

Neurosurgical Training Programme in Selected European Countries: From the Young Neurosurgeons' Point of View

Seçilmiş Avrupa Ülkelerinde Nöroşirürji Eğitim Programları: Genç Nöroşirürjiyenlerin Bakış Açısından

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ABSTRACT

AIM: In this paper we discuss the Neurosurgical Training Programme (NTP) in some European countries.

MATERIAL and METHODS: Although there is no official data on how many neurosurgeons are certified in Europe, our calculation shows that this number is somewhat lower than in the United States of America and even 3 times lower than in Japan (per 100.000 population). It is also evident that there is no consensus in the Programme duration or in the official NTP content, despite the recommendations of the EANS (The European Association of Neurosurgical Societies). Trainees from outside the European Union (EU) are under-represented in the EANS training courses. We believe that in the eastern part of Europe there is the most space for improvement in neurosurgical training. Solving of all these problems requires first and foremost their recognition and consideration - then devising a solution.

CONCLUSION: The purpose of this paper is to compare and contrast several NTP's in Europe in order to promote a more coherent medical education. Some remarks and suggestions from the perspective of young neurosurgeons are given.

KEYWORDS: Neurosurgical training, EANS, Resident, Trainee, Education, Training programme

ÖZ

AMAÇ: Bu çalışmada, bazı Avrupa ülkelerinde uygulanan Nöroşirürji Eğitim Programlarını (NEP) tartışmaktayız.

YÖNTEM ve GEREÇLER: Avrupa'da çalışmakta olan kaç nöroşirürji uzmanı olduğuna dair resmi bir rakam bulunmamakla birlikte, hesaplarımız bu sayının Amerika Birleşik Devletleri'nden az olduğunu ve Japonya'dan ise 3 kat daha az olduğunu göstermektedir (100.000 nüfus başına). Aynı zamanda NEP resmi süresi ve içeriği konusunda da EANS (Avrupa Nöroşirürji Dernekleri Birliği) önerilerine rağmen bir uzlaşma bulunmadığı aşikârdır. Avrupa Birliği dışındaki ülkelerin katılımcıları EANS eğitim kurslarında daha az temsil edilmektedir. Nöroşirürji eğitimindeki ilerlemelerde, doğu Avrupa'da daha büyük bir boşluk bulunduğunu düşünmekteyiz. Tüm bu problemlerin çözümünün, öncelikle bu problemlerin tanınması ve dikkate alınması; ardından da çözüm yollarının üretilmesi ile mümkün olacağı kanaatindeyiz.

TARTIŞMA: Bu çalışmanın amacı, Avrupa'daki bazı NEP'lerin farklılıklarının karşılaştırılması ve daha bütünlük bir tıp eğitiminin önünün açılmasına katkıda bulunmaktır. Genç nöroşirürjiyenlerin perspektifinden bazı tespitlere ve önerilere de yer verilmektedir.

ANAHTAR SÖZCÜKLER: Nöroşirürji eğitimi, EANS, Asistan, Resident, Eğitim, Eğitim programları

BACKGROUND

The current situation in terms of the unification of training of neurosurgical residents in Europe has much work remaining. The diversity of European countries, historical facts, different nationalities and languages has caused the diversity and specificity of neurosurgical schools. There are currently 50 states in (or partially in) Europe, of which 44 states have their capital within Europe. All the states, except Belarus, Kazakhstan and Vatican City, are members of the Council of Europe. Since 2007, 27 of these countries are also member states of the European Union (EU). There is no unified model of Neurosurgical Training Programme (NTP) in the EU (6, 7, 32, 34), and it is also very different in non EU countries. The duration of the programme varies in the range of 2-7 years. The selection of new trainees, the number of new recruits and the manner of their training is specific for almost every country. Certain similarities exist, but they are far from the example in the USA (7, 21). Also the number of specialists of neurosurgeons per 100.000 population is quite different, and the manner of their certification and recertification (if applicable) is widely diversified.

