







Joint Surgical Colleges Fellowship Examinations

Syllabus Neurosurgery

August 2014

The Joint Surgical Colleges Fellowship Examination (JSCFE) syllabus defines the breadth and depth of knowledge, professionalism and clinical skills to be attained by surgeons in training. It specifies the levels of expertise to be anticipated at entry and at the various stages in training and defines the standards of competence expected on completion of the training programmes. The JSCFE adopts this standard as the one against which assessment will be made. The examination will assess various elements of applied knowledge, diagnostic skills, clinical judgment and professionalism.

Clinical Management

The examination is set at the level of knowledge and standard required of a recognised specialist (day one NHS UK/Ireland consultant standard) in the generality of the specialty. Given the range of cases, the spectrum of complexity and the ability to deal with variations and complications within the practice of this specialty, a candidate should be able to demonstrate that their training / experience is such that they can safely manage both common and more complex clinical problems.

Operative skills

While the examination does not formally assess technical operating ability the JSCFE considers it inappropriate to admit a candidate to the examination if there is any doubt as to their technical skills.

Professionalism and Probity

The development of a mature and professional approach in clinical practice is essential for safe and successful patient care. Attitudes towards patients and colleagues, work ethic, ability to deal with stressful issues and the effectiveness of communication skills in providing supportive care for patients and their families are the professional qualities expected of successful candidates in this examination.

Contents

Page No

Introduction	3
Eligibility Criteria	3
Syllabus Structure	4
The Syllabus for Neurosurgery	6
Overview and objectives of the syllabus	7
Schedule of essential neurosurgical conditions	8
Sub-specialty practice	9
Key Topics	10
Basic sciences	10
Core neuroscience topics	19
Operative competencies	42
Special interest topics	56
Professional Behaviour and Leadership Syllabus	74

Introduction

The Intercollegiate Surgical Curriculum Programme (ISCP) provides the framework for systematic training from completion of the foundation years through to consultant level in the UK. It achieves this through a syllabus that lays down the standards of specialty-based knowledge, clinical judgement, technical and operative skills and professional skills and behaviour, which must be acquired at each stage in order to progress. The curriculum is web based and is accessed through <u>www.iscp.ac.uk</u>. The website contains the most up to date version of the curriculum and each of the ten surgical specialty syllabuses. The ten specialities include General Surgery, Vascular surgery, Urology, Paediatric surgery, Cardiothoracic Surgery, Trauma and Orthopaedic surgery, Oral and Maxillofacial surgery (OMFS), Plastic surgery, Neurosurgery and Otolaryngology (ENT). They all share many aspects of the early years of surgical training in common, but naturally become increasingly singular as training in each discipline becomes more advanced. Each syllabus will emphasise the commonalities and elucidate in detail the requirements for training in the different specialities.

This syllabus is designed for candidates who have declared neurosurgery as their specialty interest. The standard expected is that of a newly appointed (Day 1) Consultant Neurosurgeon in the UK who is capable of independently (without direct supervision) providing care and management in the generality of Neurosurgery.

Prior to sitting this examination it will be expected that the candidate will have gained competence in a wide range of knowledge and skills including the basic sciences which are common to all surgical specialities. These topics are defined in the syllabus for the MRCS examination (<u>http://www.intercollegiatemrcs.org.uk/new/guide_html</u>). This must be supplemented by the topics from the Neurosurgery Specialty syllabus as outlined below)

Eligibility Criteria

Candidates would normally have passed the MRCS examination of one of the four Surgical Royal Colleges

Alternatively, candidates would have successfully completed a locally registered, *higher* surgical training programme

It is expected that candidates will produce documentary evidence of having completed a minimum of 4 years surgical training following award of MRCS or equivalent.

The final decision on eligibility for admission to the examination will lie with the JSCFE Specialty Board.

Surgeons applying for this examination would be expected to demonstrate:

- Theoretical and practical knowledge related to surgery in general and to their specialty practice;
- Technical and operative skills;
- Clinical skills and judgement
- Generic professional and leadership skills;
- An understanding of the values that underpin the profession of surgery and the responsibilities that come with being a member of the profession;
- The special attributes needed to be a surgeon;
- A commitment to their ongoing personal and professional development and practice using reflective practice and other educational processes;
- An understanding and respect for the multi-professional nature of healthcare and their role within it

The syllabus covers the major areas of highly specialised practice that are relevant to a neurosurgical practice. Each syllabus is intended to allow the successful candidate to develop an area of clinical interest and expertise upon appointment to a consultant post. Some will require further training in order to achieve the competences necessary for some of the rarer complex procedures.

SYLLABUS STRUCTURE

The syllabus lays down the standards of specialty-based knowledge, clinical judgement, technical and operative skills and professional skills and behaviour that must be acquired prior to sitting the examination. The syllabus comprises the following components:

- Specialty overview outlines which describe the following:
 - Details of the specialty
 - The scope of practice within the specialty
 - The key topics that all candidates will have been expected to cover by the end of training
- Key topics that all candidates will cover and will be able to manage independently, including complications. These are also referred to as essential topics.
- Index procedures that refer to some of the more commonly performed clinical interventions and operations in the specialty. They represent evidence of technical competence across the whole range of specialty procedures in supervised settings.

The Professional Behaviour and Leadership Skills that will be assed in this examination are based on the following guidance.

- Leadership Framework <u>http://aomrc.org.uk/publications/statements/doc_download/132-medical-leadership-competency-framework.html</u>
- Appraisal Framework <u>http://www.gmc-</u> uk.org/static/documents/content/GMP_framework_for_appraisal_and_revalidation.pdf_41326960.pdf

The Scope and Practice of Neurosurgery

Trained specialists in neurosurgery will be competent to manage unselected emergency surgical patients and will have appropriate knowledge of the sub-specialty areas of practice within neurosurgery.

This list of Key Topics defines, in general terms the essential skills and levels of clinical expertise expected of a surgeon emerging from training. It is unlikely that the expertise will be confined to the descriptions that follow as surgeons may also develop additional special interests by the time they emerge from training. As it is used here, the term 'manage' equates to diagnosis, assessment and treatment or referral as appropriate.

Standards for the depth of knowledge and competence assessed by the examination

The following methodology is used to define the relevant depth of knowledge required of the candidate. Each topic within a stage has a competence level ascribed to it for knowledge ranging from 1 to 4 which indicates the depth of knowledge required:

- 1. knows of
- 2. knows basic concepts
- 3. knows generally
- 4. knows specifically and broadly

Standards for clinical and technical skills

The practical application of knowledge is evidenced through clinical and technical skills. Each topic within a stage has a competence level ascribed to it in the areas of clinical and technical skills ranging from 1 to 4:

1. Has observed

At this level the candidate:

- Has adequate knowledge of the steps through direct observation.
- Demonstrates that he/she can handle instruments relevant to the procedure appropriately and safely.
- Can perform some parts of the procedure with reasonable fluency.
- 2. Can do with assistance

At this level the candidate:

- Knows all the steps and the reasons that lie behind the methodology.
- Can carry out a straightforward procedure fluently from start to finish.
- Knows and demonstrates when to call for assistance/advice from the supervisor (knows personal limitations).
- 3. Can do whole but may need assistance

At this level the candidate:

- Can adapt to well known variations in the procedure encountered, without direct input from the trainer.
- Recognises and makes a correct assessment of common problems that are encountered.
- Is able to deal with most of the common problems.
- Knows and demonstrates when he/she needs help.
- Requires advice rather than help that requires the trainer to scrub.
- 4. Competent to do without assistance, including complications

At this level the candidate:

- Can deal with straightforward and difficult cases to a satisfactory level and without the requirement for external input.
- The level at which one would expect a UK consultant neurosurgeon to function.
- Is capable of supervising trainees.

The Syllabus for Neurosurgery

Overview and objectives of the Neurosurgery syllabus

Neurosurgery encompasses the diagnosis, assessment and surgical management of disorders of the nervous system. The specialty developed in the first half of the twentieth century through the treatment of cranial trauma and intracranial mass lesions. Subsequent advances in microsurgical techniques, non-invasive imaging, neuro-anaesthesia, intensive care, image-guided surgery, and the introduction of sophisticated radio-oncological and interventional treatments have changed and widened the scope of neurosurgical practice.

Schedule of Essential Neurosurgical Conditions

- Cranial trauma
- Spontaneous intracranial haemorrhage
- Hydrocephalus
- Intracranial tumours
- CNS infections
- Spinal trauma
- Benign intradural tumours
- Malignant spinal cord compression
- Degenerative spinal disorders
- Emergency paediatric care

Schedule of Essential Operative Competences is displayed in Key Topics

Sub-Specialty Practice

Candidates should be aware that they will be examined at an appropriate level on the following areas

Paediatric Neurosurgery

Paediatric neurosurgery accounts for 10-15% of neurosurgical activity. The discipline involves the management of developmental disorders of the neuroaxis including craniofacial anomalies and spinal dysraphism; all forms of hydrocephalus; intrinsic tumours of the brain and spine and a wide range of rarer pathologies. Paediatric neurosurgeons often contribute to the management of related disorders such as hydrocephalus, spinal dysraphism and epilepsy presenting in young adults.

Neuro-oncology

The management of malignant intrinsic tumours of the nervous system remains a major challenge. Gradual progress has followed the refinement of surgical techniques using radiological and functional guidance; improvements in adjuvant chemotherapy and radiotherapy; greater understanding of the molecular biology of CNS tumours and better organisation of oncology services. Further advances are likely to be based on advances in basic oncological science and the sophisticated delivery of intra-lesional therapies.

Functional Neurosurgery

Functional neurosurgery involves the surgical management of a wide range of neurological problems including intractable pain, epilepsy, spasticity and movement disorders. Traditional ablative surgery is being replaced by deep brain and spinal cord stimulation. Research into neuromodulation using gene therapy, biological vectors and pharmacological agents offers the prospect of effective treatment for neurodegenerative diseases and disabling psychiatric conditions.

Neurovascular Surgery

The advent of advanced endovascular techniques in the early 1990s has fundamentally changed the practice of neurovascular surgery. Most simple intracranial aneurysms are now managed by endovascular coiling such that aneurysm surgery is no longer part of general neurosurgical practice. Neurovascular surgeons work closely with their interventional colleagues dealing with complex aneurysms, vascular malformations and occlusive cerebrovascular disease.

Skull-base Surgery

Technical advances in microsurgery, surgical approaches and reconstructions have been incorporated into the routine practice of surgeons dealing with disorders of the skull-base including common tumours such as meningiomas, acoustic neuromas and pituitary adenomas. Skull-base surgery is often undertaken jointly with neuro-otological, plastic and maxillo-facial surgeons. Adjuvant treatments with sophisticated radiosurgery and fractionated stereotactic radiotherapy have improved clinical outcomes for patients with skull-base tumours

Spinal Surgery

Spinal surgery is now the largest subspecialty in neurosurgery in many countries and accounts for more than 50% of the operative workload of some departments. Many departments offer a comprehensive service for primary and secondary spinal malignancy, spinal trauma, spinal pain and degenerative spinal disorders. The demand for spinal surgery grows steadily, particularly in the elderly population.

Traumatology

Head injury remains a major cause of death and disability in children and young adults. Recent research confirms that prompt neurosurgical intervention and neurointensive care lead to substantially better outcomes.

Key Topics

Candidates must be competent to undertake the full range of emergency and urgent operative procedures. They must demonstrate sufficient operative experience to be able to undertake these procedures without supervision and to manage operative difficulties and complications (Competence level 4).

Essential Neurosurgical Conditions

- Cranial trauma
- Spontaneous intracranial haemorrhage
- Hydrocephalus
- Intracranial tumours
- CNS infections
- Spinal trauma
- Benign intradural tumours
- Malignant spinal cord compression
- Degenerative spinal disorders
- Emergency paediatric care

Schedule of Essential Operative Competences

	Basic sciences	Level
Objective	 To acquire and demonstrate underpinning basic science knowledge appropriate for the practice of surgery, including:- Applied anatomy: Knowledge of anatomy appropriate for surgery Physiology: Knowledge of physiology relevant to surgical practice Pharmacology: Knowledge of pharmacology relevant to surgical practice centred around safe prescribing of common drugs Pathology: Knowledge of pathological principles underlying system specific pathology Microbiology: Knowledge of microbiology relevant to surgical practice lmaging: Knowledge of the principles, strengths and weaknesses of various diagnostic and interventional imaging methods 	
Knowledge	 Applied anatomy: Development and embryology Gross and microscopic anatomy of the organs and other structures Surface anatomy Imaging anatomy This will include anatomy of thorax, abdomen, pelvis, perineum, limbs, spine, head and neck as appropriate for surgical operations that the trainee will be involved with during core training. Physiology: General physiological principles including: Homeostasis Thermoregulation Metabolic pathways and abnormalities Blood loss and hypovolaemic shock Sepsis and septic shock Fluid balance and fluid replacement therapy Acid base balance Bleeding and coagulation Nutrition This will include the physiology of specific organ systems relevant to surgical care including the cardiovascular, respiratory, gastrointestinal, urinary, endocrine and neurological systems.	

