Becoming a brain surgeon

From Monroe to McDreamy, neurosurgery is often heavily glamorized – certainly beyond the reality that neurosurgeons see in their careers. Despite the absence of daily life-saving heroics and perfectly coiffed hair, the job remains enthralling and extremely rewarding. And occasionally, one does save a life and do some really exciting, TV-worthy work.

One of the very real challenges of neurosurgery is getting onto a training scheme in the first place. This article advises potential applicants on sources of further information, the application and interview processes – and how to avoid common pitfalls to maximize the chances of success, the training scheme, opportunities for research and requirements for qualification as a consultant.

Find out more information

Organizations such as the Society of British Neurological Surgeons, the national membership body of the specialty, offer affiliated membership to anyone with an interest in neurosurgery. The Society of British Neurological Surgeons-affiliated Neurology and NeuroSurgery Interest Group (NANSIG) can provide information, introductions to projects with neurosurgeons, and career advice to students and trainees alike. In addition, the group organizes a number of national and local events aiming to bring together those with an interest in a career in the neurosciences.

Another good organization that has many local branches at UK medical schools is the Cutting Edge Surgical Society. Deanery websites may also be able to provide more information such as person specifications, examples of previous application forms and timelines.

Medical students and foundation year trainees have changed over the years. Perhaps driven by the burden of expectation brought about by exorbitant tuition fees, or a better understanding of the competitive nature of jobs after qualification, they seem less inclined to enjoy the huge privilege of looking after patients (and the relative lack of responsibility at their stage) and are more focussed on their CVs. It is not unusual for a student or foundation year 2 doctor to graduate with at least one publication and an international oral presentation.

Enquiries about potential audits and projects are high on the list of priorities of students and foundation years rotating through the author's department. Although we try to help, there are limits on time available for supervision and the number of projects that can be maintained at any one time – which often does not satisfy the number of enquiries. Organizations such as those mentioned above can be useful for networking with neurosurgical run-through trainees, consultants and other potential applicants. This may help to identify projects that an applicant can get involved with, or getting more information about the entry process. It can also help provide more information about the individual neurosurgical units and their relative pros and cons (e.g. sub-specialty expertise, location, training, research profile).

Statistics such as competition ratios are available on the Higher Education England website (https://specialtytraining.hee.nhs.uk/Competition-Ratios). Over the last few years, the competition ratio for neurosurgery has largely stayed the same – 2013 ST1 4.9, 2014 ST1 6.6, 2015 ST1 5.6, 2016 ST3 3.67 (other figures not available).

The application

The application form is electronic and accessed via an online portal. Application is at ST1 or ST3 dependent on length of experience in neurosurgery and attainment of Membership of the Royal College of Surgeons (MRCS). Applications typically open in early November, with a deadline around early December. The form is fairly standard, and similar to most other training job forms. It has demographic data sections, 'hard' sections such as previous and current clinical posts, other degrees, research (publications, presentations), audits, formal teaching experience, and prizes or awards, and 'soft' sections such as enquiring about a candidate's desire to do neurosurgery, and his/her proposed contribution to the specialty in the future (see below). Passing the MRCS is a pre-requisite for ST3 applications, and Advanced Life Support is a requirement for both stages of entry.

There is also a section for 'psychomotor skills'. Most surgical applicants state very confidently that they are good with their hands. There are no points available for such a subjective statement. The key is to back up the claim with evidence such as a sporting, artistic or musical skill, preferably with a recognized standard (e.g. national level Latin dancing, grade 8 classical guitar) – basically, any skill that demonstrates manual dexterity and hand–eye coordination.

There is also a section for neurosurgery operative experience. This lists common, basic to mid-level operations (e.g. burrholes, craniotomy for intracerebral haemorrhage, insertion of lumbar drain, insertion of intracranial pressure monitor). There would be an expectation of some entries in there to demonstrate exposure to operative neurosurgery but this is clearly going to be limited for ST1 applicants.

Before completing the form, it is essential to download the person specification and applicant handbook, and read it carefully a number of times. It is available on the NHS England website (www.yorksandhumberdeanery.nhs.uk/recruitment/national_recruitment/national_neurosurgery_st1__st3_recruitment/). The person specification is the roadmap outlined by the selection committee of the features they expect in a successful candidate. Ensure

Mr RK Mathew, Cancer Research UK Clinical Research Fellow, Department of Neurosurgery, Leeds General Infirmary, Leeds LS1 3EX, and Leeds Institute of Cancer and Pathology, St James's University Hospital, Leeds (ryan.mathew@nhs.net)

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that you have this alongside you for reference during the application process and refer to it often. Making sure you cover the points is essential.