SPECIFIC TRAINING IN SOME COUNTRIES

This paper is the cooperative work of ten colleagues from ten European countries; five of them are from the EU, but others are not. Our intention was to compare the different NTPs in selected countries. In this way, approximately a half of the European population was included. Working on this article, it was not always so easy to get all this information. For each NTP presented here, each co-author wrote the part from his respective country. Conceptually, we started with the same questions, but the answers were very different in the end. The collected data are summarized and compared with each other, and with the NTP in the USA and Japan as well.

NTP in Slovenia

Residency training in neurosurgery in Slovenia lasts 6 years. To enter a residency, the candidates must have a medical degree from an accredited medical school. The completion of the Slovenian Medical Licensing Exam or equivalent is also required. A candidate's academic and clinical performance in medical school and on the neurosurgical department as a volunteer is considered. To become a neurosurgeon, a candidate must complete a rigorous 6-year residency programme after medical school. Neurosurgical residents move up to become chief residents in their final year. After successfully completed residency training, the resident must pass a written exam followed by surgery of a neurosurgical case and an oral exam in the presence of a neurosurgical commission defined by medical chamber before becoming full-fledged neurosurgeons.

During residency there is no formal examination of the candidate. The written exam consists of multiple choice questions from neuroscience (neuroanatomy, neuropathology, neuroradiology, neurobiology, neurosurgery, intensive care), similar to the American Board of Neurological Surgery certification.

After a successful examination the candidate receives a diploma from the medical chamber and a license which allows him/her to work as a neurosurgeon-specialist. The young neurosurgeons are able to operate on individual neurotrauma cases, primary brain tumors, metastatic lesions, and degenerative spinal cases which require basic instrumentation. Cranial base lesions and vascular malformations are operated on with the assistance of senior neurosurgeons or senior traumatologist, in case of complex spinal pathology. There is no regular annual approval of neurosurgical specialization in Slovenia. However, the decision remains in the domain of the medical chamber in association with the national neurosurgical committee.

NTP in Albania

In Albania the potential neurosurgeon must volunteer for a period of several months within the hospital. The selection of candidates for the neurosurgical residency programme (starting December 2010) is based on national competition organized by the Department of Neurosurgery, Neurology and Psychiatry and the Faculty of Medicine. The NTP was divided in two periods until December 2010: the period before the School of Neurosurgery and the period when School of Neurosurgery started. After volunteering for a period of several months which may last a year, the candidate starts with an official residency programme. This means education in general surgery during a 4 year period, as well as affiliation and night shifts at the Department of Neurosurgery within the same period. At this time observation and hands on experience at the operating room is possible under the supervision of senior neurosurgeons. The following two years, full time is spent in neurosurgery, there are required activities on the ward, presentations in weekly staff meetings, and training in neurology and neuroradiology. This is parallel with the theoretical and practical neurosurgical courses. Unfortunately there is no possibility for cadaveric dissections and practice on radiosurgery and interventional radiology. During their residency programme for most of the residents, education abroad is recommended and supported.

The final Board exam is a combination of a presentation of one's research thesis. National competition for NTP does not open every year - it depends on the needs of hospitals.

NTP in Italy

The course of study in neurosurgery in Italy is an official university course based on a one-year contract with the university. The general plan is a six-year programme in neurosurgery. Admittance is allowed to "Medicine and Surgery" graduates - the students who passed an examination at the Faculty of Medicine and Surgery. This exam consists of a multiple choice text based on the solving of 60 questions (1/3 is oriented in neurosurgery). A practical exam is based on the concise treatment and consideration of a clinical case.

In neurosurgery, the programme implies a trainees' direct involvement in approximately 500 patients, 200 neurosurgical operations, and 20% as operator (head trauma cases,

spine, intracranial tumors, congenital). The most important diagnostic techniques in neurosurgery are also required knowledge. The young neurosurgeon must be able to routinely use the microscope, endoscope, neuronavigation, and access the cranial base. This training is officially finished with a written exam followed by an oral board exam (23).