Phormocology	
 The pharmacology and safe prescribing of drugs used in the treatment of surgical diseases including analgesics, antibiotics, cardiovascular drugs, antiepileptic, anticoagulants, respiratory drugs, renal drugs, drugs used for the management of endocrine disorders (including diabetes) and local anaesthetics. The principles of general anaesthesia The principles of drugs used in the treatment of common malignancies 	
 Pathology: General pathological principles including: Inflammation Wound healing Cellular injury Tissue death including necrosis and apoptosis Vascular disorders Disorders of growth, differentiation and morphogenesis Surgical immunology Surgical haematology Surgical biochemistry Pathology of neoplasia Classification of tumours Tumour development and growth including surgery, radiotherapy, chemotherapy, immunotherapy and hormone therapy Principles of cancer registration Principles of cancer screening The pathology of specific organ systems relevant to surgical care including cardiovascular pathology, respiratory pathology, gastrointestinal pathology, central and peripheral, neurological systems, 	
 Skin, lymphoreticular and musculoskeletal systems Microbiology: Surgically important micro organisms including blood borne viruses Soft tissue infections including cellulitis, abscesses, necrotising fasciitis, gangrene Sources of infection Sepsis and septic shock Asepsis and antisepsis Principles of disinfection and sterilisation Antibiotics including prophylaxis and resistance Principles of high risk patient management Hospital acquired infections 	
Principles of diagnostic and interventional imaging including x-rays, ultrasound, CT, MRI. PET, radiounucleotide scanning	

	Basic surgical skills	Level
Objective	 Preparation of the surgeon for surgery Safe administration of appropriate local anaesthetic agents Acquisition of basic surgical skills in instrument and tissue handling. Understanding of the formation and healing of surgical wounds Incise superficial tissues accurately with suitable instruments. Close superficial tissues accurately. Tie secure knots. Safely use surgical diathermy 	

	 Achieve haemostasis of superficial vessels. Use suitable methods of retraction. Knowledge of when to use a drain and which to choose. Handle tissues gently with appropriate instruments. Assist helpfully, even when the operation is not familiar. Understand the principles of anastomosis Understand the principles of endoscopy including laparoscopy 	
Knowledge	 Understand the principles of endoscopy including laparoscopy Principles of safe surgery Preparation of the surgeon for surgery Principles of hand washing, scrubbing and gowning Immunisation protocols for surgeons and patients Administration of local anaesthesia Choice of anaesthesia Choice of anaesthetic agent Safe practise Surgical wounds Classification of surgical wounds Principles of wound management Pathophysiology of wound healing Scars and contractures Incision of skin and subcutaneous tissue: Langer's lines Choice of instrument Safe practice Closure of skin and subcutaneous tissue: Options for closure Suture and needle choice Safe practice Knot tying	
	 Indications Types Management/removal Principles of anastomosis Principles of surgical endoscopy including laparoscopy 	
	Preparation of the surgeon for surgery Effective and safe hand washing, gloving and gowning	4
Clinical Skills	Preparation of a patient for surgery Creation of a sterile field Antisepsis Draping	4
	Administration of local anaesthesia Accurate and safe administration of local anaesthetic agent	4
Technical Skills and	Preparation of the surgeon for surgery Effective and safe hand washing, gloving and gowning	4

Procedures	
Administration of local anaesthesia	4
 Accurate and safe administration of local anaesthetic agent 	
Incision of skin and subcutaneous tissue:	4
 Ability to use scalpel, diathermy and scissors 	
Closure of skin and subcutaneous tissue:	4
 Accurate and tension free apposition of wound edges 	
Knot tying:	4
Single handed	
 Double handed 	
 Instrument 	
Superficial	
· Deep	
Haemostasis:	4
 Control of bleeding vessel (superficial) 	
 Diathermy 	
Suture ligation	
Tie ligation	
Clip application	
Transfixion suture	
Tissue retraction:	4
 Tissue forceps 	
 Placement of wound retractors 	
Use of drains:	4
/ Insertion	
Fixation	
Removal	
Tissue handling:	4
Appropriate application of instruments and respect for tissues	
Biopsy techniques	
Skill as assistant:	4
Anticipation of needs of surgeon when assisting	

	The assessment and management of the surgical patient	Level
Objective	To demonstrate the relevant knowledge, skills and attitudes in assessing the patient and manage the patient, and propose surgical or non-surgical management.	
Knowledge	The knowledge relevant to this section will be variable from patient to patient and is covered within the rest of the syllabus	
Clinical Skills	Surgical history and examination (elective and emergency) Construct a differential diagnosis Plan investigations Clinical decision making Team working and planning Case work up and evaluation; risk management Active participation in clinical audit events Appropriate prescribing Taking consent for intermediate level intervention; emergency and elective Written clinical communication skills Interactive clinical communication skills: patients	4 3 3 3 3 3 3 3 3 3 3 3 3 3

	Peri-operative care	Level
Objective	To assess and manage preoperative risk To manage patient care in the peri-operative period To conduct safe surgery in the operating theatre environment To assess and manage bleeding including the use of blood products To care for the patient in the post-operative period including the assessment of common complications To assess, plan and manage post-operative fluid balance To assess and plan perioperative nutritional management	
	Pre-operative assessment and management: Cardiorespiratory physiology Diabetes mellitus and other relevant endocrine disorders Fluid balance and homeostasis Renal failure Pathophysiology of sepsis – prevention and prophylaxis Thromboprophylaxis Laboratory testing and imaging Risk factors for surgery and scoring systems Pre-medication and other preoperative prescribing Principles of day surgery Intraoperative care: Safety in theatre including patient positioning and avoidance of nerve injuries Sharps safety	
Knowledge	 Diathermy, laser use Infection risks Radiation use and risks Tourniquet use including indications, effects and complications Principles of local, regional and general anaesthesia Principles of invasive and non-invasive monitoring Prevention of venous thrombosis Surgery in hepatitis and HIV carriers Fluid balance and homeostasis 	
Knowledge	 Post-operative care: Post-operative monitoring Cardiorespiratory physiology Fluid balance and homeostasis Diabetes mellitus and other relevant endocrine disorders Renal failure Pathophysiology of blood loss Pathophysiology of sepsis including SIRS and shock Multi-organ dysfunction syndrome Post-operative complications in general Methods of postoperative analgesia 	
	To assess and plan nutritional management Post-operative nutrition Effects of malnutrition, both excess and depletion Metabolic response to injury Methods of screening and assessment of nutritional status Methods of enteral and parenteral nutrition	
	 Haemostasis and Blood Products: Mechanism of haemostasis including the clotting cascade Pathology of impaired haemostasis e.g. haemophilia, liver disease, massive haemorrhage Components of blood Alternatives to use of blood products 	

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	 Principles of administration of blood products Patient safety with respect to blood products 	
	 Coagulation, deep vein thrombosis and embolism: Clotting mechanism (Virchow Triad) Effect of surgery and trauma on coagulation Tests for thrombophilia and other disorders of coagulation Methods of investigation for suspected thromboembolic disease Principles of treatment of venous thrombosis and pulmonary embolism including anticoagulation Role of V/Q scanning, CTpulmonary angiography, D-dimer and thrombolysis Place of pulmonary embolectomy Prophylaxis of thromboembolism: Risk classification and management of DVT Knowledge of methods of prevention of DVT, mechanical and pharmacological 	
	Antibiotics: Common pathogens in surgical patients Antibiotic sensitivities Antibiotic side-effects Principles of prophylaxis and treatment	
	Metabolic and endocrine disorders in relation to perioperative management Pathophysiology of thyroid hormone excess and deficiency and associated risks from surgery Causes and effects of hypercalcaemia and hypocalcaemia	
	Complications of corticosteroid therapy Causes and consequences of Steroid insufficiency Complications of diabetes mellitus Causes and effects of hyponatraemia Causes and effects of hyperkalaemia and hypokalaemia	
	 Pre-operative assessment and management: History and examination of a patient from a medical and surgical standpoint Interpretation of pre-operative investigations Management of co morbidity Resuscitation Appropriate preoperative prescribing including premedication 	3
Clinical Skills	Intra-operative care: Safe conduct of intraoperative care Correct patient positioning Avoidance of nerve injuries Management of sharps injuries Prevention of diathermy injury Prevention of venous thrombosis	3
	 Post-operative care: Writing of operation records Assessment and monitoring of patient's condition Post-operative analgesia Fluid and electrolyte management Detection of impending organ failure Initial management of organ failure Principles and indications for Dialysis Recognition, prevention and treatment of post-operative complications 	3
	Haemostasis and Blood Products: Recognition of conditions likely to lead to the diathesis	3

	 Recognition of abnormal bleeding during surgery Appropriate use of blood products Management of the complications of blood product transfusion 	
	 Coagulation, deep vein thrombosis and embolism Recognition of patients at risk Awareness and diagnosis of pulmonary embolism and DVT Role of duplex scanning, venography and d-dimer measurement Initiate and monitor treatment of venous thrombosis and pulmonary embolism Initiation of prophylaxis 	3
	Antibiotics: Appropriate prescription of antibiotics	3
	Assess and plan preoperative nutritional management Arrange access to suitable artificial nutritional support, preferably via a nutrition team including Dietary supplements, Enteral nutrition and Parenteral nutrition	3
	 Metabolic and endocrine disorders History and examination in patients with endocrine and electrolyte disorders Investigation and management of thyrotoxicosis and hypothyroidism Investigation and management of hypercalcaemia and hypocalcaemia Peri-operative management of patients on steroid therapy Peri-operative management of hyponatraemia Investigation and management of hyponatraemia Investigation and management of hyporatraemia 	3
Technical Skills and Procedures	Central venous line insertion Urethral catheterisation	2 4

	Assessment and management of patients with trauma	Level
Objective	Assess and initiate management of patients with multiple trauma Be able to prioritise management in such situation as defined by ATLS, APLS or equivalent	
Knowledge	General Scoring systems for assessment of the injured patient Major incident triage Differences In children Shock Pathogenesis of shock Shock and cardiovascular physiology Metabolic response to injury Adult respiratory distress syndrome Indications for using uncross matched blood Wounds and soft tissue injuries Gunshot and blast injuries Stab wounds Human and animal bites Noture and mechanism of coff tissue injury	
	 Principles of management of soft tissue injuries Principles of management of traumatic wounds Compartment syndrome 	
	Burns	

	 Classification of burns Principle of management of burns 	
	Fractures Classification of fractures Pathophysiology of fractures Principles of management of fractures Complications of fractures Joint injuries	
	 Organ specific trauma Pathophysiology of thoracic trauma Pneumothorax Head injuries including traumatic intracranial haemorrhage and brain injury Spinal cord injury Peripheral nerve injuries Blunt and penetrating abdominal trauma Including spleen Vascular injury including iatrogenic injuries and intravascular drug abuse Crush injury Principles of management of skin loss including use of skin grafts and skin flaps 	
Clinical Skills	General History and examination Investigation Referral to appropriate surgical subspecialties Resuscitation and early management of patient who has sustained thoracic, head, spinal, abdominal or limb injury according to ATLS and APLS guidelines Resuscitation and early management of the multiply injured patient Specific problems Management of the unconscious patient Initial management of skin loss Initial management of burns Prevention and early management of the compartment syndrome	4 3 3 4 4 3
Technical Skills and Procedures	Central venous line insertion Chest drain insertion Urethral catheterisation Suprapubic catheterisation	2 3 4 2

	Surgical care of the Paediatric patient	Level
Objective	To assess and manage children with surgical problems, understanding the similarities and differences from adult surgical patients	
	To understand the issues of child protection and to take action as appropriate	
Knowledge	 Physiological and metabolic response to injury and surgery Fluid and electrolyte balance Thermoregulation Safe prescribing in children Principles of vascular access in children Basic understanding of child protection law Understanding of Children's rights Working knowledge of types and categories of child maltreatment, presentations, signs and other features (primarily physical, emotional, sexual, neglect, professional) Understanding of the challenges of working in partnership with children and families 	

	 Recognise the possibility of abuse or maltreatment Recognise limitations of own knowledge and experience and seek appropriate expert advice Keep appropriate written documentation relating to child protection matters Communicate effectively with those involved with child protection, including children and their families 	
Clinical Skills	History and examination of paediatric surgical patient Assessment of respiratory and cardiovascular status 3 Undertake consent for surgical procedures (appropriate to the level of training) in paediatric patients	3 3

	Management of the dying patient	Level
	Ability to manage the dying patient appropriately.	
Objective	To understand consent and ethical issues in patients certified DNAR (do not attempt resuscitation)	
	Palliative Care: Good management of the dying patient in consultation with the palliative care team.	
	Palliative Care:	
	Care of the terminally ill	
	Appropriate use of analgesia, anti-emetics and laxatives	
Knowledge	Principles of organ donation:	
	Circumstances in which consideration of organ donation is appropriate	
	Principles of brain death	
	Understanding the role of the coroner and the certification of death	
	Palliative Care:	3
Clinical	 Symptom control in the terminally ill patient 	-
Skills	Principles of organ donation:	3
	Assessment of brain stem death	
	 Certification of death 	

