoring and accreditation

1.1 Manpower planning

Manpower planning should be developed, based on the demands and provision of safe care across the countries of the EU and associated member states. Planners will have to take into consideration demographic changes in any population such as its growth and ageing, changing treatment modalities and actual workload, the possible effects of legislation on working hours and, in some centers, the involvement in education of medical professionals. **Whilst many countries intend to increase the number of trained neurosurgeons, there is a recognised risk that overproduction leads to the dilution of experience and consequent difficulties in maintaining competencies.**

1.2 Monitoring authority at European level

Harmonisation of neurosurgical training throughout Europe will require standards of training and monitoring, and centralised registration of approval of neurosurgical training programmes in the EU and associated countries. The central monitoring body is the Joint Residency

Advisory and Accreditation Committee (JRAAC); a joint committee of the Section of Neurosurgery of the UEMS and the European Association of Neurosurgical Societies (EANS).

National professional bodies (responsible for the recognition of medical specialists in individual countries) can monitor and recognise neurosurgical training programmes using UEMS standards based on the Training Charter. In the interest of developing common standards, cooperation with JRAAC is recommended.

1.3 Accreditation of training institutions

The visitation and evaluation of training institutions is an important feed back mechanism for quality improvement.

- 1.3.1 A training institution or training programme must have European or national recognition/accreditation, respectively, according to UEMS/national standards.
- 1.3.2 To be accredited, an educational programme must substantially comply with the special requirements for residency training in neurosurgery as set down by the UEMS Training Charter. Programmes must demonstrate their compliance with these requirements at the time of the site visit. Site visits will be carried out in accordance with the Charter on Site Visits.
- 1.3.3 Nationally accredited training programmes in neurosurgery may also be approved by the Joint Residency Advisory and Accreditation Committee.
- 1.3.4 A training programme must be reviewed every 5 years, or within 12 months following the appointment of a new director of training programme.

1.4 Accreditation of trainers

Trainers must be certified neurosurgeons and the Programme Director must be registered in accordance with the medical licensing authority of the country of the training programme and possess the necessary administrative, teaching and clinical skills required to conduct the programme.

Article 2: General aspects of training in the speciality

2.1 Selection for and access to the speciality

- 2.1.1 Applicants should have a valid license to practice medicine within a training programme in EU and

associated countries; this license has to be recognised by the country where he/she will be trained. Training institutions or, if present, responsible bodies should select or appoint trainees suitable for the speciality in accordance with an established selection procedure. This selection procedure should be transparent and fair, and application should be open to all eligible persons. The candidates should be aware of these requirements.

- 2.1.2 After appointment of a trainee, a training agreement should be entered into by the Director of the Programme and trainee and duly signed by the trainee and the Director. The agreement should define – in terms of education and training – the relationships, duties and obligations on each side.

2.2 Duration of training

Training must cover the full range of the speciality and lead to the ability for independent practice on completion of training.

- 2.2.1 Neurosurgical training is of 6 years minimum duration, consisting of a minimum of 4 years' training in clinical neurosurgery in an accredited programme. Of these 4 years dedicated to neurosurgery, at least 3 years should be spent in a UEMS member state and not less than 3 years in the same recognised programme. Training must include adequate exposure to intensive care and to paediatric neurosurgery (see 3.2.1). Due to future reduction in hours of work there may be a need to prolong the training time in clinical neurosurgery from 4 to 5 years.
- 2.2.2 Up to a total of 2 years may be spent in related disciplines (in a surgical discipline, in neurology, in neuropaediatrics, in neuroradiology, in neuropathology, in neurophysiology) and/or activities including research in neurosciences.

2.3 Curriculum of general and specific training periods

- 2.3.1 A written *Training Curriculum* must be designed to provide a diversified and balanced quality (theoretical and practical) of neurosurgical education describing the contents and aims in each year of training. This must be available to trainees and the faculty. Emphasis should be placed on adequate time allocated for study and tuition independent of clinical duties. It may be necessary for some units to formally organize specific training periods in

associated neurosurgical units, if adequate experience cannot be provided internally.

