



UNION EUROPÉENNE DES MÉDECINS SPÉCIALISTES EUROPEAN UNION OF MEDICAL SPECIALISTS

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UEMS SECTION OF NEUROSURGERY

European Training Requirements for the Specialty of Neurosurgery

European Standards of Postgraduate Medical Specialist Training in Neurosurgery

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Preamble

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 recognized 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 harmonized, 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. Working time directives for both trainers and trainees are putting increasing pressure on working hours. Moreover many competing demands further fragment the training opportunities available.

Harmonisation of neurosurgical training throughout Europe requires standards of training and monitoring, and centralised registration of approval of neurosurgical training programmes in the EU and associated countries.

The central monitoring body in the field of neurosurgery is the Joint Residency Advisory and Accreditation Committee (JRAAC), a joint committee of the UEMS Section of Neurosurgery and the European Association of Neurosurgical Societies (EANS). National professional authorities (responsible for the recognition of medical specialists in individual countries) can monitor and recognise neurosurgical training programmes using UEMS standards based on this Training Charter. In the interest of developing common standards, cooperation with JRAAC is recommended.

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Goal of the training programme

The primary goal of a training programme in neurosurgery is to provide the trainee with a broad theoretical knowledge base, the necessary operative and procedural skills and experience, as well as professional judgment 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 progression, expert practice and professionalism.

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I. Training Requirements for Trainees

1. Content of training

a. **Theoretical knowledge**

Neurosurgery is a medical specialty 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 and peripheral nervous system, including their supporting structures and vascular supply, as well as the operative and non-operative management of pain. This encompasses the treatment of disorders of the brain, surrounding meninges, the skull and their blood supply including the extracranial carotid and vertebral arteries, disorders of the pituitary gland, disorders of the cranial and spinal nerves, peripheral nerves and disorders of the autonomic nervous system, disorders of the spinal cord, its surrounding meninges and spine including those which may require treatment by spinal instrumentation. During training the trainee should become familiar with the theoretical knowledge about the full spectrum of these neurosurgical disorders and treatments.

3 The formal basis of the training programme 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. Trainees may wish to acquire higher competence in a subspecialty area after finishing their formal training. This may be organised through fellowship programmes.

b. **Practical skills**

Trainees must be exposed to the full spectrum of neurosurgical procedures during their training. This requires a tutorship by several trainers, and it is advisable that the scope of the training is broadened by working in different training centres.

The Appendix 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 diagnostic investigations.

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In addition to the list of key procedures, there are **more complicated or rare procedures** that the trainee should have assisted in or partly performed:

- pituitary microadenomas
- complex basal meningiomas
- arteriovenous malformations
- paediatric procedures, especially supra- and infratentorial tumours
- complex spinal procedures

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

The Neurosurgical Training Record lists the cumulative operative totals actually done by a trainee and shows the Competence Level of each procedure expected at the end of the training. On completion of training the trainee tabulates his/her cumulative operative totals and indicates his/her level of competence. The training programme director may request 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 Appendix)
- adequate competency level for each procedure (see Appendix)
- satisfactory assessment forms for each year of training.

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c. Professionalism

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

Moreover medical professionalism includes knowledge of aspects of health care management, hospital management,...

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2. Organisation of training

a. **Assessment and evaluation**

Logbook and Training Portfolio

Each trainee must keep an authorized **Logbook** that meets the standards of the EANS/UEMS logbook 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. Logbook entries must be monitored by regular inspection and signed off by the appropriate trainer. The logbook must be available at Board Examination.

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 or 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.

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 Logbook 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.

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In the event of a trainee 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
- withdrawal of the trainee from the programme.

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

A parallel assessment for trainees to assess their training must be available to monitor the effectiveness of the training programme.

Certification of completion of training

The National Authority is the responsible body for recognition/certification of medical specialties 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 candidate's thought processes.