Applications that have been successful at the longlisting stage proceed to shortlisting. ST1 applicants are also required to sit the Multi-Specialty Recruitment Assessment. This is a computer-based assessment, delivered in partnership with the Work Psychology Group and Pearson VUE, that aims to assess some of the fundamental competencies outlined in the ST1 person specifications. It is based around clinical scenarios and is available across a number of consecutive days in a large number of Pearson VUE computer testing centres (better known as being the locations where the driving theory test is undertaken).

During shortlisting, each application is scored by two trained assessors. The national selection chair deals with any unresolved discrepancies of more than one point between the assessors. Scoring criteria are clearly listed in the person specification and are based on formal recognition of achievements. For example, informal bedside teaching of medical students will not attract points, whereas a formal role in the medical school (e.g. undergraduate small group facilitator) or with an organization (e.g. suturing tutor or faculty on a Cutting Edge Surgical Society-organized basic skills course) will score highly. It is important that any such statements are backed up with written evidence – get a certificate of participation or written confirmation of your role on letter headed paper.

With respect to publications, the person specification is very clear that acceptance for publication is a minimum standard. Statements such as 'submitted', 'in revision', 'in writing-up stage' or 'in data collection' are not published pieces of work and as such will not attract any points. The person specification at ST1 or ST3 lists evidence of academic activity as desirable but does not specify that this has to be in neurosurgery or in any particular specialty, although publications in the field of neurosurgery will demonstrate further commitment to the specialty.

A common pitfall in the application process is to complete the form in the last days and hours before the deadline. Previous selection committee analysis has shown that such applications are most likely to be rejected. This is particularly important for the soft sections of the form which absolutely must be reviewed by more senior colleagues, and even partners or friends (for grammar and readability).

The interview

Interview is via a national selection centre (usually based in Sheffield) early in the year (typically late January or February). It occurs over 2 days and a number of documents are required at the time of attendance – these are listed in the applicant handbook. References are only required for those who are ultimately given job offers but you must identify willing referees in advance.

The interview itself consists of five stations that all applicants cycle through.

The portfolio station has two parts – a pre-submitted 5-minute presentation (the title of the presentation and the deadline to submit this are given to the candidates after he/she is shortlisted for interview) of no more than three slides to be given by the applicant, and a questioning session on the applicant's portfolio and career to date. It is essential to read and re-read your portfolio. There is nothing more embarrassing for all concerned than when the applicant is questioned about something in his/her portfolio that he/she has completely forgotten about.

The clinical station intends to assess applied medical knowledge based around a clinical scenario. This may be related to neurosurgery, e.g. postoperative seizures, or completely unrelated, e.g. blood transfusions. The key is to be safe first and foremost. Cynically speaking, the panel do not want to be questioned many years later for poor judgement by appointing someone they should obviously have spotted as rogue material. No-one expects you to show at interview that you have the potential to cure brain cancer or make the paralysed walk, but they expect you to demonstrate that you are safe, able to rationally deal with a crisis situation, and communicate that effectively to a senior until you develop the skills to deal with it yourself.

The simulated consultation is intended to assess communication skills, judgement under pressure and professional integrity. The telephone consultation assesses similar skills with the addition of technical knowledge and clinical expertise but in a very different modality, and may also be with a fellow health-care professional rather than a patient.

The management station assesses problem solving under pressure.

The practical station consists of three mini-practical stations – these typically change year to year but may involve use of surgical microscopes or neuro-navigation for example – and aims to assess dexterity and hand–eye coordination. It is expected that you will have done relatively little operating by the time you come to application but it is important that you have basic practical abilities. Interview panels are looking to appoint the 'trainable trainee', not Sir Victor Horsley (neurosurgery joke, look him up if you don't get it).

Stations are assessed using a structured scoring system. At the end of the interview process, the cumulative score of each candidate is calculated and a rank order established. Lay representatives may be present at some stations but they are merely observing the fairness and consistency of the process, and are not involved in scoring.

The essential pointers are to prioritize patient safety at all times, provide as much clinical detail as possible to the consultant, propose a plan which can then be discussed (shows more skill than just presenting the information and then asking for a plan), and not being afraid to ask for the consultant to come in, or for more senior help if the safety of the patient is under threat. It is advisable that candidates practise these scenarios in their units before interview. Typical errors are failure to be safe, failure to follow a logical thought process, failure to offer differential diagnoses and propose a plan, panicking and lack of clinical details.