	Organ and Tissue transplantation	Level
Objective	To understand the principles of organ and tissue transplantation	
Knowledge	 Principles of transplant immunology including tissue typing, acute, hyperactute and chronic rejection Principles of immunosuppression Tissue donation and procurement Indications for whole organ transplantation 	

Core Neuroscience Topics

Topic	Embryology and maldevelopment	Level
Category	Core Neuroscience knowledge	
Sub- category:	Applied neuroanatomy	
Objective	To understand basic neuroembryology and its relevance to clinical practice	
Knowledge	Embryogenesis of the brain and spinal cord Embryogenesis of supporting structures - skull and vertebral column Common anatomical variations and developmental abnormalities	4 4 4
Clinical Skills	N/A	
Technical Skills and Procedures	N/A	

Торіс	Anatomy of the skull	Level
Category	Core Neuroscience knowledge	
Sub- category:	Applied neuroanatomy	
Objective	To understand the anatomy of the skull	
Knowledge	Structure, blood supply, innervation, surface and three-dimensional relationships of the: - scalp - skull - meninges - orbit - cranial fossae - cranial foraminae - cranial nerves	4
Clinical Skills	N/A	
Technical Skills and Procedures	N/A	

Topic	Anatomy of the brain	Level
Category	Core Neuroscience knowledge	
Sub- category:	Applied neuroanatomy	
Objective	To understand the structural anatomy of the brain	
Knowledge	Cortical topography Projection and association tracts Organisation of the basal ganglia Structure, organisation and connections of the cerebellum, pons and brainstem Cranial nerves and their relationships Visual and auditory pathways Ventricular system and choroid plexus Subarachnoid space and cisterns Circle of Willis and principle regional and segmental blood supply	4 4 4 4 4 4 4 4

	Venous drainage and dural sinuses	4 4
Clinical Skills	N/A	
Technical Skills and Procedures	N/A	(

Торіс	Anatomy of the spine	Level
Category	Core Neuroscience knowledge	
Sub- category:	Applied neuroanatomy	
Objective	To understand the anatomy of the spine	
Knowledge	Structure, blood supply, innervation, surface and three-dimensional relationships of the: - vertebral column - spinal cord: ascending and descending tracts - spinal nerve roots - cauda equina	4
Clinical Skills	N/A	
Technical Skills and Procedures	N/A	

Торіс	Anatomy of the autonomic and peripheral nervous system	Level
Category	Core Neuroscience knowledge	
Sub- category:	Applied neuroanatomy	
Objective	To understand the anatomy of the autonomic and peripheral nervous system	
Knowledge	Sympathetic and parasympathetic pathways Visceral and pelvic innervation: control of sphincter function Brachial plexus Lumbosacral plexus Course, distribution and innervation of the major peripheral nerves	4 4 4 4 4
Clinical Skills	N/A	
Technical Skills and Procedures	N/A	

Topic	Functional neurophysiology	Level
Category	Core Neuroscience knowledge	
Sub- category:	Neurophysiology	
Objective	To understand the functional organisation and integration of the central nervous system	
Knowledge	Structure and function of neurones and glial cells	4

	Synaptic function, action potentials and axonal conduction	4
	Higher cerebral functions	4
	Sleep and coma	4
	Memory and disorders of the limbic system	4
	Control of motor function: ascending and descending pathways, basal ganglia and cerebellar function	4
	The special senses	4
	Functions of the autonomic nervous system	4
	Hypothalamic-pituitary function	4
Clinical Skills	N/A	
Technical Skills and Procedures	N/A	

Topic	Principles of clinical neurophysiology	Level
Category	Core Neuroscience knowledge	
Sub- category:	Neurophysiology	
Objective	To understand the basic principles of clinical neurophysiology	
Knowledge	Principles of electroencephalography Principles of somatosensory, motor and brainstem evoked potential monitoring Peripheral neuropathies and entrapment neuropathies including: - structure and function of peripheral nerves - use of nerve conduction studies Disorders of the neuromuscular junction including: - structure and function of smooth and striated muscle - use of electromyographic studies	4 4 4
Clinical Skills	Interpretation of the results of EEG, EMG and NC studies	3
Technical Skills and Procedures	None specified	

Topic	Pathophysiology of intracranial disorders	Level
Category	Core Neuroscience knowledge	
Sub- category:	Pathophysiology of intracranial disorders	
Objective	To understand the pathophysiology of intracranial disorders	
Knowledge	Cerebral blood flow and metabolism Cerebral autoregulation and vasospasm Blood brain barrier and cerebral odema Intracranial pressure dynamics Cerebral ischaemia and neuroprotection CSF hydrodynamics - production and absorption	4 4 4 4 4 4
Clinical Skills	N/A	
Technical Skills and Procedures	N/A	

Торіс	Principles of neuropharmacology	Level
Category	Core Neuroscience knowledge	
Sub- category:	Neuropharmacology	
Objective	To understand the principles of neuropharmacology	
Knowledge	Receptor and ion channel function Neuropeptides and neurotransmitters Principles of pharmacological neuroprotection The pharmacology of anaesthetic agents, muscle relaxants, barbiturates, anticonvulsants and corticosteroids including: - mechanisms of action - pharmacodynamics - interactions	4 4 4 4
Clinical Skills	N/A	
Technical Skills and Procedures	N/A	

Торіс	Principles of neuropathology	Level
Category	Core Neuroscience knowledge	
Sub- category:	Neuropathology and Neuro-oncology	
Objective	To understand the neuropathology of infection, inflammation, ischaemia, neoplasia and trauma affecting the nervous system	
Knowledge	Acute and chronic inflammatory processes in the CNS including demyelination Bacterial, fungal and parasitic meningitis, encephalitis and abscess formation Viral encephalitis Slow viruses, CJD and vCJD HIV associated infections, tumours and leucoencehalopathies Cytopathology of neurones and glial in response to ischaemia, hypoxia and trauma Diffuse axonal injury Macroscopic brain and spinal cord injury including effects of brain shift, herniation and raised ICP Classification, epidemiology and pathology of CNS tumours Tumour biology, cell kinetics, tumour markers, immunocytochemistry	4 4 4 4 4 4 4 4 4 4
Clinical Skills	N/A	
Technical Skills and Procedures	None specified	

Торіс	Principles of neuroradiology	Level
Category	Core Neuroscience knowledge	
Sub- category:	Neuroradiology	
Objective	To understand the principles of neuroradiological imaging of the structure and function of the nervous system	
Knowledge	Interpretation of plain radiographs of the skull and spine Principles of computerised tomography of the brain, skull and spine	4 4

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	Interpretation of CT scans with particular reference to acute spinal disorders, cranial trauma, hydrocephalus, intracranial tumours and spontaneous intracranial haemorrhage	4
	Principles of basic magnetic resonance imaging	4
	Interpretation of MRI scans with particular reference to acute spinal disorders, cranial trauma, hydrocephalus and intracranial tumours	4
	Principles of advance magnetic resonance imaging including fMRI, DWI and spectroscopy	3
	Interpretation of angiographic images: CTA, MRA and DSA	3
Clinical Skills	N/A	
Technical Skills and Procedures	N/A	

Topic	Principles of neuropsychology	Level
Category	Core Neuroscience knowledge	
Sub- category:	Neuropsychology	
Objective	To understand the principles of neuropsychological assessment, application of the Mental Health Act	
Knowledge	The principles of neuropsychological assessment Common neuropsychological problems associated with head injury, subarachnoid haemorrhage, hydrocephalus, structural lesions of the frontal and temporal lobes and disorders of the limbic system	3 3
Clinical Skills	Ability to undertake bed-side assessment of cognition and memory	3
Technical Skills and Procedures	None	

Торіс	Principles of neurological rehabilitation	Level
Category	Core Neuroscience knowledge	
Sub- category:	Neurological Rehabilitation	
Objective	To understand the principles of neurological rehabilitation	
Knowledge	The principles of neurological rehabilitation including strategies to optimise the recovery of cognition, communication, continence, selective movement, gait, self-care, psychological stability, social adjustment and employment	3
Clinical Skills	N/A	
Technical Skills and Procedures	N/A	

Topic	Medical ethics	Level
Category	Core Neuroscience knowledge ST1	
Sub- category:	Medical ethics	

Objective	To understand the ethical issues that commonly arise in the management of patients with neurological disorders	
Knowledge	Criteria for the diagnosis of brainstem death Diagnosis and management of persistent vegetative states Prognosis in chronic progressive neurological disorders Professional and statutory framework governing living directives and end-of-life decisions	4 3 3 3
Clinical Skills	Ability to empathise with and support patients and carers	3
Technical Skills and Procedures	None specified	

Торіс	Principles of neurogenetics	Level
Category	Core Neuroscience knowledge	
Sub- category:	Neurogenetics	
Objective	To understand the principles of neurogenetic studies and their relevance to clinical practice	
Knowledge	Inherited neurological disorders Genetic control of neural connectivity Inborn errors of metabolism Molecular genetics of CNS tumours	3 3 3 3
Clinical Skills	N/A	
Technical Skills and Procedures	N/A	

Topic	Impaired consciousness and non-traumatic coma	Level
Category	Management of Common Neurological Conditions	
Sub- category:	None	
Objective	To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with impaired consciousness and non-traumatic coma	
Knowledge	The aetiology, pathophysiology and differential diagnosis of altered consciousness and coma due to: - meningitis - encephalitis - intracranial haemorrhage - acutely raised ICP - hydrocephalus - hypoxaemia and ischaemia - cardiogenic shock - hypoglycaemia - epilepsy - metabolic encephalopathies - drugs and toxins	4
Clinical Skills	Neurological assessment and initial resuscitation of patients in coma or with impaired consciousness Indications for intubation and ventilation Treatment of seizures	4 4 4

	Establishing a neurological differential diagnosis Planning and interpreting scans and other investigations Presentation and summary of cases	4 4 4
Technical Skills and Procedures	Maintenance of airway Endotracheal intubation Central venous cannulation Lumbar puncture	4 3 3 4

Topic	Headache - acute and chronic	Level
Category	Management of Common Neurological Conditions	
Sub- category:	None	
Objective	To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with acute and chronic headache	
Knowledge	The aetiology and differential diagnosis of acute and chronic headache including headache associated with: - benign headache syndromes - migraine, cluster headache and related syndromes - space occupying lesions - meningitic disorders - intracranial haemorrhage - trigemminal neuralgia - atypical craniofacial pain syndrome Indications for investigation including scanning, lumbar puncture and angiography	4
Clinical Skills	Neurological history taking Neurological examination Establishing a neurological differential diagnosis Planning investigation Interpretation of scans and other investigations Presentation and summary of cases	4 4 4 4 4
Technical Skills and Procedures	Lumbar puncture	4

Торіс	Weakness and paralysis	Level
Category	Management of Common Neurological Conditions	
Sub- category:	None	
Objective	To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with weakness and paralysis	
Knowledge	Common causes of ocular, cranial nerve, limb, trunk and respiratory muscle weakness	4
Clinical Skills	Neurological history taking Neurological examination Establishing a neurological differential diagnosis Planning investigation Interpretation of scans and other investigations Presentation and summary of cases	4 4 4 4 4 4
Technical Skills and Procedures	None specified	

Торіс	Dizziness, unsteadiness and falls	Level
Category	Management of Common Neurological Conditions	
Sub- category:	None	
Objective	To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with dizziness, unsteadiness and falls	
Knowledge	Common causes of cerebellar, vestibular, extrapyrammidal and autonomic dysfunction	4
Clinical Skills	Neurological history taking Neurological examination Establishing a neurological differential diagnosis Planning investigation Interpretation of scans and other investigations Presentation and summary of cases	4 4 4 4 4 4
Technical Skills and Procedures	None specified	

Торіс	Pain and sensory loss	Level
Category	Management of Common Neurological Conditions	
Sub- category:	None	
Objective	To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with pain and sensory loss	
Knowledge	Common causes of musculoskeletal, neurogenic and neuropathic pain and sensory loss	4
Clinical Skills	Neurological history taking Neurological examination Establishing a neurological differential diagnosis Planning investigation Interpretation of scans and other investigations Presentation and summary of cases	4 4 4 4 4 4
Technical Skills and Procedures	None specified	

Торіс	Hearing disorder	Level
Category	Management of Common Neurological Conditions	
Sub- category:	None	
Objective	To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with hearing loss	
Knowledge	Common causes of conductive and sensorineural hearing loss Principles of audiological assessment	4 3
Clinical Skills	Neurological history taking Neurological examination Establishing a neurological differential diagnosis Planning investigation Interpretation of scans	4 4 4 4 4

	Interpretation of pure tone audiograms and auditory evoked potentials Presentation and summary of cases	3 4
Technical Skills and Procedures	None specified	