- 2.3.2 There should be established *Rotation Periods* covering all main areas of neurosurgery (including paediatric neurosurgery). These rotations should be organized in such a way as to give trainees increasing responsibility as they process through their training with regard to patient care and surgical experience. Rotations may include neurology, surgical disciplines, neuroradiology, neuropathology, radiosurgery, etc. neurosciences or research, depending on requirements, local availability and the department's emphasis.
- 2.3.3 Some institutions may wish to use a structured *Surgical Training Plan*. The main idea of this is a continuous and systemic escalation of surgical responsibilities and competence through training years 1–6.

2.3.4 Education programme

There should be a documented, continuous *Education Programme* throughout the training, which should include daily, weekly and monthly conferences, etc. There must be protected time for study and tuition.

This education programme should consist of

- A programme of lectures including visiting speakers.
- Clinical presentations from all neuroscience disciplines.
- Neuropathological and neuroradiological conferences.
- Journal club.
- Mortality and morbidity conference (with audited attendance).
- Research meetings.
- Regular teaching conferences including subspecialties (residents should take increasing responsibility in the conferences and in the teaching of junior trainees, nurses, students).
- Teaching in ethics, administration, management and economics.

2.3.5 Exposure to research

Trainees should be encouraged and would be expected to develop an understanding of research methodology. An appropriately qualified person should supervise specific research projects. There should be a protected period of time within a 6-year-programme where a trainee can participate in a specific research project. All trainees will be expected to be able to assess published work. In academic programmes, clinical and/or basic research

the opportunities must be available to the trainee with appropriate faculty supervision.

2.3.6 Participation in meetings/courses

It is recommended that trainees attend the meetings of the national neurosurgical society once a year (or an equivalent meeting). If possible trainees should participate in the European Association of Neurosurgical Societies' training courses or equivalent national training courses. During their training, they should also attend a subspecialty course/meeting (spinal, stereotaxy, paediatric, peripheral nerves, neurooncology, neurovascular, etc.) and if possible a hands-on-course in anatomy or surgical techniques.

- 2.3.7 Trainees should keep a *Trainee Portfolio* containing details of previous training posts, examinations passed, lists of publications and presentations at meetings, courses attended, cumulative operative totals, copies of assessment forms of these different training periods.

2.4 Training log-book and periodic progress assessment of trainees

2.4.1 Log book

Each trainee must keep an authorized *Log-book* that meets the standards of the EANS/UEMS log-book for documentation of operative experience. The trainee will have to demonstrate that he/she has assisted a wide range of cases which should include a balance of trainer assisted and personal cases under supervision. Log-book entries must be monitored by regular inspection and signed off by the appropriate trainer. The log-book must be available at Board examination.

2.4.2 Periodic progress assessment

The purpose of assessment is to ensure continuing progress in the trainee's knowledge and skills as well as professional conduct and ethics.

Trainees have to meet the agreed standards and requirements of the planned programme. Assessment must be performed on a six monthly basis or at the end of each rotation period by the appropriate trainer in writing using an evaluation sheet. The log-book is used as supporting documentation. The result of the evaluation must be discussed with each resident. Failure to meet the agreed targets must be brought to the attention of the training programme director.

It is the responsibility of the training programme director to identify any failure in a trainee's progress, to conduct and to provide appropriate advice, and to take remedial action.

In the event of trainees not progressing as required, there are three stages of remedial action. Targeted training: closer monitoring and supervision to address particular needs; intensified supervision and, if necessary, repetition of the appropriate part of the programme; and finally to withdraw a trainee from the programme.

It is of greatest importance that accurate records of the trainee's progress are kept (trainee's portfolio).

In future a parallel assessment for trainees to assess their training may be introduced to monitor the effectiveness of the training programme.

Article 3: Requirement for training institutions

3.1 Process for recognition as a training institution

In order to be recognized, the training institution must substantially comply with the special requirements for Residency Training in Neurosurgery and the General Requirements in Graduate Medical Education of the UEMS Training Charter. The training institution (programme) must be able to demonstrate its compliance with these requirements at the time of a site visit conducted by the JRAAC or equivalent national body.

3.1.1 The application

The Programme Director must submit a Programme Application Form to JRAAC describing the personnel, space, technical facilities, and in particular the Residency Training Programme. The Application Form can be obtained from the secretary of JRAAC or the web site of EANS (www.eans.org → committees JRAAC).

3.1.2 The site visit

The next step will be a site visit of the applicant institution, conducted by two independent visitors nominated by JRAAC and a third national observer/visitor appointed by the applicant institution. The date of the site visit will be arranged between the Programme Director and the site visitors. The Programme Director will receive the necessary information to prepare the site visit in due time. The site visit will be performed in accordance with [the guidelines of the UEMS Charter on Visitation of Training Centers](#).