Common pitfalls at interview

Having mentored a number of students and trainees who are budding neurosurgeons the things that always makes people stand out are enthusiasm and passion. Most appear startled when asked: 'Why do you want to be a neurosurgeon?', as if it were the most difficult

and unfair question that they could have been asked; certainly the most unexpected, judging by their shocked expressions. Dropping the interviewer's facies, and asking them more genially, 'What is it about neurosurgery that interests you?' is the same question, but seems to evoke a response.

Neurosurgeons who are employing future neurosurgeons want to know that an applicant has a real desire to undertake the gruelling training, contribute to and advance the specialty. At such an early stage of your career, it may seem difficult to see it in the moment but if successful, you will become their colleagues, their peers.

It is also very important to inform the interviewer that you have thoroughly researched the specialty and have a clear idea of what being a neurosurgeon involves. Understanding a specialty means talking to actual people that do it, and watching them at work – in their darkest moments as well as their most joyous. This may mean shadowing on calls, observing in theatre, attending a neuro-oncology or spinal multidisciplinary team or clinical governance meeting. Every time you attend one of these, make a quick note about it, so that when you come to apply you can recall the details of the experience and think about how it gave you an insight into neurosurgery. With this very real appreciation of the rigours of the specialty, it is much more likely that you will convince an interview panel that you understand what it takes to be a neurosurgical trainee and that you are not just enticed by the idea of being a 'brain surgeon'.

Similar to the application form, another common pitfall is to make subjective statements about your abilities. This is especially true in the portfolio interview section. Too often, people state that they are able to juggle many things at once, just like a neurosurgeon needs to. How much better an answer would be with an example taken from your life. Playing the cello, being secretary of the medics' graduation ball committee and the small matter of passing finals shows good time management. Delve into any aspect of your life that may reveal an aptitude for manual dexterity, time management, teamwork and interpersonal skills. The key trick, missed by most candidates, is linking the skill with the desired quality in a good neurosurgeon. Every time someone asks you what makes a good neurosurgeon, or what skills a good neurosurgeon needs, think: desired skill, related evidence from life, link the two. A simple but effective mantra.

Interviews can be stressful and anxiety-inducing. However, remember to be nice, smile and show some personality. Neurosurgeons are not the shy, retiring type. They are, in the most part, fun-loving and jovial, albeit often intense and brash too. No-one in neurosurgery wants to employ or work with a focused and dedicated, but miserable individual.

Furthermore, a good sense of humour and a perspective outside of work will help reconcile the events of an often unforgiving surgical specialty. Neurosurgical complications not infrequently result in major morbidity or even mortality. Having personality and strength of character is the only way to overcome those confidence hits. Being nice, smiling and personality alone will not get you into neurosurgery of course but along with the attributes mentioned so far, it will certainly help convince the interview panel that you are a good future colleague. Think: would you want to work with yourself?

Early years training (ST1–2/3)

For those who are offered run-through training, early years training aims to create safe and competent neurosurgical junior doctors. The training period starts with a residential week-long 'bootcamp' during which basic neurosurgical principles and skills are taught. This is also a good opportunity to get to know your training cohort. Neurosurgery is a relatively small specialty (15–30/year at ST1, 5–10/year at ST3) and you are likely to see the same faces at conferences and training courses.

By the end of these years, trainees should be comfortable with the vast majority of aspects of ward patient management and have developed operative skills in basic common neurosurgical procedures. This period will encompass placements in neurology, the neuro high dependency unit and neuro intensive therapy unit. Depending on local arrangements, placements may also rotate through allied surgical specialties such as orthopaedics and plastic surgery. All trainees must have worked in an emergency department for a minimum of 4 months at foundation year 2 level or above by the end of their entire training, so that is often taken into consideration during the early years if required.

Attaining the MRCS examination is a requirement of entry into ST3.

Middle to late years training (ST3/4–8) and fellowships

There is some variability among units as to whether this starts at ST3 or ST4. It is essentially the start of focused neurosurgical training. Trainees rotate through the subspecialties of neurosurgery, and often follow the 'firm' structure of being a registrar to a named consultant. They will take part in elective operating lists, clinics and attend multidisciplinary teams. They will also take on neurosurgical on-call commitments. Different units use different models of on-call – single tier, two-tier, senior registrar cover for rota starters, consultant cover for rota starters. Some units will consider ST3 as the starting point for neurosurgical registrar on-call, whereas others will consider this as ST4, while still others will base that decision around individual competency levels.