After passing the exam, many of these certified neurosurgeons migrate abroad for some cooperation called "fellowships". They tend to go to countries such as Germany or USA where they can improve their skills and often find a job.

NTP in Bulgaria

Regarding the laws of Bulgaria the NTP is performed only in accredited hospitals. To enter the residency programme candidates must have a medical degree. They are taken annually to specific hospitals on a competitive basis. The academic performance in medical school is also considered. NTP in Bulgaria is 5 years in duration and is finished by a State exam in order to be certified as neurosurgeon.

This education focuses on clinical decision making, operative technique, ethical, legislation and forensic aspects in the field of neurosurgery. The trainees should obtain basic knowledge in anatomy, physiology and pathology of the nervous system, diagnostic modalities, theoretical and practical knowledge in neurosurgery. The training programme covers all areas of modern neurosurgery including neurotraumatology, neurooncology, vascular neurosurgery, parasitic and inflammatory diseases of the nervous system, pediatric neurosurgery, spinal, functional surgery, and neuroendoscopy.

Trainees are involved in more than 500 neurosurgical operations for the period of their education; a logbook is kept for these cases. A training requirement list of key procedures has to be signed by the programme director to finish the residency. There are also rotations to various neurosurgery departments for one year. Eventually, trainees have to pass eight partial exams.

After successfully completing NTP the resident must pass a State exam in 2 days which consist of multiple choice questions, written and oral section, and clinical case to assess the neurosurgical skills. When the examination is passed the candidate receives a diploma from the Ministry of Health and a license as a specialist neurosurgeon.

A certified neurosurgeon has to apply for a place as a staff member in a hospital or as a consultant in an outpatient center. The certified neurosurgeon can perform cranial, spinal and pediatric interventions. There are no subspecialties and there is an annual approval in Bulgaria. However, most of the neurosurgeons have interests in particular fields and continuous medical education is encouraged.

NTP in Russian Federation

The Russian system of NTP requires a 6- or 7-year course. After graduating from medical school and completing a year-long internship, doctors enter NTP which will take two years to

complete. The training programme is rigorous, complex and covers all areas of neurosurgery. The first year of training must include several months of residency in neurology, neuropathology and in a neuroimaging department to incorporate experience in clinical neurophysiology, neurointensive care and neurorehabilitation (8, 13, 17). The last six months of the first year residents have full time training in basic neurosurgery. The final year encompasses advanced neurosurgical training and special interest training in one of the neurosurgical subspecialties. At the end of this time, the trainee must pass the examination including structured interviews, problem solving, image interpretation, clinical scenario management, communication and practical skills assessment.

After the programme is complete, they usually work in different neurosurgical departments and outpatient centers, being able to perform basic neurosurgical operations under the supervision of their department's chief during the first year. Upon completion of a training programme, some neurosurgeons receive advanced training in a form of fellowships in particular areas of study, such as spinal disorders, cerebrovascular disorders or brain tumors to perform advanced neurosurgery interventions. Neurosurgeons continue their medical education and training throughout their career. Every five years it is obligatory to pass examinations to confirm one's qualification.

Residency training in neurosurgery in Russia needs to be improved. Neurosurgical training programmes currently focus on clinical and surgical skills without time for research activities. These training programmes should permit the transition from a resident neurosurgeon to a fully trained neurosurgeon. Newly trained neurosurgeons should possess the cognitive and psychomotor skills necessary to deal with the pathological conditions even without external advice from their colleagues. It will be possible to achieve these goals by prolonging the residency to four-five years.