The site visit serves to explore in detail the training programme, the educational and scientific environment, by holding discussions with the Chairman, the teachers, the trainees, and administration of the unit. A report will be prepared by the site visitors and will be part of the final decision of the unit on the accreditation status of the programme. All information obtained during the interviews with trainers and trainees remains absolutely confidential.

The accreditation status as decided by the JRAAC will be reported to the Programme Director by formal Letter of Notification. Together with the site visit report, additional advice and recommendations – if necessary – will be given to further improve the Training Programme.

3.1.3 The accreditation

The following decisions may be taken by the JRAAC with regard to the accreditation status of a Training Institution and Programme:

Full accreditation may be granted if the programme has demonstrated its full compliance with the European Training Charter. The Department will receive a certificate indicating that the Department and the Training Programme fulfil the criteria meeting European Standards of Excellence for Education in Neurosurgery. The accreditation shall be re-assessed after 5 years or within one year after change of Programme Director.

Provisional accreditation indicates that the programme is basically in line (but not in compliance) with the requirements and standards. It is considered to be at the development stage of its training programme. The Programme Director will be requested to submit a so-called Progress Report within one or two years of notification. The Committee shall specify precisely the information to be provided. When a Progress Report is requested, a specific due date should be included in the request.

Accreditation may be withheld if the programme does not substantially comply with the requirements and standards. The Committee will cite those areas in which the reviewed programme does not comply with the standards. A new application can be submitted when the areas indicated are brought into compliance with the requirements and standards.

Accreditation may be discontinued if a programme for some reason is no longer in compliance with the requirements and standards. A new application can be submitted if the requirements are again fulfilled.

Reassessment of a Programme is usually done after 5 years or within one year after a change of Programme Director.

3.2 Requirements on equipment and educational facilities

3.2.1 The training programme

- There must be a referral base sufficient to provide an adequate case volume and mixture to support the training programme.
- There must be a minimum of 4 trainers (including chairman/programme director).
- There must be at least 30 neurosurgical beds, and in addition critical care beds (7–10 per million).
- There must be at least two designated fully staffed (neurosurgically trained staff) and appropriately equipped operating theatres with availability of a 24 h operating theatre.
- There must be an operating microscope with CCTV for each theatre. The following are deemed to be essential equipment: ultrasonic aspirator, image guidance and/or ultrasound, a stereotactic system, radiological imaging, endoscopy equipment as standard.
- Neurosurgical theatres should be covered by anaesthetists with a special interest in neuroanaesthesia. Anaesthesia cover should be available at all times for neurosurgery.
- There must be designated and fully staffed neurosurgical intensive care beds. Neurosurgical intensive care may be managed by neurosurgery or there may be joint responsibility between neurosurgery and anaesthesia.
- There must be an emergency unit with 24 h admission.
- There must be outpatient clinics where non-emergency patients are seen before and after surgical procedures.
- There must be exposure to paediatric neurosurgery as a mandatory component of a training programme. Where this does not form part of routine work of the neurosurgical department, a six-month-secondment to an appropriate paediatric programme would be arranged.
It must be recognised that in some European states paediatrics requires special training and a protected environment.
- There should be opportunity to obtain experience of functional neurosurgery either within the department or in another neurosurgical department specialised in this field.

Highly specialised centres not covering the whole neurosurgical field can be included in rotational systems but cannot be training centres in their own right.

3.2.2 Associations and access to other relevant specialities

Allied specialities must be present to a sufficient extent to provide the trainee with the opportunity of developing his/her skills in a team approach to patient care. The training programme should be closely associated with the following departments or units officially certified for training:

- a department of neurology
- a department of surgery and traumatology to support neurosurgical involvement in cranial and spinal trauma
- a department of anaesthesiology with special responsibility for neuroanaesthesiology
- a department of radiology
- a department or unit of neuroradiology which has: imaging techniques with dedicated CT-scanning, access to MR-scanning on site and appropriate angiography equipment for diagnostic procedures including availability of interventional radiology
- a department of pathology
- a department or unit of neuropathology
- a department of radiotherapy
- a department of internal medicine and/or oncology
- a department of paediatrics.