Торіс	Visual disorder	Level
Category	Management of Common Neurological Conditions	
Sub- category:	None	
Objective	To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with visual disorders	
Knowledge	Patterns of visual loss in relation to common bulbar, retrobulbar, sellar, parasellar and optic pathway disorders Analysis of diplopia and nystagmus in relation to common cranial nerve and brainstem disorders	4 4
Clinical Skills	Neurological history taking Neurological examination Use of computerised visual field assessment Detailed fundoscopy Establishing a neurological differential diagnosis Planning investigation Interpretation of scans and other investigations Presentation and summary of cases	4 4 4 4 4 4 4 4
Technical Skills and Procedures	None specified	

Торіс	Language and speech disturbance	Level
Category	Management of Common Neurological Conditions	
Sub- category:	None	
Objective	To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with disturbances of language and speech	
Knowledge	Classification, causes and presentations of dysphasias, speech dyspraxia and dyslexia Classification, causes and presentations of dysarthria Role of speech and language therapists in assessment and treatment	4 4 2
Clinical Skills	Neurological history taking Neurological examination with assessment of dysphasia and dysarthria Establishing a neurological differential diagnosis Planning investigation Interpretation of scans and other investigations Presentation and summary of cases	4 4 4 4 4 4
Technical Skills and Procedures	N/A	

Tonic	Swallowing disorders	
- i obic	owallowing disorders	LEVEI

Category	Management of Common Neurological Conditions	
Sub- category:	None	
Objective	To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with swallowing disorders	
Knowledge	Neurological causes of dysphagia Indications for laryngoscopy, videofluoroscopy, nasogastric and percutaneous gastric feeding	4 2
Clinical Skills	Neurological history taking Neurological examination Establishing a neurological differential diagnosis Planning investigation Interpretation of scans and other investigations Presentation and summary of cases	4 4 4 4 4 4
Technical Skills and Procedures	None specified	

Торіс	Disorders of Sphincteric and sexual function	Level
Category	Management of Common Neurological Conditions	
Sub- category:	None	
Objective	To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with sphincteric disorders	
Knowledge	Common causes of sphincteric and sexual dysfunction Interpretation of urodynamic studies	4 2
Clinical Skills	Neurological history taking Neurological examination Establishing a neurological differential diagnosis Planning investigation Interpretation of scans and other investigations Presentation and summary of cases	4 4 4 4 4 4
Technical Skills and Procedures	None specified	

Торіс	Movement disorder	Level
Category	Management of Common Neurological Conditions	
Sub- category:	None	
Objective	To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with movement disorders	
Knowledge	Parkinson's disease latrogenic movement disorders Dystonic syndromes Choreiform syndromes	4 4 2 2
Clinical Skills	Neurological history taking Neurological examination Establishing a neurological differential diagnosis Planning investigation Interpretation of scans and other investigations Presentation and summary of cases	4 4 4 4 4 4

Technical	
Skills and None specified	
Procedures	

Торіс	Memory and cognitive disorders	Level
Category	Management of Common Neurological Conditions	
Sub- category:	None	
Objective	To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with disorders of memory and cognition	
Knowledge	Disorders of memory and cognition associated with head injury, subarachnoid haemorrhage, hydrocephalus, structural lesions of the frontal and temporal lobes and disorders of the limbic system	4
Clinical Skills	Neurological history taking Neurological examination Establishing a neurological differential diagnosis Planning investigation Interpretation of scans and other investigations Presentation and summary of cases	4 4 4 4 4 4
Technical Skills and Procedures	None specified	

Topic	Behavioural disorders	Level
Category	Management of Common Neurological Conditions	
Sub- category:	None	
Objective	To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with behavioural disorders	
Knowledge	The common acute and chronic presentations of organic and psychiatric behavioural disorders relating to alcohol and drug abuse, encephalitis, organic dementia, and psychosis	4
Clinical Skills	Neurological history taking Neurological examination Establishing a neurological differential diagnosis Planning investigation Interpretation of scans and other investigations Presentation and summary of cases	4 4 4 4 4 4
Technical Skills and Procedures	None specified	

Торіс	General management of the head injured patient	Level
Category	Basic Clinical Neurosurgery	
Sub- category:	Cranial Trauma	
Objective	To achieve competence in the general management of head-injured patients	
Knowledge	Pathophysiology of head injury and of multiple trauma including an understanding of:	4

	 Cerebral perfusion and oxygenation Raised intracranial pressure Impaired intracranial compliance Intracranial herniation Medical management of acutely raised intracranial pressure Indications for operation intervention including the use of pressure monitoring Principles, diagnosis and confirmation of brain death Principles of intensive care of head injured patients Principles of spinal stabilisation and radiological assessment in head injured patients 	4 4 4 4 4
	and behavioural disability and post- traumatic epilepsy Role of neurological rehabilitation	3
Clinical Skills	Clinical assessment of the multiply-injured patient. Neurological assessment of the head-injured patient including: - Assessment and categorisation of impaired consciousness - Recognition and interpretation of focal neurological deficits Prioritisation of clinical risk Interpretation of CT scans and plain radiology	4 4 4 3
Technical Skills and Procedures	No procedures specified	

Торіс	Insertion of ICP monitor	Level
Category	Basic Clinical Neurosurgery	
Sub- category:	Cranial Trauma	
Objective	To achieve competence in the insertion of subdural and intraparenchymal ICP monitors	
Knowledge	Indications for ICP monitoring Applied anatomy of the skull vault Calibration, zeroing and interpretation of ICP traces Potential complications of the procedure	4 4 4 4
Clinical Skills	Non specified	
Technical Skills and Procedures	Insertion of frontal subdural and intraparenchymal ICP monitors using a standard frontal burr hole and/or twist drill craniostomy.	4

Торіс	Burr hole evacuation of chronic subdural haematoma	Level
Category	Basic Clinical Neurosurgery	
Sub- category:	Cranial Trauma	
Objective	To achieve competence in burr hole evacuation of chronic subdural haematomas	
Knowledge	Pathophysiology of chronic subdural haematomas Applied anatomy of the skull vault and subdural space Indications for surgery Surgical options Complications of surgery Management of anti-platelet and anti-coagulant medication	4 4 4 4 4 4
Clinical	Neurological assessment of patients with a CSDH	4

Skills	Interpretation of CT scans Obtaining informed consent Post-operative assessment and management	3 4 4
Technical Skills and Procedures	Performance of single and multiple frontal and parietal burrhole evacuation of CSDHs	3

Торіс	Management of soft tissue trauma	Level
Category	Basic Clinical Neurosurgery	
Sub- category:	Cranial Trauma	
Objective	To achieve competence in the management of cranial soft tissue trauma	
Knowledge	Anatomy and blood supply of the scalp Indications for primary and secondary closure of wounds Indications for antibiotic prophylaxis	4 4 4
Clinical Skills	Assessment of tissue perfusion and viability	4
Technical Skills and Procedures	Wound exploration under local and general anaesthesia Wound debridement Arrest of scalp haemorrhage Layered closure of the scalp without tension Suturing technique Wound drainage and head bandaging	4 3 4 4 3 4

Торіс	General management of subarachnoid haemorrhage	Level
Category	Basic Clinical Neurosurgery	
Sub- category:	Spontaneous Intracranial haemorrhage	
Objective	To achieve competence in the general management of subarachnoid haemorrhage (SAH)	
Knowledge	Aetiology of SAH Pathophysiology of SAH WFNS grading of SAH Principles of resuscitation and timing of interventions. Indications for CT scanning, diagnostic lumbar puncture, CT angiography and digital subtraction angiography. Principles of management of post-haemorrhagic hydrocephalus Indications for endovascular and surgical intervention	4 4 4 4 4 4
Clinical Skills	Interpretation of CT scans including assessment of intracranial blood load, haematomas and hydrocephalus Basic interpretation of cerebral angiography	3 3
Technical Skills and Procedures	Lumbar puncture	4

Торіс	Diagnostic lumbar puncture	Level
Category	Basic Clinical Neurosurgery	
Sub- category:	Spontaneous Intracranial haemorrhage	

Objective	To understand the indications for diagnostic lumbar puncture To undertake an atraumatic lumbar puncture	
Knowledge	Indications for diagnostic lumbar puncture Interpretation of basic microscopy and biochemistry Principles of spectrophotometry	4 4 3
Clinical Skills	None specified	
Technical Skills and Procedures	Lumbar puncture	4

Торіс	Management of delayed secondary ischaemia	Level
Category	Basic Clinical Neurosurgery	
Sub- category:	Spontaneous Intracranial haemorrhage	
Objective	To recognise and manage delayed cerebral ischaemia following subarachnoid haemorrhage	
Knowledge	Pathophysiology of delayed cerebral ischaemia including the impact of secondary insults Principles governing the augmentation of cerebral blood flow	4
Clinical Skills	Assessment of a deteriorating patient Recognition and management of secondary insults Interpretation of CT scans Management of hypervolaemic hypertension	4 4 4 3
Technical Skills and Procedures	Insertion of central venous catheter Insertion of lumbar drain Insertion of external ventricular drain	3 3 3

Торіс	Management of post-haemorrhagic hydrocephalus	Level
Category	Basic Clinical Neurosurgery	
Sub- category:	Spontaneous Intracranial haemorrhage	
Objective	To achieve competence in the management of post-haemorrhagic hydrocephalus	
Knowledge	Pathophysiology of hydrocephalus Indications for external ventricular drainage and lumbar subarachnoid drainage Applied anatomy of the skull vault, subdural space and ventricular system Complications of surgery	4 4 4 4
Clinical Skills	Assessment of the unconscious and deteriorating SAH patient Interpretation of CT scans	4 3
Technical Skills and Procedures	Insertion of lumbar drain Insertion of external ventricular drain	4 3

Topic	Adult hydrocephalus	Level
Category	Basic Clinical Neurosurgery	
Sub-	Hydrocephalus	

category:		
Objective	The management of hydrocephalus complicating intracranial haemorrhage, head injury and intracranial space occupying lesions; insertion and taping of CSF reservoirs; insertion and maintenance of lumbar and ventricular drains	
Knowledge	The pathophysiology of CSF circulation Applied surgical anatomy of the ventricular system Indications for external ventricular drainage, ventriculoperitoneal shunting, Iumbar CSF drainage and shunting, ventriculo-cisternostomy Complications of surgery	3 3 3 3
Clinical Skills	None	
Technical Skills and Procedures	Insertion of ventricular drain/access device Insertion of VP shunt Revision of VP shunt	3 2 1

Торіс	Assessment and peri-operative management of patients with space- occupying intracranial tumours	Level
Category	Basic Clinical Neurosurgery	
Sub- category:	Intracranial tumours	
Objective	To achieve competence in the assessment and peri-operative management of patients with intracranial tumours	
Knowledge	The neuropathology of primary and secondary intracranial tumours including: - classification - epidemiology - natural history Clinical presentations of intracranial tumours Indications for neuroimaging Management of raised intracranial pressure Principles of operative management Detection and management of post-operative complications	3 4 4 4 3 4
Clinical Skills	Neurological history taking and examination Basic interpretation of CT and MRI scans	4 4
Technical Skills and Procedures	None specified	

Topic	Image-guided biopsy of intracranial tumour	Level
Category	Basic Clinical Neurosurgery	
Sub- category:	Intracranial tumours	
Objective	To undertake image-guided biopsy of an intracranial tumour under supervision	
Knowledge	Indications for biopsy of intracranial tumours Risks of biopsy Principles of image-guided surgery	4 4 4
Clinical Skills	Interpretation of CT and MRI scans and selection of biopsy targets	3
Technical Skills and Procedures	Image-guided frameless and/or frame-based stereotactic biopsy including: - Setting up a computer workstation and importing and interrogating image data - Positioning the patient and applying a cranial fixator	3

 Obtaining and confirming accurate patient registration Positioning and performing a suitable burr hole Passage of biopsy probe and biopsy 	
- Preparation of smear histology (when available)	

Topic	Acute Spinal Disorders	Level
Category	Basic Clinical Neurosurgery	
Sub- category:	Acute Spinal Disorders	
Objective	To achieve competence in the peri-operative management of patients presenting with acute spinal disorders	
Knowledge	The assessment and peri-operative management of patients presenting with spinal cord, cauda equina and spinal root compression The management of spinal shock The ward management of patients with spinal instability The detection and initial management of post-operative complications including compressing haematomas, CSF fistula and spinal sepsis	4 4 4 4
Clinical Skills	None	
Technical Skills and Procedures	None	

Торіс	General management of the head injured patient	Level
Category	Cranial Surgery	
Sub- category:	Cranial Trauma	
Objective	To achieve competence in all aspects of the general management of head- injured patients	
Knowledge	Pathophysiology of head injury and of multiple trauma Prevention of secondary insults Indications for operative intervention Medical management of acutely raised intracranial pressure	4 4 4 4
Clinical Skills	Clinical assessment of the head-injured and multiply-injured patient Prioritisation of clinical risk Interpretation of CT scans and plain radiology Interpretation of multi-modality cerebral monitoring Ability to assess and advise on the transfer of head-injured patient using image-transfer and telemedicine	4 4 4 4 4
Technical Skills and Procedures	None specified	