Towards the end of these years, trainees will need to consider which subspecialty of neurosurgery they wish to pursue – neuro-oncology, neurovascular, functional, skull base, complex spine, epilepsy, paediatric, trauma. While appointments are still made to general neurosurgical consultant posts, many state a subspecialty interest that they wish the applicant to have, and require demonstrable evidence of this. This may be particularly relevant for posts in units that have very subspecialized services and consultant on-call rotas. The easiest way to achieve this is to undertake a subspecialty fellowship, either in the UK or internationally. Some of these fellowships are extremely competitive and appoint up to 2 years in advance.

Trainees will also be expected to partake in research, recruit to trials, present at conferences, undertake audits and gain managerial experience (e.g. by organizing local rotas).

Research during training

For trainees interested in pursuing an academic neurosurgical career, or for those wishing to spend some time in research to acquire skills that they may use later alongside their clinical posts, there are opportunities to undertake an MD or PhD. There are essentially two routes to achieve this during training. The first and most popular is out of programme research time. Trainees typically maintain an on-call commitment

KEY POINTS

- Know why you want to do neurosurgery – take some time to really think about this.
- Prepare the application form as early as possible, and have it reviewed by as many people as possible.
- Read the person specification and applicant handbook.
- Enthusiasm and passion for neurosurgery is essential.
- Think about what makes a good neurosurgeon: assess whether you have those attributes, and what evidence you have to back up your claims.
- Understand the training structure, opportunities for research, subspecialty training and the ultimate requirements to achieve completion of competence.

during this time to maintain practical skills. With prospective approval from the General Medical Council, up to 12 months of out of programme research time can be counted towards training if equivalent competencies can be demonstrated.

Alternatively, the National Institute for Health Research sponsor a small number of academic clinical fellowship posts in neurosurgery (typically 4–5 per year nationally). These are based at specific neurosurgical units – Cambridge, Oxford, Southampton, Manchester. Trainees will still need to take time out of their training programme to achieve a higher degree (MD/PhD) but the academic focus is maintained throughout their standard training period with dedicated time allocated to research.

Assessments and exams

All competencies required at all stages of training are set out in the Intercollegiate Surgical Curriculum Programme (www.iscp.ac.uk). This is managed by the Joint Committee for Surgical Training and trainees pay an annual fee to use the system. It forms the basis of workplace assessments, links to the electronic surgical logbook (www.elogbook.org), and records outcomes of the annual review of competence progression – an annual appraisal, conducted by the local training programme director and other panel members, of the trainee's previous year's progress. The annual review of competence progression also encompasses a trainee's feedback process on his/her placements and supervisors, and also addresses any probity issues, complaints and health problems.

Currently, trainees are required to be in their ST7 year and have approval and confirmation from their training programme director that they are at the appropriate stage of knowledge and competence before making their first attempt at the Fellowship of the Royal College of Surgeons exam – FRCS(Neurosurg). Setting eligibility criteria is intended to give the trainee the best chance of passing the exam at his/her first attempt as it requires a lot of work, considerable clinical experience, personal sacrifice (many trainees may have young families by that point for example) and is expensive. The exam is still viewed as a 'first-day' consultant exam, i.e. the trainee must be considered ready to be a first day consultant as the FRCS is examined at this level.

Aside from satisfactory progression through training and attainment of the fellowship exam, trainees are expected to achieve a minimum number of operations as assessed by the surgical logbook (including minimum numbers of 'index' cases). Along with some other research and managerial criteria, all these factors are taken into consideration for the awarding of the Certificate of Completion of Specialty Training. Further information can be sought from the neurosurgery Special Advisory Committee and Joint Committee on Surgical Training at the time of commencement of training. Awarding of the Certificate of Completion of Specialty Training enables the individual to take up a consultant neurosurgical appointment.

Final thoughts

Neurosurgery remains a unique and awe-inspiring specialty. From the first moment the dura is peeled back to expose a pulsating living brain, it is gripping – an experience that money or power cannot buy. Instead, dedication and hard work are required to be afforded such an enormous privilege. All the attributes of performing neurosurgery itself are tested during the aforementioned journey from application through to completion of training – meticulous preparation, firm understanding of process, an ability to perform under pressure, stamina, competence, safety, an ability to overcome adversity and personality. A journey that can yield immense satisfaction, lifelong friendships and fun. **BJHM**

Conflict of interest: Mr RK Mathew is the founder and co-director of NeuroTips Limited, a company which has previously run introductory courses for students and junior doctors interested in neurosurgery.