National bodies should note the existence of the EANS two-part examination (written and oral), which leads to European certification (European Diploma of Neurosurgery). However, this does not constitute a license to practice neurosurgery in any European country, which is the responsibility of the National Authority. This EANS examination may be a useful tool which could be assimilated by countries that do not have board certification examination arrangements in place. The EANS examination is open to residents in accredited European neurosurgical training programmes (Part I), and to candidates licensed to practice neurosurgery by the National Authority (Part II). At the time of writing, in some countries European certification is recognised as being equivalent to national certification.

b. Schedule of training

Selection for and access to the specialty

Applicants should have a valid license to practice medicine within a training programme in the EU and associated countries; this license has to be recognised by the country where he/she will be trained. Training institutions should select or appoint trainees for the speciality in accordance with an established selection procedure. In some countries this selection procedure may be organised on a national level; however it is important that the training institution gives final approval before a candidate enters the training programme.

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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. After appointment of a trainee, a training agreement should be entered into by the Director of the programme and trainee and duly signed by both the trainee and the director. The agreement should define - in terms of education and training - the relationships, duties and obligations of each party.

Duration of training

Training must cover the full range of the specialty and lead to the ability for independent practice on completion of training. Depending on national regulations, the training may start immediately after completion of medical school, or be preceded by an internship.

Neurosurgical training is recommended to be of 6 years' minimum duration, although it is recognised that in some member states the National Authorities may or already have decided to decrease the number of years of training. However, a minimum of 4 years' training in clinical neurosurgery in an accredited programme is mandatory. Up to a total of 2 years may be spent in related disciplines (in neurology, in another surgical discipline, in intensive care medicine, in neuropaediatrics, in neuroradiology, in neuropathology, in clinical neurophysiology,.) and in research in neurosciences.

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Due to reduction in hours of work there may be a need to prolong the training time in clinical neurosurgery to a minimum of 5 years. It is up to the National Authorities to decide if this can be achieved within a 6 years training, or if the total duration of training should be prolonged. Of the years dedicated to clinical 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 is a continuing process. Competence in complex procedures exceeding the required operative totals and competence levels of the Appendix should be developed either during the subspecialisation year or after completion of training within the frame of a subspecialisation fellowship.

Curriculum of general and specific training periods

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 allocation for study and tuition independent of clinical duties. It may be necessary for some departments to formally organize specific training periods in associated neurosurgical units, if adequate experience cannot be provided internally.

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There should be established rotation periods covering all main areas of neurosurgery. These rotations should be organized in such a way as to give trainees increasing responsibility as they progress through their training with regard to patient care and surgical experience. Rotations may include other clinical disciplines and research in neurosciences, depending on requirements, local availability and the department's emphasis. 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 subsequent training years.

There should be a documented, continuous **Education Programme** throughout the training, which should include seminars, conferences and meetings at a regular basis (daily, weekly, monthly).

This education programme should consist of

- a programme of lectures including visiting speakers
- clinical presentations from all neuroscience disciplines
- neuropathological and neuroradiological conferences
- journal clubs
- mortality and morbidity conferences (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.

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There must be protected time for study and tuition. Trainees should be encouraged and are expected to develop an understanding of research methodology. All trainees are expected to be able to assess published work. In academic programmes, the opportunity for clinical and/or basic research should be available to the trainee with appropriate faculty supervision. An appropriately qualified person should supervise specific research projects if applicable. There should be a protected period of time within a 6-year-programme where a trainee can participate in a specific research project.

It is recommended that trainees attend the meetings of the national neurosurgical society (or an equivalent meeting). If possible trainees should participate in the training courses organized by the European Association of Neurosurgical Societies (EANS) or equivalent national and international training courses. During their training, they should also attend scientific meetings and hands-on-courses.

Trainees should keep a Trainee Portfolio containing details of all activities of the Education Programme in which he/she participated.

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II. Training Requirements for Trainers

1. Requested qualification and experience

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.

A training programme requires the appointment of a **Training Programme Director** to coordinate the training activities of the unit. The Training Programme Director is not necessarily head of the clinical department. The director must be a certified specialist of a minimum of 5 years. His/her substantial working contract must be with the training institution. The curriculum vitae of the Programme Director should provide evidence of continuing professional development (CPD). The Programme Director must have full secretarial and administrative support and there must be sufficient protected time to carry out all responsibilities.