Topic	Surgical management of cranial trauma	Level
Category	Cranial Surgery	
Sub- category:	Cranial Trauma	
Objective	To achieve competence in the operative management of head-injured patients	

Knowledge	Pathophysiology of raised intracranial pressure and space occupying haematomas Applied surgical anatomy	4
	Principles of peri-operative care Indications for surgery and appropriate surgical approaches	4
Clinical Skills	Assessment of the head-injured patient Interpretation of trauma CT scans	4 4
Tochnical	Craniotomy for supratentorial traumatic haematoma, in particular: Planning and siting of craniotomies for evacuation of extradural and subdural haematomas	3 3
Skills and Procedures	Handling the "tight" brain Achieving haemostasis in the coagulopathic patient	3 3
	Achieving haemostasis from the skull base and venous sinuses	3
	Delayed cranioplasty of skull vault	3

Торіс	Neuro-intensive care of the head-injured patient	Level
Category	Cranial Surgery	
Sub- category:	Cranial Trauma	
Objective	To achieve competence in the neurointensive care of head-injured patients	
Knowledge	Pathophysiology of head injury The management of raised intracranial pressure, impaired intracranial compliance, and cerebral ischaemia Prevention and management of secondary insults	4 4 4
Clinical Skills	Assessment of the unconscious patient Use and interpretation of multimodality monitoring Interpretation of CT scans Ability to advise on management of secondary complications and further surgical intervention	4 4 4 4
Technical Skills and Procedures	None specified	

Торіс	Neurological rehabilitation	Level
Category	Cranial Surgery	
Sub- category:	Cranial Trauma	
Objective	To understand the role of post-traumatic neurological rehabilitation	
Knowledge	The natural history of recovery from head injury Understanding of neurological, cognitive and behavioural disabilities following mild and severe head injury Risks of post-traumatic epilepsy and its management	4 4 4
Clinical Skills	Ability to contribute to the multi-disciplinary assessment of head injured patients Ability to advise family and carers regarding prognosis, professional and lay support	4
Technical Skills and Procedures	None specified	

Торіс	Primary intracerebral haematomas	Level
Category	Cranial Surgery	
Sub- category:	Intracranial Haemorrhage	
Objective	To achieve competence in the operative management of space-occupying spontaneous intracerebral haematomas	
Knowledge	Aetiology of supra and infratentorial intracerebral haemorrhage Pathophysiology of spontaneous intracerebral haemorrhage Indications for surgical evacuation Management strategies to reduce the risk of intra-operative re-bleeding in presence of suspected aneurysm or AVM including partial haematoma evacuation, pre or post-operative embolisation and definitive surgical treatment	4 4 4 4
Clinical Skills	Assessment of patients with intracerebral haematomas and raised intracranial pressure Interpretation of CT and MRI scans and identification of probable aetiology Indications for pre-operative CT angiography, MRA and digital subtraction angiography	4 4 4
Technical Skills and Procedures	Craniotomy for supratentorial haematoma including: Planning and siting of craniotomies Use of ventricular drainage Intracerebral haemostasis in the coagulopathic patient	3 3 3 3

Торіс	Aneurysmal subarachnoid haemorrhage	Level
Category	Cranial Surgery	
Sub- category:	Intracranial Haemorrhage	
Objective	To achieve competence in the surgical aspects of the multi-disciplinary management of aneurysmal subarachnoid haemorrhage SAH	
Knowledge	Pathophysiology of SAH Prevention and management of delayed cerebral ischaemia, cerebral vasospasm and hydrocephalus Relative indications for endovascular and surgical interventions	4 4 4
Clinical Skills	Clinical assessment of patients with aneurysmal SAH Non operative management of patients undergoing endovascular coiling Management of delayed cerebral ischaemia	4 4 4
Technical Skills and Procedures	External ventricular drainage Lumbar subarachnoid drainage Ventriculoperitoneal shunting	4 4 3

Торіс	Adult hydrocephalus	Level
Category	Cranial Surgery	
Sub- category:	Hydrocephalus	
Objective	To achieve competence the assessment and operative management of adult patients with communicating and non communicating hydrocephalus.	
Knowledge	The pathophysiology of CSF circulation Applied surgical anatomy of the ventricular system Indications for external ventricular drainage, ventriculoperitoneal shunting, Iumbar CSF drainage and shunting, ventriculo-cisternostomy Complications of surgery	4 4 4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with hydrocephalus, including interpretation of CT and MRI scans and identification of shunt malfunction	4
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Technical Skills and Procedures	Lumbar subarachnoid drainage External ventricular drainage Primary ventriculoperitoneal shunt Revision of ventriculoperitoneal shunt Lumbo-peritoneal shunt	4 4 3 2 2

Торіс	Paediatric hydrocephalus	Level
Category	Cranial Surgery	
Sub- category:	Hydrocephalus	
Objective	To achieve competence in the assessment of children with hydrocephalus. To undertake emergency external ventricular drainage in children with acute hydrocephalus	
Knowledge	The pathophysiology of CSF circulation Applied surgical anatomy of the ventricular system Indications for external ventricular drainage	4 4 4
Clinical Skills	Assessment of the ill child with hydrocephalus, impaired consciousness and sepsis Differential diagnosis of shunt malfunction Interpretation of CT scans in shunted children	4 4 4
Technical Skills and Procedures	Taping and draining from an Ommaya reservoir Taping a shunt External ventricular drainage	4 4 2

Торіс	General principles of neuro-oncology	Level
Category	Cranial Surgery	
Sub- category:	Neuro-oncology	
Objective	To achieve competence in the multi-disciplinary management of patients with intracranial neoplasia	
Knowledge	Classification, natural history and pathology of benign and malignant intracranial neoplasia Pathophysiology of raised intracranial pressure associated with space occupying tumours Diagnostic imaging of intracranial tumours including the interpretation of CT and MRI scans and the role of MRS Principles of fractionated radiotherapy, stereotactic radiotherapy and radiosurgery Role of adjuvant chemotherapy Principles of clinical trials and their application to neuro-oncology Principles of palliative care	4 4 4 4 4 4 4
Clinical Skills	Clinical assessment of patients with raised intracranial pressure and space occupying lesions Ability to contribute to the multi-disciplinary management of patients with intracranial neoplasia Empathetic communication with patients and families	4 4 4
Technical Skills and Procedures	None specified	

Topic	Principles of image-guided surgery	Level
Category	Cranial Surgery	
Sub- category:	Neuro-oncology	
Objective	To achieve competence in image-guided surgery applied to the management of patients with intracranial tumours	
Knowledge	An understanding of the principles and practice of frameless image-guided surgery and the principles of frame-based stereotactic surgery	4
Clinical Skills	Interpretation of CT and MRI scans	4
Technical Skills and	Image-guided biopsy of supratentorial intrinsic tumour Ability to import, check and interrogate image data sets on a standard work station Setting up an image-guidance system and obtaining satisfactory intra-	3 4 4
Procedures	Planning and siting burr holes and craniotomy flaps using image-guidance Identification of an intra-cranial tumour and its margins using image-guidance	4

Торіс	Supra-tentorial intrinsic tumours	Level
Category	Cranial Surgery	
Sub- category:	Neuro-oncology	
Objective	To achieve competence in the operative management of supra-tentorial intrinsic tumours	
Knowledge	Indications for surgery Applied surgical anatomy Principles of peri-operative care Complications of surgery	4 4 4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with supratentorial intrinsic tumours	4
Technical Skills and Procedures	Craniotomy for superficial, lobar supratentorial intrinsic tumour In particular: safe patient positioning planning and siting of craniotomy with and without image-guidance intra-operative management of raised ICP appropriate exposure of the tumour, using operating microscope as necessary safe use of fixed retractors precise use of suction, electo-coagulation and ultrasonic aspiration intracranial haemostasis	3 3 3 3 3 3 3 3 3 3

Торіс	Convexity meningioma	Level
Category	Cranial Surgery	
Sub- category:	Neuro-oncology	
Objective	To achieve competence in the operative management of a convexity menginiomas	
Knowledge	Indications for surgery Applied surgical anatomy	4 4

	Principles of peri-operative care Complications of surgery	4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with convexity meningiomas	4
Technical Skills and Procedures	Resection of a convexity meningioma, in particular: safe patient positioning planning and siting of craniotomy with and without image-guidance intra-operative management of raised ICP appropriate exposure of the tumour precise use of suction, electo-coagulation and ultrasonic aspiration use of internal tumour decompression dissection in the subarachnoid plane using the operating microscope as necessary intracranial haemostasis use of duraplasty and cranioplasty	3 3 3 3 3 3 3 3 3 3 3 3

Торіс	General microbiological principles	Level
Category	Cranial Surgery	
Sub- category:	CNS Sepsis	
Objective	To achieve competence in the general management of CNS infections including ventriculitis, cerebral abscess, subdural empyema and spinal epidural abscess	
Knowledge	The pathophysiology of intracranial and spinal sepsis Principles of anti-microbial chemotherapy Indications for operative intervention	4 4 4
Clinical Skills	Clinical assessment of patients with CNS infections Interpretation of CT and MRI scans	4 4
Technical Skills and Procedures	None specified	

Topic	Management of intracerebral abscess	Level
Category	Cranial Surgery	
Sub- category:	CNS Sepsis	
Objective	To achieve competence in the operative management of cerebral abscess using burr hole aspiration	
Knowledge	Indications for surgery Applied surgical anatomy Principles of peri-operative care Complications of surgery	4 4 4 4
Clinical Skills	The assessment and pre-operative preparation of patients with a cerebral abscess	4
Technical Skills and Procedures	Burr hole aspiration of a cerebral abscess with and without image-guidance	4

Торіс	Management of the spinal injury patient	Level
Category	Spinal Surgery	

Sub- category:	Spinal Trauma	
Objective	To achieve competence in all aspects of the non-operative management of spinal injury patients.	
Knowledge	Pathophysiology of spinal cord injury Classification of spinal fracture dislocations Biomechanics of spinal instability Indications for halo traction and external stabilisation Indications for and principles of open reduction and stabilisation	4 4 4 4 4
Clinical Skills	Clinical assessment of the spinal injury patient Management of spinal shock Interpretation of plain radiology, CT and MRI scans Liaison with spinal injury units	4 4 4 4
Technical Skills and Procedures	Use of external mobilisation including cervical collars and spinal boards Application of halo traction Application of a halo-body jacket	4 3 2

Торіс	Malignant spinal cord compression	Level
Category	Spinal Surgery	
Sub- category:	Spinal Oncology	
Objective	To achieve competence in the general management of patients with malignant spinal cord compression.	
Knowledge	The pathophysiology of spinal cord compression The classification, aetiology and natural history of vertebral metastases Spinal instability associated with vertebral malignancy Indications for surgical intervention Role of primary radiotherapy and adjuvant radiotherapy or chemotherapy	4 4 4 4 4
Clinical Skills	Clinical assessment of patients with malignant spinal cord compression Interpretation of plain radiology, CT and MRI scans Liaison with medical oncologists and radiotherapist	4 4 4
Technical Skills and Procedures	N/A	

Topic	Surgical management of thoraco-lumbar metastases	Level
Category	Spinal Surgery	
Sub- category:	Spinal Oncology	
Objective	To achieve competence in the basic surgical management of patients with malignant spinal cord compression	
Knowledge	Indications for surgery The principles of operative spinal decompression and stabilisation of patients with spinal cord metastases. Applied surgical anatomy Principles of peri-operative care Complications of surgery	4 4 4 4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with malignant spinal cord compression	4
Technical	Extradural spinal biopsy and decompression by laminectomy in selected	3

Skills and	patients without segmental instability	
Procedures	Instrumented posterior spinal stabilisation	2

Topic	Lumbar radiculopathies	Level
Category	Spinal Surgery	
Sub- category:	Degenerative Spinal Disorders	
Objective	To achieve competence in the surgical management of lumbar compressive radiculopathies by lumbar microdiscectomies and associated microsurgical decompressions.	
Knowledge	Indications for operative management of lumbar radiculopathies Applied surgical anatomy of the lumbar spine with particular reference to degenerative neural compression and morphological variations in vertebral anatomy Selection of minimally-invasive approaches Principles of peri-operative care Complications of surgery	4 4 4 4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with lumbar radiculopathies Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms	4
Technical Skills and Procedures	Primary lumbar microdiscectomy Primary posterior decompression (laminotomy, hemilaminectomy etc): including - Identification of spinal level by pre and intra-operative fluoroscopy - Achieving safe access to the spinal canal by micro-surgical fenestration - Achieving full decompression of the spinal canal, lateral recess and foramen by appropriate bone and soft tissue resection - Protection and safe retraction of neural tissues	3 3

Topic	Compressive cervical myeloradiculopathies	Level
Category	Spinal Surgery	
Sub- category:	Degenerative Spinal Disorders	
Objective	To achieve competence in the surgical management of compressive cervical myeloradiculopathies	
Knowledge	Indications for operative management of cervical myeloradiculopathies Applied surgical anatomy of the cervical spinal column with particular reference to the relationships between the bony elements, spinal cord, nerve roots and vertebral arteries Selection of surgical approaches Principles of peri-operative care Complications of surgery	4 4 4 4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with cervical myeloradiculopathies Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms	4
Technical Skills and Procedures	Single level anterior cervical discectomy with and without fusion In particular: Standard anterolateral approach to the cervical spine Use of fluoroscopy or plain radiographs to confirm spinal level Radical and subtotal excision of the cervical disc, PLL, central and unco- vertebral osteophytes Protection and full decompression of the spinal cord and spinal nerve roots	3 3 3 3 3

3

Due to the nature of neurosurgical practice there will be conditions and procedures that are not individually specified in this examination syllabus and that will form part of a candidate's training

Table1. Schedule of Essential Operative Competencies

This table summarises the level of operative competence that a candidate should have attained prior to sitting the examination.