NTP in Turkey

General medical training takes about 6 years in Turkey following high school education. This 6 year consists 3 years of basic, 2 years of clinical training and 1 year internship. In some faculties an additional one year preparation at the beginning is mandatory for English language. After completing medical school, a central exam is performed including two steps of English and scientific exams for specialization. Candidates are free to choose any clinic's program in this exam. Both University hospitals and government research hospitals have programs. No interview is necessary. Programmes vary from clinic to clinic; this programme was shortened by the Council of Higher Education of Turkey and recently takes 5 years. The first one or two years of residency necessitates a turnover of 36 hours of non-stop work and 12 hours of rest. The first and second years of neurosurgery trainees generally have to have 10-15 night shifts per month. There is no limit for the weekly work hour. During the progression of training, the night shifts begin to decrease and the trainee finds more time for educational and academic studies.

The neurosurgical training includes some rotations like neuroanatomy, pathology, anesthesiology, neurology, emergent medicine and general surgery. A resident must have a logbook for the operations he/she participated on during training. Furthermore, this must be signed by the director of the department at the end of training. There is one final exam at the end of the training which is held by department's academic staff. One alternative to this in Turkey is an involuntary government service for 2 years at government hospitals. A neurosurgeon is not permitted to perform any surgery without completing involuntary government service in Turkey. A one year military service is also compulsory for all males. After all, a specialized neurosurgeon may have opportunity to work in private, government or academic hospitals or scientific studies like fellowships or PhD programmes etc. A central board exam is being performed by Turkish Neurosurgical Society since 2006, but it has no formal processes yet.

In Turkey, there is one neurosurgeon per 56.000 inhabitants according to 2007 records (37). After this statistical report, the Council of Higher Education and Turkish Neurosurgical Society made a decision to decrease the numbers of residents. As of 2010, there are 1221 neurosurgeons which mean 1,68/100.000 habitants in Turkey. Distribution is: 654 in government hospitals, 235 in University hospitals and 332 in private hospitals (3, 31, 37).

NTP in Switzerland

To become a board-certified neurosurgeon in Switzerland, the curriculum takes officially 6 years. In reality, the majority trainees need up to 8 or more years. They have an opportunity to choose one year of discipline of choice other than neurosurgery (surgery, neurology, neuroradiology, neurophysiology, neuroanatomy, otorhinolaryngology, maxillo-facial surgery, neuropathology, and orthopedics). This is followed by 5 years of neurosurgery. During this period the trainee has to change the institution at least once by going to a different hospital. Preliminary exams include: written exam in basic surgery (general surgery), written licensing examination for dose-intensive X-ray examinations and radiation protection, and the EANS exam Part 1. The final examination is an oral one. There is no practical exam where you have to demonstrate your surgical skills.

After passing the final exam the young neurosurgeons should be able to operate individually on lumbar disc herniation, laminectomy with or without intradural intervention, variety of cervical spine surgeries, spinal fusion, some intracranial tumors, posterior fossa, hydrocephalus treatment, head trauma, dural reconstruction of the cranial base, stereotactic and functional procedures etc. What is recommended to change is more structured training concerning practical surgical aspects. Every year there are about 4-6 new certified neurosurgeons.

NTP in Bosnia and Herzegovina

NTP in Bosnia officially lasts six years (till the end of 2010 it was five years). Previously, after finishing medical school,

work in general practice for two years was compulsory (26). Volunteering at the Neurosurgical department is desirable and often starts at the final year of study; this usually lasts more than two years before obtaining an official programme. There is no choice for specialization, but the competition is based on the requirements and individual needs of hospitals. During the NTP, the first year trainees (which were previously at the Department already spent more than two years of preparation) are included in the programme of significant responsibility. In the morning they assist in major operations (aneurysms, AVM, skull base tumors, complex spinal surgery and pediatric neurosurgery) as the first or second assistant. In the afternoon, they write administration documents, finish the examination of patients on the ward, and during the night they are on call.