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

2. Core competencies

The **Training Programme Director** has to establish a transparent and fair selection and appointment process for trainees. The director has to arrange a balanced training programme (Training Curriculum) with established rotations ensuring that the trainee will have complete exposure to all aspects of neurosurgery. The Training Curriculum must be written and available to trainers and trainees. The director has to ensure that there is dedicated time allocated to the trainers for training and that the trainers are fulfilling their training responsibilities. The director has to oversee the process of periodic assessment and review of the trainees. The director has to ensure that the individual trainees' documentation (Training Portfolio) is up to

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date and has to ensure that trainees attend appropriate and approved courses. The director has to provide valid documentation as to the satisfactory completion of training. The director has to 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. The director has to provide the opportunity for research and other educationally valid activities such as opportunities to attend training courses and scientific meetings.

Neurosurgical **trainers** have to set realistic aims and objectives for a rotation or training period. The trainer has to supervise the day to day work of the trainee on the ward, in the outpatient clinic and in the operating theatre. The trainer has to evaluate the trainees' surgical progress at the end of each rotation or training period and ensure that the assessments and reports are documented and signed both by the trainer and the trainee. The trainer has to inform the programme director at an early stage of problems of any kind with the trainee.

III. Training Requirements for Training Institutions

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1. Process for recognition as training centre

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 must be able to demonstrate its compliance with these requirements at the time of a site visit conducted by the Joint Residency Advisory and Accreditation Committee (JRAAC) (or equivalent national body).

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 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 Centres.

The site visit serves to explore in detail the training programme, the educational and scientific environment, by holding discussions with the director, 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 on the accreditation status of the

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programme. All information obtained during the interviews with trainers and trainees remains absolutely confidential.

The accreditation status as decided by JRAAC will be reported to the Programme Director by a 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.

The following decisions may be taken by 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.

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 Progress Report within one or two years of notification. JRAAC shall specify precisely the information to be provided. When a Progress Report is requested, a specific date should be included in the request.

Accreditation may be withheld if the programme does not substantially comply with the requirements and standards. JRAAC 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.

a. Requirement on clinical activities

There must be a sufficient referral base 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).

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 neurosurgeons or there may be joint responsibility between neurosurgeons and anaesthetists/intensivists.

There must be an emergency unit with 24 hours admission.

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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 should be arranged. It must be recognised that in some European countries paediatric neurosurgery requires special training and a specific environment. There should be opportunity to obtain experience in functional neurosurgery either within the department or in another neurosurgical department specialised in this field.

Allied specialities must be present to a sufficient extent to provide the trainee with the opportunity of developing his/her skills in a multidisciplinary 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 neuroanaesthesia
- 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 and interventional neuroradiology
- a department of pathology
- a department or unit of neuropathology
- a department of radiotherapy
- a department of internal medicine
- a department of oncology
- a department of paediatrics.

b. Requirement on equipment and accommodation

There must be fully staffed and appropriately equipped operating theatres with availability of a 24 hour operating theatre. There must be an operating microscope for each theatre. Moreover the following are deemed to be essential equipment: ultrasonic aspirator, image guidance and/or ultrasound, a stereotactic system, radiological imaging, endoscopy equipment.

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Furthermore, the following accommodations should be available:

- Easily accessible library with adequate selection of books and journals on neurosurgery (hard copy or electronic), with facilities for literature searches.
- Office space for both faculty and trainees.
- Space and equipment for practical training of techniques in a laboratory setting (not necessarily on site).
- Space, equipment and supporting personnel for clinical and/or basic research in academic programmes.

2. Quality Management within Training institutions

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

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

There must be an internal system of medical audit, such as mortality and morbidity conferences, together with a structured procedure for the reporting of accidents.

The hospital should have measures in place (e.g. in the form of a committee) in relation to quality control such as infection control. A drugs and therapeutics committee should exist. A programme and training in risk management should be in place. The hospital or the training institution should have an annual activities report.