	Final
Surgical Approaches	
Burr hole	4
Craniotomy – convexity	4
Craniotomy – pterional	4
Craniotomy – midline supratentorial	4
Craniotomy – midline posterior fossa	4
Transsphenoidal approach	4
Lateral posterior fossa	4
Lumbar fenestration	4
Laminectomy	4
General Procedures	
Insertion of lumbar drain	4
Tapping/draining of CSF reservoir	4
Application of skull traction	4
Image Guidance/Stereotaxy set up	4
Management of cranial trauma	
Insertion of Intracranial (ICP) monitor	4
Burr hole evacuation of CSDH	4
 Elevation of depressed skull fracture 	4
Craniotomy for traumatic haematoma (ICH)	4
Management of spontaneous intracranial haemorrhage	
Craniotomy for spontaneous intracerebral haematoma (ICH supratentorial)	
Craniotomy for spontaneous intracerebellar haematoma (ICH infratentorial)	4
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	4
Management of hydrocephaius	1
Insertion of Venthcular drain/access device	4
Pavision of VP shunt	4
Revision of VP shuft	
Management of intracranial tumours	
Supratentorial tumour biopsy	4
Craniotomy for supratentorial intrinsic tumour/metastasis	4
Craniotomy for posterior fossa intrinsic tumour/metastasis	4
Craniotomy for convexity meningioma	4
Management of intradural spinal tumours	
Excision of intradural extramedullary tumour	4

 Management of degenerative spinal disorders Lumbar microdiscectomy Anterior cervical discectomy 	4 4
 Emergency paediatric care Insertion of EVD Evacuation of intracranial haematoma (ICH) 	4 4

Торіс	Management of head injured patients	Level
Category	Cranial Surgery	
Sub-category:	Cranial Trauma	
Objective	To achieve competence in all aspects of the advanced operative management of head-injured patients	
Knowledge	Pathophysiology of raised intracranial pressure and space occupying haematomas Applied surgical anatomy Principles of peri-operative care Indications for surgery and appropriate surgical approaches Indications for open and endoscopic closure of traumatic CSF fistulae Complications of surgery and their management	4 4 4 4 4 4
Clinical Skills	Competence in all aspects of peri-operative management of head- injured patients Ability to diagnose and confirm brain death	4
Technical Skills and Procedures	Craniotomy for supra and infratentorial extradural, subdural and intracerebral haematomas Lobectomy for haemorrhagic contusion Vault cranioplasty using in-situ or preformed prostheses Decompressive bifrontal craniotomy with extensive durotomy Subfrontal extradural or subdural repair of anterior fossa fractures Combined craniofacial repair of fronto-orbito-maxillary injuries (fellowship)	4 4 3 3 3

Торіс	Aneurysmal Subarachnoid haemorrhage	Level
Category	Cranial Surgery	
Sub-category:	Spontaneous Intracranial haemorrhage	
Objective	To achieve competence in the surgical aspects of the multi- disciplinary management of aneurysmal subarachnoid haemorrhage SAH	
Knowledge	Pathophysiology of SAH Prevention and management of delayed cerebral ischaemia, cerebral vasospasm and hydrocephalus Relative indications for endovascular and surgical interventions	4 4 4
Clinical Skills	Clinical assessment of patients with aneurysmal SAH Non operative management of patients undergoing endovascular coiling Management of delayed cerebral ischaemia	4 4 4
Technical Skills and Procedures	External ventricular drainage Lumbar subarachnoid drainage Ventriculoperitoneal shunting Revision of ventriculoperitoneal shunt Craniotomy for intracerebral haematoma	4 4 4 4 4

Торіс	Adult hydrocephalus	Level
Category	Cranial Surgery	
Sub- category:	Hydrocephalus	
Objective	To achieve competence in all aspects of the management of adult patients with hydrocephalus	
Knowledge	The patholophysiology of CSF circulation Applied surgical anatomy of the ventricular system Indications for external ventricular drainage, shunting, lumbar CSF drainage and shunting, ventriculo-cisternostomy Surgical complications and their management	4 4 4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with hydrocephalus Interpretation of pressure studies and CSF infusion studies Interpretation of CT and MRI scans and identification of shunt malfunction	4 4 4
Technical Skills and Procedures	Competence in all aspects of primary and revisional shunt surgery including: Use of 3-D image-guidance or ultrasound for difficult ventricular cannulation Intra-operative testing of shunt function Selection of appropriate shunts Management of peri-operative ventricular haemorrhage Lumbo-peritoneal shunt Third ventriculo-cisternostomy	4 4 4 4 4 2

Topic	Anterior and middle fossa skull base tumours	Level
Category	Cranial Surgery	
Sub- category:	Intracranial tumours	
Objective	To achieve competence in the surgical management of patients with anterior and middle fossa tumours	
Knowledge	Indications for selected approaches in relation to pathology and surgical goals Applied microsurgical anatomy of the anterior and middle cranial fossae Principles of intra-operative management of patients undergoing resection of anterior and middle fossa tumours including olfactory groove, planum sphenoidale, parasellar and sphenoid wing and falcine meningiomas Complications of surgery and their management	4 4 4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with anterior and middle fossa tumours Interpretation of CT and MRI scans	
Technical Skills and Procedures	Standard pterional and subfrontal approaches including: - Pterional resection and basal drilling - Subfrontal approach to the optic nerve, chiasm and internal carotid arteries - Sylvian fissure splitting and exposure of the MCA bifurcation - CSF drainage by chiasmatic cisternal suction, intra-operative ventricular puncture and lamina terminalis fenestration Bi-Frontal/Frontal and panietal parafalcine approaches Microsurgical resection of superfical skull base meningioma Anterior interhemispheric, fronto-orbital, zygomatic and temporo-zygomatic	4 4 4

approaches	2

Topic	Transphenoidal surgery	Level
Category	Cranial Surgery	
Sub- category:	Intracranial tumours	
Objective	To achieve competence in transphenoidal approaches to the pituitary fossa and resection of pituitary adenomas	
Knowledge	Pathophysiology of the hypothalamic-pituitary axis Indications for surgery Selection of surgical approaches: sublabial, transnasal and endoscopic Applied surgical anatomy of the skull base Principles of peri-operative care Complications of surgery and their management	4 3 3 3 4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with pituitary, sellar and parasellar tumours Interpretation of CT and MRI scans	4
Technical Skills and Procedures	Microsurgical transphenoidal approach Transphenoidal resection of non-functioning macroadenoma	3 2

Topic	Movement disorders	Level
Category	Cranial Surgery	
Sub- category:	Functional neurosurgery	
Objective	To understand the management of patients with movement disorders	
Knowledge	The aetiology and pathophysiology of movement disorders Indications for medical, minimally-invasive and surgical management Complications of surgery and their management	3 2 4
Clinical Skills	Surgical aspects of the multi-disciplinary assessment of patients with movement disorders	3
Technical Skills and Procedures	N/A	

Topic	Midline tumours	Level
Category	Cranial Surgery	
Sub- category:	Intracranial tumours	
Objective	To achieve competence in the management of patients with midline sellar, parasellar, pineal and third ventricular tumours	
Knowledge	Indications for surgery Applied surgical anatomy of midline structures Selection of surgical approaches including principles of endoscopic biopsy and/or resection Principles of intra-operative management of patients undergoing resection of midline sellar, para-sellar, pineal and third ventricular tumours including colloid cysts	4 4 4 4

	Complications of surgery and their management	4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with midline tumours tumours Interpretation of CT and MRI scans	4
Technical Skills and Procedures	Transfrontal, transcortical approach to the lateral and third ventricle Microsurgical resection of lateral intraventricular tumour Transfrontal endoscopic biopsy	3 2 2

ſ	Торіс	Malignant posterior fossa tumours	Level
	Category	Cranial Surgery	
	Sub- category:	Intracranial tumours	
	Objective	To achieve competence in the surgical management of superficial, hemispheric and midline intrinsic posterior fossa tumours and metastases	
	Knowledge	Indications for surgery Selection of surgical approaches Applied surgical anatomy Principles of peri-operative care Complications of surgery and their management	4 4 4 4 4
	Clinical Skills	The assessment, counselling and pre-operative preparation of patients with posterior fossa malignant tumours Interpretation of CT and MRI scans	4
	Technical Skills and Procedures	Competence in midline, paramedian and retrosigmoid posterior fossa craniotomies including: - safe patient positioning in the prone and semi-prone positions - exposure of the lateral and sigmoid sinuses - exposure and decompression of the foramen magnum - use of cisternal CSF drainage - safe use of fixed retractors - exposure and resection of superficial, lateral and mid-line intrinsic cerebellar tumours and metastases	4

Торіс	Cerebellopontine angle tumours	Level
Category	Cranial Surgery	
Sub- category:	Intracranial tumours	
Objective	To achieve competence in the management of patients with cerebellopontine angle tumours	
Knowledge	Relative indications for surgery, radiosurgery and conservative management Principles of intra-operative management of patients undergoing resection of CP angle tumours including vestibular schwannomas and menignomas Principles and application of cranial nerve and brainstem monitoring Applied microsurgical anatomy of the CP angle, brainstem and lower cranial nerves Relative indications for retrosigmoid, middle fossa, and translabyrinthine approaches with respect to hearing preservation, tumour size and position	4 4 3 4 3
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with CP angle tumours Interpretation of CT and MR scans	4
Technical Skills and Procedures	Retrosigmoid approach Subarachnoid dissection and exposure of the tumour and lower cranial nerves 2 Subtotal microsurgical resection of acoustic neuroma	4 3

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Торіс	Intracerebral abscess and subdural empyema	Level
Category	Cranial Surgery	
Sub- category:	CNS Infection	
Objective	To achieve competence in the management of patients with CNS infections including ventriculitis, cerebral abscess and subdural empyema	
Knowledge	The aetiology and pathophysiology of intracranial sepsis Indications for burr hole drainage, ventricular drainage and craniotomy in the management of intracranial sepsis Indications for combined otorhinological procedures Applied surgical anatomy Principles of peri-operative care Surgical complications	4 4 4 4 4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with intracranial sepsis Interpretation of CT and MRI scans Management of anti-microbial therapy	4 4 3
Technical Skills and Procedures	Burr hole drainage of intracerebral abscess Ventricular drainage Craniotomy for subdural empyema, including frontal and parietal parafalcine approaches Craniotomy and resection of frontal, temporal and cerebellar abscess Anterior and middle fossa extradural and subdural duroplasty	4 4 4 3

Topic	Intracranial aneurysms	Level
Category	Cranial Surgery	
Sub- category:	Neurovascular surgery	
Objective	To achieve competence in the surgical aspects of the multi-disciplinary management of ruptured and unruptured intracranial aneurysms	
Knowledge	Aetiology, epidemiology and natural history of unruptured and ruptured intracranial aneurysms Pathophysiology and general management of subarachnoid haemorrhage Angiographic and microsurgical anatomy of the cerebral circulation Indications for surgical management of intracranial aneurysms by clipping, trapping, microsurgical reconstruction and microvascular bypass Complications of surgery and their management	4 4 3 3 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with ruptured and unruptured aneurysms Interpretation of CT, MR and catheter angiography	4
Technical Skills and Procedures	Standard pterional and subfrontal approaches Clipping of anterior circulation aneurysm	4 2

Торіс	Intracranial vascular malformations	Level
Category	Cranial Surgery	

Sub- category:	Neurovascular surgery	
Objective	To achieve competence in the surgical aspects of the multi-disciplinary management of intracranial vascular malformations	
Knowledge	Pathogenesis, aetiology, epidemiology and natural history of intracranial vascular malformations including AVMs, A-V fistula, cavernomas and venous malformations Pathophysiology and general management of intracranial haemorrhage Angiographic and microsurgical anatomy of the cerebral circulation Indications for embolisation and radiosurgery Indications for surgical management of malformations Complications of surgery and their management, including hyperperfusion syndromes	4 4 3 3 3 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with vascular malformations Interpretation of CT, MR and catheter angiography	4
Technical Skills and Procedures	Image-guided craniotomy and exposure of supratentorial AVM Microsurgical resection of superficial gyral or sulcal AVM	3 2