3.2.3 Educational facilities

- Easily accessible library with adequate selection of books and journals on neurosurgery (mandatory).
- Office space for both faculty and trainees.
- Facilities for computer literature searches.
- Space and opportunity for practical and theoretical study (mandatory).
- Space and equipment for practical training of techniques in a laboratory setting.
- Space, equipment and supporting personnel for clinical and/or basic research in academic programmes.

3.3 Institutional quality management provisions

A training institution must have an internal system of medical audit or quality assurance.

- #### 3.3.1 Internal regulations.
- There should be written general guidelines of the training institution concerning patient care and patient information (patient's

consent), referrals, medical records, documentation, on-call and back-up schedules, days off, residents' work schedules, attendance at conferences and educational activities. These should be available to staff and trainees.

- 3.3.2 Internal medical quality assurance. There must be an internal system of medical audit, such as mortality and morbidity conferences, together with a structured procedure for reporting of accidents.
- 3.3.3 The hospital should have measures in place (perhaps in the form of a committee) in relation to quality control such as infection control and drugs and therapeutics committee should exist.
- 3.3.4 A programme and training in risk management should be in place.
- 3.3.5 The hospital or the training institution should have an annual activities report.

Article 4: Requirements for training programme director and trainers

4.1 Criteria for training programme director

- 4.1.1 A training programme requires the appointment of a Training Programme Director to coordinate the training activities of the unit.
- 4.1.2 The Training Programme Director does not need to be the head of the training institution.
- 4.1.3 He/she must be a certified specialist of a minimum of 5 years. His/her substantial working contract must be with the training institution.
- 4.1.4 The CV of the Programme Director should provide evidence of continuing professional development (CPD).
- 4.1.5 The Programme Director must have full secretarial and administrative support and there must be sufficient protected time to carry out his/her responsibilities.

4.2 Responsibilities of training programme director

He has to

- 4.2.1 establish a transparent and fair selection and appointment process for trainees
- 4.2.2 arrange a balanced training programme with established rotations ensuring that the trainee will have complete exposure to all aspects of neurosurgery. The programme must be written and available to trainers and trainees

- 4.2.3 ensure that there is dedicated time allocated to the trainers for training and that the trainers are fulfilling their training responsibilities, oversee the process of periodic assessment and review of the trainees
- 4.2.4 ensure that the individual trainees' documentation (training portfolios) are up to date
- 4.2.5 ensure that trainees attend appropriate and approved courses
- 4.2.6 provide valid documentation as to the satisfactory completion of training
- 4.2.7 ensure the annual collection and compilation of the number and types of neurosurgical operative procedures performed in the department and also in participating units connected with the training programme
- 4.2.8 provide opportunity for research, audit and other educationally valid activities such as opportunities to attend training courses and scientific meetings.

4.3 Criteria for neurosurgical trainers

- 4.3.1 Trainers should be certified neurosurgeons who can demonstrate that they are in compliance with the requirements of continuing professional development.
- 4.3.2 Trainers should possess the necessary administrative, teaching and clinical skills, and commitment to conduct the programme.
- 4.3.3 Trainers should have undertaken instruction in training (learning needs and teaching objectives) and assessment of trainees.
- 4.3.4 Trainers should provide evidence of scholarly activities (clinical and/or basic research, publications in recognised journals and participation in neurosurgical scientific meetings).
- 4.3.5 Trainers will require secretarial and administrative support.

4.4 Responsibilities of neurosurgical trainers

They have to

- 4.4.1 set realistic aims and objectives for a rotation or training period
- 4.4.2 supervise the day to day work of the trainee on the ward, in clinic and in the operating theatre
- 4.4.3 support and assess trainees' surgical progress at the end of each rotation or training period

- 4.4.4 ensure that the assessments and reports are documented and signed both by the trainer and the trainee
- 4.4.5 inform the programme director of problems at an early stage.

Article 5: Requirements for trainees

5.1 Minimal/optimal numbers

Trainees during their training must be exposed to at least 4 different trainers and the full spectrum of neurosurgical procedures.

Appendix 1 lists the key procedures and the minimum and optimum numbers of procedures that trainees should have performed at completion of training.

If the minimum of one key procedure is not fully met, this can be counterbalanced by a comparable key procedure of the same area. It is expected that minimum operative totals of each area are attained.