During the first three years of NTP, the circulation at the other departments related to neurosurgery is also obligatory. The next two years (4th and 5th), residents are constantly in the neurosurgical department. The last year, they are usually qualified independently and they perform relatively complex neurosurgical procedures under the supervision of experienced colleagues, using, of course, microsurgical technique. During the NTP the trainee is required to pass 30 partial exams (colloquia) orally, and pass the same surgical technique in the OR. The final neurosurgical exam has two parts. First part is multiple-choice questions testing. At the end follow an oral exam performed by three-person Board appointed by the National Ministry of Health. In this Board are sometimes included international experts.

There are a lot of areas that are not adequately covered by the NTP, in particular in the field of functional neurosurgery, epilepsy surgery and endovascular neurosurgery. The EANS Diploma in neurosurgery is desirable but not required. Trainees follow the instructions in the EANS Logbook but they are also optional.

NTP in Slovak Republic

The NTP in the Slovak Republic aims to produce neurosurgeons capable of independent practice but with limited autonomy in relation to the hierarchical system of management in neurosurgery (head of department, head physician). An essential requirement for entry into neurosurgical training is graduation from a university in general medicine. Generally, this neurosurgical training programme lasts 6.5 year and consists of 54 months in clinical neurosurgery, 6 months in general surgery, three months in neurointensive care unit, three months in traumatology/orthopedics, three months in clinical neurology, one month in neurophysiology, neuroradiology and neuropathology, one month in gynecology and obstetrics, two months in internal medicine and further three months of training in any related specialty such as oral surgery, plastic surgery or otorhinolaryngology.

The final examination is organized by the National Board Examination Committee at least once a year and consists of practical examination (performance of neurosurgical procedure), written examination (neurosurgical scientific

essay), written question examination (approx. 100 questions), and an oral examination. The oral examination is the final step of the diploma which certifies that the owner has the required theoretical and practical knowledge in neurosurgery for independent practice.

The candidates who pass the examination successfully become competent at the assessment of clinical problems, non operative management, neurosurgical intensive care and interpretation of neuroradiological and other neuroscience investigations. The neurosurgeon should have confidence in the following areas: craniotomy for cranial trauma, benign and malignant tumours, cranioplasty, shunting procedures, procedures for cranial, spinal infection disease, cervical and lumbar degenerative disc disease, spinal trauma and tumour, peripheral nerve procedures and stereotactic surgeries. Although the residency training should produce a neurosurgeon capable of independent practice, it is not expected that the trainee achieves competence in all neurosurgical procedures, especially in complex neurosurgical pathologies.

Neurosurgeons after the residency programme usually stay at the department where they began their neurosurgical career. Each year approximately 1-3 trainees pass the neurosurgical training programme.

NTP in Germany

The number of doctors in Germany increased in the last few years and it became easier to get a neurosurgical trainee position. Neurosurgical training is possible in the university hospitals as well as in a larger district or community hospitals with neurosurgical departments and in some neurosurgical

private practices. Changing hospitals and departments during NTP is possible and is not uncommon for the trainees.

During the six-year-programme trainees have to gain broad theoretical knowledge and surgical skills in management of a comprehensive catalogue of disorders. Six months on neurosurgical intensive care unit are compulsory for all trainees. Reduced working hours in the last 2-3 years due to the European Working Time Directive and shortage of doctors made it difficult to complete all theoretical and practical requirements in scheduled time. Therefore it usually takes 1-2 years longer to finish the training programme and pass the final oral exam.

Taking the final exam is not possible without fulfilling a determined number of operations, e.g. 100 on spinal disorders, 25 on peripheral nerves, 50 on traumatic brain injuries, 50 on brain tumours and vascular procedures, 50 on congenital malformations and shunts, 10 pain procedures, but also 150 diagnostic procedures and over 500 neurophysiologic measurements, ultrasound examinations, lumbar punctures or local and regional anaesthesia. There are small differences in the training regulations of the 17 State Chambers of Physicians in Germany. The final oral exam is always taken in front of the three-person board in the local medical association of the state where the trainee worked on the end of his/her training.