Торіс	Occlusive cerebrovascular disease	Level
Category	Cranial Surgery	
Sub- category:	Neurovascular surgery	
Objective	To achieve competence in the clinical management of occlusive cerebrovascular disease	
Knowledge	The epidemiology, natural history and pathophysiology of extra- and intracranial atherosclerotic occlusive disease The epidemiology, natural history and pathophysiology of non-atherosclerotic occlusive diseases Optimal medical management of occlusive and thrombo-embolic cerebrovascular disease Imaging of the acutely ischaemic brain using CT and MRI Principles of non-invasive and invasive imaging of the extra and intracranial vasculature using CT, MRI and catheter angiography Principles of regional cerebral blood flow and metabolism measurement and imaging using CT and MRI perfusion techniques; SPECT and PET scanning Indications for carotid endarterectomy Indications for endovascular intervention including intra-arterial thrombolysis; carotid angioplasty and stenting; intracranial angioplasty Principles of cerebral revascularisation by indirect synangiosis, low-flow EC-IC anastomosis and high flow EC-IC bypass grafting	3 3 3 3 3 2 2 2 2 2 2
Clinical Skills	The assessment, counselling and pre-operative preparation of patients undergoing surgery for occlusive cerebrovascular disease with ruptured and unruptured aneurysms Interpretation of CT, MR and catheter angiography	4 3
Technical Skills and Procedures	None	

Торіс	Chronic pain	Level
Category	Cranial Surgery	

Sub- category:	Functional neurosurgery	
Objective	To understand the management of patients with chronic pain syndromes	
Knowledge	The aetiology and pathophysiology of chronic pain syndromes Indications for medical, minimally-invasive and surgical management Complications of surgery and their management	3 3 3
Clinical Skills	Surgical aspects of the multi-disciplinary assessment of chronic pain patients Pre-operative counselling and preparation	3
Technical Skills and Procedures	None	

Торіс	Trigeminal neuralgia	Level
Category	Cranial Surgery	
Sub- category:	Functional neurosurgery	
Objective	To achieve competence in the surgical aspects of the multi-disciplinary management of patients with trigeminal neuralgia	
Knowledge	Aetiology, epidemiology and natural history of trigeminal neuralgia Differential diagnosis and management of related cranio-facial pain syndromes Medical management of cranio-facial pain Surface anatomy of the trigemminal nerve and microsurgical anatomy of the CP angle Indications for surgical management of trigeminal neuralgia by peripheral neurectomy, percutaneous rhizotomy, radiofrequency rhizotomy, microvascular decompression Complications of surgery and their management	4 4 4 4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with trigeminal neuralgia Interpretation of posterior fossa CT and MRI scans	4 4
Technical Skills and Procedures	Retrosigmoid microsurgical approach to the CP angle and trigeminal nerve Trigeminal microvascular decompression Percutaneous trigeminal rhizotomy	3 2 2

Topic	Epilepsy	Level
Category	Cranial Surgery	
Sub- category:	Functional neurosurgery	
Objective	To understand the management of patients with idiopathic and lesional epilepsy)	
Knowledge	The aetiology and pathophysiology of idiopathic and lesional epilepsy Indications for medical and surgical management	4 3
Clinical Skills	Surgical aspects of the multi-disciplinary assessment of epilepsy patients Interpretation of CT, MRI and SPECT scans Pre-operative counselling and preparation	4 4 4
Technical Skills and Procedures	Image-guided resection of cortical lesions Vagal nerve stimulation	3 3

Topic	Cervical spine fracture-subluxation	Level
Category	Spinal Surgery	
Sub- category:	Spinal Trauma	
Objective	To achieve competence in the general management of fracture-subluxations of the cervical spine	
Knowledge	Pathophysiology of spinal cord injury Classification of cervical spinal fracture dislocations Biomechanics of spinal instability Indications for halo traction and external stabilisation Indications for and principles of open reduction and stabilisation	4 4 4 4 4
Clinical Skills	Clinical assessment of the spinal injury patient Management of spinal shock Interpretation of plain radiology, CT and MRI scans Liaison with spinal injury units Counselling and pre-operative preparation of spinal injury patients	4 4 4 4 4
Technical Skills and Procedures	Application of cranial-cervical traction	4

Торіс	Thoraco-lumbar fractures	Level
Category	Spinal Surgery	
Sub- category:	Spinal Trauma	
Objective	To achieve competence in the general management of thoracolumbar fractures	
Knowledge	Pathophysiology of spinal cord injury Classification of thoracolumbar fracture dislocations Biomechanics of spinal instability Indications for open reduction and stabilisation	4 4 4 4
Clinical Skills	Clinical assessment of the spinal injury patient Management of spinal shock Interpretation of plain radiology, CT and MRI scans Liaison with spinal injury units Counselling and pre-operative preparation of spinal injury patients	4 4 4 4 4
Technical Skills and Procedures	Posterior reduction of thoracolumbar fractures by pedicle screw instrumentation and ligamentotaxis	2

Topic	Intradural extramedullary tumours	Level
Category	Spinal Surgery	
Sub- category:	Benign Intradural Tumours	
Objective	To achieve competence in the management of patients with intradural extramedullary tumours including scwannomas, neurofibromas and meningiomas	
Knowledge	Classification, natural history and basic molecular biology of intradural spinal tumours Pathophysiology of spinal cord compression Indications for surgery Selection of surgical approaches	4 4 4 4

	Applied surgical anatomy Principles of peri-operative care Complications of surgery and their management	4 4 4
Clinical Skills	Assessment, counselling and pre-operative preparation of patients with intradural spinal tumours Interpretation of spinal MRI scans	4
Technical Skills and Procedures	Microsurgical excision of posterior and postero-lateral intradural extramedullary tumours Microsurgical excision of anterior intradural extramedullary tumours	4 2

Торіс	Intramedullary spinal cord tumours	Level
Category	Spinal Surgery	
Sub- category:	Benign Intradural Tumours	
Objective	To achieve competence in the management of patients with intramedullary spinal cord tumours	
Knowledge	Classification, natural history and pathology of intramedullary spinal cord tumours Indications for biopsy, subtotal and radical excision Role of adjuvant treatment Applied surgical anatomy of spine and spinal cord Selection of surgical approaches Principles of intra-operative management of patients undergoing resection of intramedullary tumours Complications of surgery and their management	4 4 4 4 4 4
Clinical Skills	Assessment, counselling and pre-operative preparation of patients with intramedullary spinal cord tumours Interpretation of spinal MRI scans	4
Technical Skills and Procedures	Microsurgical biopsy of intramedullary spinal cord tumour Subtotal microsurgical resection of intramedullary tumour Duroplasty	3 2 4

Торіс	Malignant spinal cord compression	Level
Category	Spinal Surgery	
Sub- category:	Malignant Spinal Cord Compression	
Objective	To achieve competence in the management of patients with malignant secondary spinal cord compression	
Knowledge	The pathophysiology of spinal cord compression The classification, aetiology and natural history of vertebral metastases Spinal instability associated with vertebral malignancy Indications for percutanous and open spinal biopsy Role of primary radiotherapy and adjuvant radiotherapy or chemotherapy Indications for spinal decompression with and without instrumented spinal stabilisation	4 4 4 4 4
Clinical Skills	Clinical assessment of patients with malignant spinal cord compression Interpretation of plain radiology, CT and MRI scans Liaison with medical oncologists and radiotherapist Counselling and pre-operative preparation of patients with malignant spinal cord compression	4 4 4 4
Technical	Decompressive thoracic and lumbar laminectomy with extradural tumour	4

Skills and	resection	
Procedures	Posterior pedicle screw stabilisation	
	Anterior cervical corporectomy with anterior column re-construction and	3
	anterior cervical plating	

Торіс	Lumbar radiculopathies	Level
Category	Spinal Surgery	
Sub- category:	Degenerative Spinal Disorders	
Objective	To achieve competence in the surgical management of lumbar compressive radiculopathies by lumbar microdiscectomies and associated microsurgical decompressions	
Knowledge	Indications for operative management of lumbar radiculopathies Applied surgical anatomy of the lumbar spine with particular reference to degenerative neural compression and morphological variations in vertebral anatomy Selection of minimally-invasive approaches Principles of peri-operative care Complications of surgery	4 4 4 4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with lumbar radiculopathies Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms	4
Technical Skills and Procedures	Lumbar microdiscectomy Microsurgical lateral recess decompression Posterior decompression (laminotomy, hemilaminectomy etc) Revisional lumbar microsurgical discectomy with and without decompression Microsurgical lumbar discectomy for central disc protrusion with cauda equina compression	4 4 4 4 4

Торіс	Cervical myeloradiculopathy	Level
Category	Spinal Surgery	
Sub- category:	Degenerative Spinal Disorders	
Objective	To achieve competence in the management of cervical radiculopathy	
Knowledge	Indications for operative management of cervical radiculopathies Applied surgical anatomy of the cervical spinal column, spinal cord, nerve roots and vertebral arteries Selection of surgical approaches Principles of peri-operative care Complications of surgery	4 4 4 4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with cervical myeloradiculopathies Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms	4
Technical Skills and Procedures	Single and multi-level anterior cervical discectomy with and without fusion Anterior cervical plating Posterior cervical microforaminotomy and microdiscectomy Posterior cervical decompression (laminotomy, hemilaminectomy etc	4 4 3 4

Торіс	Rheumatoid disease	Level
Category	Spinal Surgery	

Sub- category:	Craniocervical junction disorders	
Objective	To understand the management of rheumatoid patients with atlanto-axial subluxation, cranial settling and related disorders	
Knowledge	The pathology and natural history of rheumatoid spondylopathy Indications for operative management of atlanto-axial subluxation, cranial settling and related disorders Applied surgical anatomy of the craniocervical junction Selection of surgical approaches Principles of peri-operative care Complications of surgery	3 3 3 3 4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with cervical myeloradiculopathies Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms and 3D spinal reconstructions	4 4
Technical Skills and Procedures	Atlanto-axial wiring for reducible atlanto-axial subluxation	2

Торіс	Hindbrain herniation	Level
Category	Spinal Surgery	
Sub- category:	Craniocervical junction disorders	
Objective	To achieve competence in the management of craniocervical stenosis and hindbrain herniation	
Knowledge	The pathogenesis and natural history of hindbrain herniation, cranicervical stenosis, syringomyelia and syringobulbia Indications for foramen magnum decompression Applied surgical anatomy of the craniocervical junction Selection of surgical approaches Principles of peri-operative care Complications of surgery	4 4 4 4 4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with hind brain anomalies Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms and 3D spinal reconstructions	4
Technical Skills and Procedures	Foramen magnum decompression	3

Topic	Spinal epidural abscess	Level
Category	Spinal Surgery	
Sub- category:	Spinal Infection	
Objective	To achieve competence in the operative management of spinal epidural abscess	
Knowledge	The aetiology and pathophysiology of spinal sepsis Indications for drainage of spinal epidural abscess by laminectomy and multiple laminotomies Applied surgical anatomy Principles of peri-operative care Surgical complications and their management Principles of peri-operative care	4 4 4 4 4 4

Clinical Skills	The assessment, counselling and pre-operative preparation of patients with spinal sepsis Interpretation of spinal CT and MRI scans Management of anti-microbial therapy	4 4 3
Technical Skills and Procedures	Drainage of spinal epidural abscess by laminectomy and/or multiple laminotomies	4

Торіс	Vertebral osteomyelitis and discitis	Level
Category	Spinal Surgery	
Sub- category:	Spinal Infection	
Objective	To achieve competence in the operative management of vertebral osteomyelitis and discitis	
Knowledge	The aetiology and pathophysiology of vertebral osteomyelitis and discitis, including pyogenic, tuberculous and atypical infections Indications for percutaneous and open biopsy Indications for spinal stabilisation Principles of peri-operative care Surgical complications and their management	4 4 4 4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with spinal sepsis Interpretation of spinal CT and MRI scans Management of anti-microbial therapy	4 4 3
Technical Skills and Procedures	Transpedicular and open vertebral and disc biopsy	2

Торіс	Carpal tunnel compression	Level
Category	Peripheral Nerve Surgery	
Sub- category:	None	
Objective	To achieve competence in carpal tunnel decompression	
Knowledge	Presentation, differential diagnosis and management of carpal tunnel syndrome Interpretation of nerve conduction studes Indications for surgery Applied surgical anatomy	4 4 4 4
Clinical Skills	Assessment and counselling of patients with carpal tunnel syndrome	4
Technical Skills and Procedures	Carpal tunnel decompression	4

Торіс	Ulnar neuropathy	Level
Category	Peripheral Nerve Surgery	
Sub- category:	None	
Objective	To achieve competence in the management of ulnar neuropathy	

Knowledge	Presentation, differential diagnosis and management of ulnar neuropathies Interpretation of nerve conduction studes Indications for surgery Applied surgical anatomy	4 4 4 4
Clinical Skills	Assessment and counselling of patients with an ulnar neuropathy	4
Technical Skills and Procedures	Cubital ulnar nerve decompression with and without transposition	4