Trainees should have been directly involved in the pre- and post-operative management of these patients and should have a detailed understanding of the preoperative investigation.

Many of the above procedures demand the use of the operating microscope with which the trainee must be fully familiar.

In addition to the list of key procedures, the trainee should have assisted in or partly performed operations for:

- pituitary microadenomas
- complex basal meningiomas
- arterio-venous malformations
- paediatric procedures – supra and infra-tentorial tumours
- spinal conditions, etc.,

as summarized in the Assistant Figures' List (Appendix 1).

5.2 Communication abilities

- the trainee must demonstrate ability to record and convey patient details of history, examination and investigate findings to senior staff
- consent patients for operative procedures listed in 5.1 clearly detailing the reasons for performing the procedure and the risks involved
- communicate with patients and relatives and of passing on distressing information (e.g. malignancy or bereavement) in a sensitive and caring manner.

5.3 Log-book and assessment

5.3.1 The trainee must maintain an operative log book detailing his/her involvement in all cases.

5.3.2 The trainee should keep a training portfolio, which should include an up-to-date curriculum vitae incorporating

- details of previous training posts, dates, duration and trainers
- details of examinations passed
- list of publications with copies of published first page (abstract)
- list of research presentations at local, national and international meetings
- list of courses attended
- cumulative operative totals
- copies of assessment forms for each training period, completed and signed by trainers for that period.

5.4 Competence levels and certification for individual procedures

The Neurosurgical Training Record (Appendix 2) lists the cumulative operative totals actually done by a trainee and shows the "Competence Level" of each procedure expected at the end of six years' training. On completion of training the trainee tabulates his/her cumulative operative totals and indicates his/her level of competence. The training programme may require completion of this form at the end of each year of training.

At the end of neurosurgical training, the Training Director certifies the attainment of:

- satisfactory operative totals (see Appendices 1 and 2)
- adequate competency level for each procedure (Appendix 2)
- satisfactory assessment forms for each year of training.

5.5 Specifications of training

The formal basis is the Training Curriculum of the department with training periods covering all main areas of neurosurgery. During his/her training, a trainee may wish to emphasise academic or research exposure or a particular area of subspecialisation. This can be organised with the programme director if the trainee's progress and performance allows for this, and the rotation may be adapted correspondingly. In future more trainees may wish to acquire higher competence in a subspecialty area after finishing their formal 6-year-training. This may be organised through so-called fellowship programmes.

Article 6: Certification of completion of training

The National Authority is the responsible body for recognition/certification of medical specialities in each member state of the EC/EFTA. The majority of these countries now have a compulsory Board Examination consisting of an oral exam, a written exam or both, to assess knowledge, clinical judgement and the candidates' thought processes. National bodies should note the existence of the EANS two-part examination (written and oral) with sessions twice a year, which leads to European certification. This may be a useful tool which

could be assimilated by countries which do not have board certification examination arrangements in place. At the time of writing, European certification is not recognised as being equivalent to national certification.

Subspecialisation

Training is a continuing process. Competence in complex procedures exceeding the required operative totals and competence levels of appendices 1 and 2 should be developed either during the subspecialisation year or more likely after completion of training within the frame of a 1–1½ year subspecialisation fellowship.