Appendix Neurosurgical Training Requirements

				Minimum competency level at the end of training*			
Operative Totals		ADULTS	minimum	optimum	1	2	3
1. Head Injuries	Total						
Burr holes (external ventricular drainage, ICP-monitoring, reservoir)		15	30				X
Chronic subdural haematoma		10	20				X
Craniotomy (extradural/subdural/intracerebral haematoma, contusions)		10	20				X
Depressed skull fracture		5	8				X
Dural repair (CSF fistula)		2	5		X		
Cranioplasty		5	10				X
2. Supratentorial Tumours and Lesions (Craniotomy)	Total						
Glioma		20	40				X
Metastasis		10	20				X
Meningioma		8	12				X
Pituitary adenoma (transsphenoidal - transcranial)		0	10		X		
Stereotactic/image guided tumour biopsy		10	20				X
Other lesions (epidermoid, arachnoidal cyst etc.)		2	4				
3. Posterior Fossa Lesions	Total						
Primary and metastatic tumours		3	6				X
Chiari malformation		2	4		X		
Other lesions (epidermoid, arachnoidal cyst etc.)		2	4		X		
4. Infection (cranial - spinal)	Total						
Abscess / subdural empyema		5	10				X
5. Vascular Neurosurgery	Total						
Aneurysm clipping		0	5	X			
AVM		0	2	X			
Cavernous malformation		2	5		X		
Haematoma (spontaneous intracerebral and intracerebellar)		8	12				X
6. Hydrocephalus (≥16 years)	Total						
Shunting procedure, initial		20	30				X
Shunt-revision		10	15				X
Third ventriculostomy		2	5		X		
External ventricular drainage		10	20				X
7. Spine	Total						
Cervical disc disease-spondylosis: anterior decompression/foraminotomy		15	25				X
Cervical instrumentation (anterior/posterior)		5	10		X		
Lumbar disc disease-spondylosis and spinal stenosis		50	70				X
Lumbar instrumentation		5	20				
Spinal Tumours: Extradural		3	5				X
Spinal Tumours: Intradural extramedullary		0	5			X	
Instrumentation in vertebral tumours		0	5	X			
Spinal Trauma: Decompression/Instrumentation		5	10			X	
8. Trigeminal Neuralgia and other neuralgias	Total						
Injection techniques, radiofrequency lesion		5	10			X	
Microvascular decompression		0	5	X			

9. Functional Neurosurgery	Total					
DBS, Thalamotomy, Pallidotomy	0	5	X			
Surgery for epilepsy	0	5	X			
Therapeutic electrostimulation (peripheral nerve, spinal)	10	20		X		
Implantation of ports/pumps for intrathecal drug delivery	10	20				X
10. Peripheral Nerve Surgery**	Total					
Entrapment decompression/transposition	30	45				X
12. Basic Techniques	Total					
Craniotomy supratentorial	60	80				X
Craniotomy posterior fossa	20	30				X

Operative totals		PAEDIATRIC (through 15 y)		minimum	optimum	1	2	3
1. Hydrocephalus and Congenital Malformation	Total							
External ventricular drainage	5	10						X
Shunting procedure	5	10						X
2. Head and Spine Injuries	Total							
Burr holes, ICP-monitoring/drainage/reservoir	0	5				X		
Chronic subdural haematoma/hygroma	0	2				X		
Extra-/subdural hematoma	0	3				X		
3. Brain tumours and lesions (craniotomy)	Total							
Supratentorial and infratentorial tumors	0	5				X		

Other procedures that trainees have to assist or perform in part	minimum	1	2	3
Craniopharyngioma	5	X		
Pituitary adenoma (transphenoidal - transcranial)	10	X		
Vestibular neurinoma	10	X		
Parasagittal meningioma	10		X	
Complex basal / posterior fossa meningioma	10	X		
Aneurysm clipping	10	X		
AVM	5	X		
Carotid endarterectomy	3	X		
Thoracic disc disease	3	X		
Spinal Tumours: Intradural extramedullary	5		X	
Spinal Tumours: intramedullary	3	X		
Instrumentation in vertebral tumours	3	X		
Microvascular decompression	5	X		
DBS, Thalamotomy, Pallidotomy	5	X		
Surgery for epilepsy	5	X		
Craniosynostosis	5	X		
Paediatric supratentorial tumors	5	X		
Paediatric Infratentorial tumors	5	X		
Meningocele, meningomyelocele	3	X		
Tethering syndromes, spinal dysraphism	5	X		
Peripheral nerve sutures (with graft) **	3	X		

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 compensated 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.

* 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.

** In some European countries peripheral nerve procedures have not been a mandatory requirement.