EANS training programme and examination is recommended but not generally required. According to the German Medical Association there were 1773 fully qualified neurosurgeons in Germany on the end of year 2009, and approximately 90 trainees successfully complete their NTP per year (Table I).

Table I: The Diversity of the Dispersion of the Number of Neurosurgeons in 10 European Countries. Although There is No Official Data How Many Neurosurgeons is Certified in Europe, Our Calculation, Based Also on WHO Report [23], Shows that This Number is in Average Somewhat Lower than in the USA and even 3 Times Lower than in Japan. It is also Evident that There is No Consensus in the Programmes Duration or in the Official NTP Content, Despite the Recommendations of the EANS.

	EU	Population (in millions)	N of neurosurgeons per 100.000 populations	NTP in years	Colloquium during RP	National annual approval
Albania	No	4.2	0.4	6	No	No
Bosnia and Herzegovina	No	4.0	0.8	6	Yes	No
Bulgaria	Yes	7.6	1.0	5	Yes	No
Germany	Yes	82.5	1.5	6	No	No
Italy	Yes	60.0	1.7	5	No	No
Russian Federation	No	145.0	1.7	2	No	No
Slovak Republic	Yes	5.0	1.5	6.5	No	No
Slovenia	Yes	2.0	1.0	6	No	No
Switzerland	No	7.5	1.4	6	No	No
Turkey	No	72.3	1.7	5	No	Yes
Europe		831.4	0,8	2-6		No
Japan		128.0	5.0	7		No
USA		311.0	1.2	6		Yes

DISCUSSION

Over years, surgical training is changing and years of tradition are being challenged by legal and ethical concerns for patient safety (1). Many factors influence the education policy in neurosurgery, for example the problems in the development or economy of the European national health systems (12, 15, 29). There are differences between neurosurgeons as well as the education policy in the various European countries (16, 19, 24). If we want to solve the problem of diversity in NTP in Europe in the coming decades, and thus to preserve confidence in European neurosurgery, it is necessary to find some central ground and to equalize the training programmes within Europe. The concept of a European Certification has met with much opposition from members of various national societies (5, 11, 36). If doctors use old techniques and methods then they will probably treat patients wrongly (22).

In that sense it is necessary to make additional efforts of national societies, but also EANS. Solving the problem requires first and foremost its recognition and consideration - then devising pathways for a solution.

Some countries have long had harmonized rules and training programmes for neurosurgeons (4, 20). For example, neurosurgical training in USA is a minimum of 72 months in length, including the PGY-1 (First Practicum Year), which is under the complete control of the neurosurgical Programme Director. At least 42 months must be devoted to core clinical neurosurgery with progressive responsibilities culminating in 12 months at the most senior level. The entire 42 months must be done in programmes accredited by the RRC (Residency Review Committee). At least 21 months must be obtained in one programme. Prior to accepting a candidate into the certification process, the Board requires a statement from the individual's Programme Director to the effect that he or she has met the minimum training requirements, performed in a satisfactory manner, and is well prepared to enter into the independent practice of neurosurgery (7, 14, 27, 28, 30).

A total of more than 30.000 neurosurgeons are reported to be available across the world. The median number of neurosurgeons is 0.56 per 100000 populations (Interquartile range 0.07-1.02) globally (2, 33). Approximately one third of all neurosurgeons in the World work in Europe. Surgical training must be precise and without mistakes, and training new neurosurgeons is crucial for the future. We need more harmony within Europe to promote this (19, 25).