Appendix 1. Neurosurgical training requirements as of July 9, 2005

Operative Totals		Adults*	minimum = T	optimum
1. Head Injuries	Total		47	93
Burr holes ext. ventricular drainage /ICP-monitoring/reservoir			15	30
Chronic subdural haematoma			10	20
Craniotomy-extradural/subdural/intracerebral haematoma/contusions			10	20
Depressed skull fracture			5	8
Dural repair (CSF fistula)			2	5
Cranioplasty			5	10
2. Supratent. Tumours and Lesions (excl. stereotactic procedures)	Total		40	61
Intrinsic tumours - primary/ metastatic			30	40
Meningioma			8	12
Pituitary adenoma (transphen. - transcranial)			0	5**
Other benign lesions (epidermoid, arachnoidal cyst, etc.)			2	4
3. Posterior Fossa Lesions	Total		7	14
Primary and metastatic tumours			3	6
Chiari malformation / Posterior Fossa Decompression			2	4
Other benign lesions (epidermoid, arachnoidal cyst, H. Lindau, etc.)			2	4
4. Infection (cranial - spinal)	Total		8	12
Abscess / subdural empyema			8	12
5. Vascular	Total		10	27
Craniotomy Aneurysm			0	8**
Craniotomy AVM			0	2**
Cavernous angioma			2	5
Haematoma (spontaneous intracerebral/intracerebellar)			8	12
6. Hydrocephalus (≥16 years)	Total		42	69
Shunting procedure, initial			20	30
Shunt-revision			10	15
Endoscopic fenestrations			2	4
External ventricular drainage			10	20
7. Spine	Total		92	145
Cervical disc disease/Spondylosis: anterior decompr./foraminotomy			15	25
Cervical instrumentation (anterior/posterior)			3	5
Lumbar disc disease/ Spondylosis: lumbar disc			50	70
laminotomy/ laminectomy for spondylosis			10	15
lumbar instrumentation			5	10
Spinal Tumours: Extradural			3	5
Intradural extramedullary			3	5
Instrumentation in vertebral tumours			0	5**
Spinal Trauma: Decompression/Instrumentation			3	5
8. Trigeminal and other Neuralgias	Total		7	13
Injection techniques/RF-lesion			5	8
Microvascular decompression			2	5
9. Stereotactic and Functional Neurosurgery	Total		5	23
Stereotactic tumour biopsy			5	10
Surgery for epilepsy			0	3**
Therapeutic electrostimulation (peripheral nerve, spinal)			2	5**
Implantation of ports/pumps for intrathecal drug delivery			2	5**
10. Peripheral Nerve***	Total		30	45
Entrapment decompression/transposition			30	45
11. Computer-aided interventions (not the procedures)	Total		10	25
12. Basic Techniques	Total			
Craniotomy supratentorial			60	80
Craniotomy posterior fossa			8	20

(Continued)

Appendix 1 (Continued)

Operative totals Paediatric through 15 yrs		minimum	optimum
1. Hydrocephalus and Congenital Malformation	Total	7	15
External ventricular drainage		5	10
Shunting procedure:		2	5
2. Head and Spine Injuries	Total	0	10
Burr holes, ICP-monitoring/drainage/reservoir		0	5**
Chronic subdural haematoma/hygroma		0	2**
Extra-/subdural hematoma		0	3**
3. Brain tumours and lesions	Total	0	3
Supratentorial tumors		0	3

Procedures that Trainees have to assist or perform in part (minimum)	assistant
Craniopharyngioma	5
Pituitary adenomas (transphen, + transcranial)	10
Acoustic neurinoma	10
Complex basal / posterior fossa meningioma	10
Craniotomy Aneurysm	12
AVM	5
Occlusive: Endarterectomy	3
Thoracic disc disease	3
Spinal Tumours: intramedullary	3
Thalamotomy, Pallidotomy/Stimulation technique	5
Implantation of ports/pumps for intrathecal drug delivery	5
Single suture craniosynostosis	2
Paediatric Infratentorial tumors	2
Meningo/meningomyelocele	3
Tethering syndromes	2
Spinal dysraphism	2
Peripheral nerve sutures (with graft)***	3

* It is of great importance that within the specific areas there is sufficient experience. If the minimum of one key procedure is not fully met, this can be counterbalanced by a comparable key procedure of the same area. The minimum operative total of each area should be attained.

** For some operations only “optimum” figures are given. Some national societies may define such operations as key procedures.

*** In a few European countries peripheral nerve procedures in the past have not been a mandatory requirement.

Explanations to Appendix 1

Key procedure

In order to make neurosurgical training comparable in the various European countries, key procedures had to be defined. Every trainee at the end of training should be able to perform these procedures independently, i.e. with a trainer supervising but not making a significant decision/practical manoeuvre during the operation. With these key procedures, a good standard of training is guaranteed which will become important when subspecialty areas are being developed.

Societies may wish to include additional key procedures and certainly can do so.

Minimum and optimum figures

Defining minimum figures of a key procedure has to take into consideration peculiarities and different situations in the various European countries. If a department cannot offer the full range of key procedures or provide sufficient volume of activity to allow the trainee to acquire the minimum figures, cooperation with another (larger) department is recommended.

Minimum figures should be attained. If the minimum of one key procedure is not fully met, this can be counterbalanced by a comparable key procedure of the same area. It is expected that the minimum operative total for each area be attained.

The optimum figures are provided as a goal for a good training programme and also to allow for competency-based training. It takes into account that trainees progress at varying rates. For some operations only “optimum” figures are indicated. National societies may define such operations as key procedures.

Assistant figures

This list contains procedures that trainees have to assist in or perform in part but with no obligation to perform them personally/independently. Most of these procedures will be learned either after finishing residency or in a subsequent subspecialty programme. The requirement of the assistant figures ensures that trainees are exposed to such complex diseases during their training and become familiar with the diagnostic procedures, the treatment options, and the follow-up required. Minimum figures should be attained.

Appendix 2. Neurosurgical training record

NATURE OF OPERATION - Adults	T Operative Totals			Minimum Competency level end of 6th Year			Training Director's Signature
	T	TS	A	1	2	3	
1. Head Injuries							
Burr holes ext. ventricular drainage /ICP-monitoring/reservoir							
Chronic subdural haematoma							
Craniotomy -extradural/subdural/intracerebral haematoma/ contusions							
Depressed skull fracture							
Dural repair (CSF fistula)							
Cranioplasty							
2. Supratent. Tumours+Lesions (excl. stereotactic procedures)							
Intrinsic tumours - primary / metastatic							
Meningioma - vault							
Meningioma - parasagittal							
Meningioma - complex basal							
Pituitary adenoma (transphen. - transcranial)							
Craniopharyngioma							
Other benign lesions (epidermoid, arachnoidal cyst, etc.)							
3. Posterior Fossa Lesions							
Primary and metastatic tumours (cerebellar hemisphere)							
Arnold Chiari malformation/ Posterior fossa decompression							
Acoustic neurinoma							
Other benign lesions (epidermoid, arachnoidal cyst, H. Lindau, etc.)							
4. Infection (cranial - spinal)							
Abscess / subdural empyema							
5. Vascular							
Craniotomy Aneurysm							
Craniotomy AVM							
Cavernous angioma							
Haematoma (spontaneous intracerebral/intracerebellar)							
Carotid endarterectomy							
6. Hydrocephalus (≥16 years)							
Shunting procedure, initial							
Shunt-revision							
Endoscopic fenestrations							
External ventricular drainage							
7. Spine							
Cervical disc disease/Spondylosis: anterior decompr./foraminotomy							
Cervical instrumentation (anterior/posterior)							
Lumbar disc disease/ Spondylosis: lumbar disc							
laminotomy/laminectomy for spondylosis							
lumbar instrumentation							
Thoracic disc disease							
Spinal Tumours: Extradural							
Intradural extramedullary							
Intradural intramedullary							
Instrumentation in vertebral tumours							
Spinal Trauma: Decompression/Instrumentation							
8. Trigeminal and other Neuralgias							
Injection techniques/RF-lesion							
Microvascular decompression							
9. Stereotactic and Functional Neurosurgery							
Stereotactic tumour biopsy							
Thalamotomy, Pallidotomy/Stimulation technique							
Surgery for epilepsy							
Therapeutic electrostimulation (peripheral nerve, spinal)							
Implantation of ports/pumps for intrathecal drug delivery							

(Continued)

Appendix 2 (Continued)

NATURE OF OPERATION - Adults	T Operative Totals			Minimum Competency level end of 6th year			Training Director's Signature
	T	TS	A	1	2	3	
10. Peripheral Nerve							
Entrapment decompression/transposition							
Peripheral nerve sutures (with graft)							
11. Computer-aided interventions (not the procedures)							
12. Basic Techniques							
Craniotomy supratentorial							
Craniotomy posterior fossa							
Transsphenoidal approach							

Operative totals Paediatric through 15 ys	Operative Totals			Competency levels end of 6th year			Training Director's Signature
	T	TS	A+C	1	2	3	
1. Hydrocephalus and Congenital Malformation							
External ventricular drainage							
Shunting procedure:							
Meningo/meningomyelocele							
Tethering syndromes							
Spinal dysraphism							
2. Head and Spine Injuries							
Burr holes, ICP-monitoring/drainage/reservoir							
Chronic subdural haematoma/hygroma							
Extra-/subdural hematoma							
3. Supra- and/or infratentorial tumours and lesions							
Supratentorial and/or infratentorial tumors							

Definitions:

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.

Competency levels:

1 Should have assisted in, but is unable to perform the procedure.

2 Competent to perform procedure under direct supervision.

3 Competent to perform procedure without direct supervision.