The European Association of Neurosurgical Societies (EANS) was founded in 1971 as an association of European neurosurgical societies. For 40 years it has arranged congresses, scientific meetings and symposia, including the quadrennial European congress of neurosurgery, the Annual EANS meetings and the European training courses, but the unification of national NTP is still far. EANS national membership has expanded significantly in recent years and currently includes 38 countries (9). The EANS is involved in all aspects of neurosurgical training both at pre-board

certification level and at special interest training level. At a general training level the EANS' main activity is the European Neurosurgical Training Courses. These consist of four annual courses of five days each, covering the key topics of Vascular neurosurgery, Tumor, Head injury/Functional and Spine/Peripheral nerves. The course cycle therefore takes four years to complete, followed by European examinations in neurosurgery, which are set at a similar level to the examinations of the American Board of Neurosurgery. A candidate who receives a passing grade for this examination is granted the European Diploma in Neurosurgery. This degree, although a good attempt for certification of young neurosurgeons in Europe, unfortunately, is not binding, nor significantly adopted in many countries, especially outside the EU.

A good step is also the proposed European electronic Logbook of neurosurgical operations for recording neurosurgical procedures which are required to be performed during neurosurgical training, but is also optional (10) (Table II).

The Joint Residency Advisory and Accreditation Committee (JRAAC), a joint committee of the EANS and the Section of Neurosurgery of the UEMS, was founded by both organizations with the task of developing standards and guidelines for the European Training Programme in neurosurgery, to establish matching training curriculum and to try to standardize training in the different European countries. So far only 27 Neurosurgical Departments, from 15 countries, have received the European Accreditation of their Training Programmes. No doubt, there is increasing interest for a more structured training, identifying a minimum level of competence a specialist neurosurgeon. By working with JRAAC, the National Societies could develop their own system in countries where it does not exist or does not meet European criteria. Coordination of national Programmes in the future seems to be the only option (18).

EANS in this regard should have a leadership position and provide additional and clear recommendations; national neurosurgical societies should align their Programmes with those recommendations. In this way, in the future it will be possible to train better trained neurosurgeons with uniform basic programmes; even if they are from different European countries. These would benefit the society and the licensing of neurosurgeons at the European level would be simplified. A similar example of European education could follow later for some non-European countries.

CONCLUSION AND RECOMMENDATIONS

As a result of this investigation, we conclude that:

1. NTP in most European countries is generally well established, but there is still much space for improvement.
2. Many factors influence the education policy in neurosurgery, for example the problems in the development or economy of the European national health systems.

Table II: EANS Supported NTP Requirement List for Trainee Surgical Procedures [5,6], in Many Countries, Local or National Programme is not Determined by Minimum Operations Which must be Made by Trainee During the Course of Specialization

CATEGORY	MINIMAL NUMBER	OPTIMAL NUMBER
Adults Training Requirement List (Key Procedures)		
Head Injuries	47	93
Supratentorial Tumors and Lesions (excl. stereotactic procedure)	40	61
Posterior Fossa Lesions	7	14
Infection (cranial-spinal)	8	12
Vascular	10	27
Hydrocephalus (>= 16 years)	42	69
Spine	92	145
Trigeminal and other Neuralgias	7	13
Stereotactic and Functional Neurosurgery	9	23
Peripheral Nerve	30	45
Computer-aided interventions (not the procedures)	10	25
Basic Techniques	68	100
Children Training Requirement List (Key Procedures)		
Hydrocephalus and Congenital Malformation	7	15
Head and Spine Injuries	0	10
Brain tumors and lesions	0	3
Complex procedures that trainees have to assist or perform in part (Craniopharyngioma, pituitary adenomas /transphenoidal + transcranial approach/, acoustic neurinoma, complex basal/posterior fossa meningiomas, aneurysms, AVMs etc.)	85	
TOTAL	462	655

- It is necessary to find some common ground and to equalize the training programmes within Europe.
- EANS should have a leadership position in providing additional and clear recommendations for NTP, and national societies should follow those recommendations.
- Neurosurgical training concept must be more precise with more harmony within Europe.
- We want to promote and recommend an exchange of programmes and trainees between different countries during the NTP, for example over the whole 5th year. That could be good experience to offer trainees an opportunity to see another neurosurgical environment.

CONFLICT of INTEREST

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