Торіс	Peripheral nerve sheath tumours	Level
Category	Peripheral Nerve Surgery	
Sub- category:	None	
Objective	To achieve competence in the resection of major and minor peripheral nerve tumours	
Knowledge	Pathology of peripheral nerve sheath tumours Indications for complete and subtotal resection of tumours Applied surgical anatomy of the major peripheral nerves	4 4 4
Clinical Skills	Assessment and counselling of patients with peripheral nerve sheath tumours	4
Technical Skills and Procedures	Microsurgical excision of peripheral nerve sheath tumour	3

Торіс	Paediatic head and spinal injury	Level
Category	Paediatric Neurosurgery	
Sub- category:	None	
Objective	To achieve competence the management of accidental and non-accidental paediatric head and spinal injuries.	
Knowledge	Pathophysiology of raised intracranial pressure in children following head injury Prevention and treatment of secondary insults relating to transfer and emergency surgery in head-injured children Medical management and intensive care in paediatric head injury Pathophysiology, legal and social aspects of non-accidental injury in children Management of perinatal trauma, growing fractures and penetrating injuries in children Indications for decompressive craniectomy in management of intractable increases in ICP Rehabilitation after mild, moderate and severe head injuries Diagnosis and certification of brain death in children Classification, assessment, investigation and management of paediatric spinal injuries (including SCIWORA)	4 4 4 4 4 4 3 4 4
Clinical Skills	Assessment and clinical management of children with head and spinal injuries	4
Technical Skills and Procedures	Insertion of ICP monitor Insertion of ventriculostomy Craniotomy for traumatic intracranial haematoma Repair of depressed skull fracture	4 4 4 3

Topic	Paediatric hydrocephalus	Level
Category	Paediatric Neurosurgery	
Sub- category:	None	
Objective	To achieve competence in the management of paediatric hydrocephalus	
Knowledge	The pathophysiology of CSF circulation Applied surgical anatomy of the ventricular system Indications for external ventricular drainage, lumbar CSF drainage and shunting, ventriculo-cisternostomy Indications for VP and VA shunting and Principles of shunt function and selection Surgical complications and their management	4 4 4 4 4 4
Clinical Skills	Assessment of the ill child with hydrocephalus, impaired consciousness and sepsis Differential diagnosis of shunt malfunction Interpretation of CT scans in shunted children	4 4 4
Technical Skills and Procedures	Insertion, tapping and draining from a CSF reservoir External ventricular drainage including externalisation of VP shunts Ventriculo-peritoneal shunting	4 4 3

Торіс	Intracranial vascular disorders	Level
Category	Paediatric Neurosurgery	
Sub- category:	None	
Objective	To achieve competence in the emergency neurosurgical management of children presenting with intracranial vascular disorders	
Knowledge	Epidemiology, natural history, pathophysiology and clinical features of subarachnoid haemorrhage, haemorrhagic stroke and ischaemia stroke in children secondary to intracranial aneurysms, arteriovenous malformations and fistulae, cavernomas, arterial dissection, moya-moya disease and venous sinus thrombosis Surgical and endovascular strategies for the management of acute intracranial vascular disorders in children	4
Clinical Skills	The assessment and clinical management of children presenting with spontaneous intracranial haemorrhage and acute cerebral ischaemia	4
Technical Skills and Procedures	Emergency operative management of spontaneous intracerebral hemorrhage	4

Special Interest Topics

Торіс	Paediatric neurooncology	Level
Category	Paediatric neurosurgery	
Sub- category:	None	
Objective	To achieve competence in the surgical aspects of the multi-disciplinary management of children with tumours of the brain and spinal cord	
Knowledge	Epidemiology, natural history and pathology of tumours of the central nervous	4

	system in children including medulloblastoma, pilocytic astrocytoma, high grade gliomas, supratentorial PNET, pineal region tumours, brain stem tumours and intramedullary spinal cord tumours Imaging of paediatric CNS tumours Radiological and biochemical staging of tumours Indications for surgery, radiotherapy, primary and adjuvant chemotherapy Goals of surgery Long-term effects of treatment on cognition, hypothalamic-pituitary function and quality of life	4 4 4 4
	Management of delayed spinal deformity associated with treatment of spinal cord tumours	3 3
Clinical Skills	Assessment and clinical management of children with tumours of the central nervous system Multidisciplinary approach to treating patients with paediatric brain tumours	4
Technical Skills and Procedures	Emergency operative management of a deteriorating child with an intracranial haemorrhage and/or hydrocephalus secondary to tumour Use of CT, MRI, electromagnetic and ultrasound guided localisation of tumours of the brain and spine Stereotactic, image-guided and endoscopic biopsy of intracranial tumours Supratentorial craniotomy for hemispheric tumour Approaches to the suprasellar region: pterional, orbitozygomatic and subfrontal Approaches to the third ventricle: transcortical-transventricular, transcallosal Approaches to the pineal region: endoscopic, supracerebellar, suboccipital transtentorial Midline posterior fossa craniotomy for tumour Retrosigmoid approach to tumour presenting in the CP angle Laminoplasty approach to spine cord tumours.	4 4 4 4 4 4 4 3 3
Professional Skills	Consent issues in children Recognition of importance of mentorship in dealing with unfamiliar or complicated exposures and procedures	4 4

Торіс	Paediatric head and spinal injury	Level
Category	Paediatric neurosurgery	
Sub- category:	None	
Objective	To achieve competence in all aspects of the management of accidental and non-accidental paediatric head and spinal injuries.	
Knowledge	Pathophysiology of raised intracranial pressure in children following head injury Prevention and treatment of secondary insults relating to transfer and emergency surgery in head-injured children Medical management and intensive care in paediatric head injury Pathophysiology, legal and social aspects of non-accidental injury in children Management of perinatal trauma, growing fractures and penetrating injuries in children Indications for decompressive craniectomy in management of intractable increases in ICP Rehabilitation after mild, moderate and severe head injuries Diagnosis and certification of brain death in children Classification, assessment, investigation and management of paediatric spinal injuries (including SCIWORA)	4 4 4 4 4 3 4
Clinical Skills	Assessment and clinical management of children with head and spinal injury	4

Technical Skills and Procedures	Insertion of ICP monitor Insertion of ventriculostomy Craniotomy for traumatic intracranial haematoma Repair of depressed skull fracture Anterior skull base repair	4 4 4 3
Professional Skills	Understanding of the legal issues surrounding non-accidental injury Understanding of multi-disciplinary approach to non- accidental injury	

Торіс	Hydrocephalus	Level
Category	Paediatric neurosurgery	
Sub- category:	None	
Objective	To achieve competence in all aspects of the management (operative and non-operative) of paediatric patients with hydrocephalus.	
Knowledge	Pathophysiology and investigation of abnormal CSF dynamics in hydrocephalus and BIH Indications for third ventriculostomy and for shunt insertion Principles of shunt design and function Antenatal diagnosis of hydrocephalus and its prognosis Medical and ophthalmological treatment options for BIH.	4 4 4 4
Clinical Skills	Assessment and clinical management of neonates and children presenting with hydrocephalus Assessment and clinical management of neonates and children presenting with shunt malfunction including obstruction, over-drainage and slit ventricle syndrome Interpretation of CT, MRI scans and ultrasound scans	4 4 4
Technical Skills and Procedures	Insertion of intracranial pressure monitor Insertion of ventricular access device in neonates Insertion and revision of ventriculoperitoneal shunt/subduroperitoneal shunt Insertion and revision of ventriculoatrial /ventriculopleural shunt Insertion and revision of lumboperitoneal shunt Endoscopic third ventriculostomy Endoscopic fenestration of loculated ventricles CT, MRI and ultrasound guided ventricular access Management of arachnoid cysts by shunting, open or endoscopic fenestration	4 4 4 4 4 4 4 4 4
Professional Skills	Antenatal counselling Consent in neonates and children	4 4

Торіс	Congenital spinal disorders	Level
Category	Paediatric neurosurgery	
Sub- category:	None	
Objective	To achieve competence in all aspects of the management (operative and non-operative) of children with congenital spinal disorders	
Knowledge	Embryogenesis of craniospinal dysraphism Pathophysiology of CSF circulation associated with hindbrain hernia, syringobulbia and syringomyelia Epidemiogy, natural history and clinical features of congenital spinal disorders including dysraphism, tethered cord syndrome, diastematomyelia, Chiari	4 4 4

	malformations, Klippel-Feil syndrome, achondroplasia, Downs syndrome etc Imaging of the neonatal and growing paediatric spine of children with congenital disorders commonly Antenatal diagnosis of dysraphism and its implications.	4
Oliviaal		
Clinical	Assessment and clinical management of children presenting with open or	4
Skills	closed dysraphic spines and other congenital spinal abnormalities.	
	Closure of myelomeningocoele	4
	Foramen magnum decompression for hind brain herniation	4
	Syringostomy and shunting of syringom velia Untethering of thickened filum	3
Technical	Excision of simple dermal sinus tract	4
Skills and	Unterthering and resection of bony spur in diastematomyelia	3
Procedures	Untethering of lipomyelomeningocoele	3
	Instrumented stabilization and fusion in the treatment of congenital spinal	2
	disorders	2
Professional	Consent issues in children	4
Skille	Collaborative multidisciplinary approach, particularly with orthopaedic surgery	
UKIII5	Conaborative multidisciplinary approach, particularly with orthopaedic surgery	4

Торіс	Craniofacial disorders	Level
Category	Paediatric neurosurgery	
Sub- category:	None	
Objective	To achieve competence in all aspects of the management (operative and non-operative) of children with simple craniosynostosis and cranial deformity after trauma or tumour To understand the management of children with syndromic craniosynostosis and encephalocoeles	
Knowledge	Advances in the genetic understanding of craniofacial conditions Epidemiology, natural history and clinical features of simple and syndromic craniosynostosis including cosmetic, cognitive and ophthalmological complications Imaging of simple and syndromic craniosynostosis Indication for and timing of surgical interventions Understanding of causes and management of positional plagiocephaly Epidemiology, natural history, and clinical features of common skull vault conditions including eosinophilic granuloma, fibrous dysplasia etc	4 4 4 4 4 4
Clinical Skills	Management of ophthalmic and airway emergencies in syndromic craniosynostosis Neurosurgical contribution to the multi-disciplinary management of children with craniofacial abnormalities	4
Technical Skills and Procedures	Cranioplasty using autologous, titanium or acrylic implants Surgical management of non-syndromic single suture synostosis (in the context of a multidisciplinary team)	4
Professional Skills	Consent issues children Liaison with supraregional centres for designated cases.	4

Торіс	Paediatric epilepsy	Level
Category	Paediatric neurosurgery	
Sub-	Nono	
category:	NOTIE	

Objective	To understand the management of paediatric epilepsy and the assessment of children for epilepsy surgery	
Knowledge	Classification, epidemiology, natural history and clinical features of epilepsy in childhood Clinical, encephalographic, videotelemetric and radiological assessment of children entering a surgical program Indications for, prognosis and complications of VNS, disconnection procedures and temporal lobe surgery	4 4 4
Clinical Skills	Treatment of status epilepticus Neurosurgical contribution to the multidisciplinary assessment and clinical management of children in preparation for and undergoing epilepsy surgery	4 4
Technical Skills and Procedures	Cortical lesionectomy VNS insertion/revision Invasive EEG recording by grid and depth electrode placement Surgery for temoral lobe epilepsy Non-temporal lobe resections Disconnection procedures	4 3 2 2 2 2 2
Professional Skills	Consent in children	

Торіс	Intracranial vascular disorders	Level
Category	Paediatric neurosurgery	
Sub- category:	None	
Objective	To achieve competence in the neurosurgical aspects of the multi-disciplinary management of children presenting with intracranial vascular disorders	
Knowledge	Epidemiology, natural history, pathophysiology and clinical features of subarachnoid haemorrhage, haemorrhagic stroke and ischaemia stroke in children secondary to intracranial aneurysms, arteriovenous malformations and fistulae, cavernomas, arterial dissection, moya-moya disease and venous sinus thrombosis Surgical, endovascular and radiosurgical strategies for the management of intracranial vascular disorders in children	4
Clinical Skills	The assessment and clinical management of children presenting with spontaneous intracranial haemorrhage, acute cerebral ischaemia and chronic cerebral ischaemia	4
Technical Skills and Procedures	Emergency operative management of spontaneous intracerebral hemorrhage Resection of superficial vascular malformations and cavernomas	4 3
Professional Skills	Consent issues in children	4

Торіс	Spasticity and movement disorders	Level
Category	Paediatric neurosurgery	
Sub- category:	None	
Objective	To understand the principles of surgical management of spasticity and movement disorders in children	
Knowledge	Clinical presentations of spasticity and other movement disorders in childhood	3

	Multi-disciplinary assessment of children entering a surgical program The indications for, prognosis and complications of intrathecal baclofen therapy, dorsal rhizotomy and deep brain stimulation in the management of spasticity and dystonia Awareness of indications for CNS modulating procedures in the management of pain and convulsive disorders	3 3 2
Clinical Skills	Neurosurgical aspects of the multi-disciplinary assessment and management of children with spasticity and movement disorders	4
Technical Skills and Procedures	Baclofen pump insertion, assessment of function and revision Laminotomy for selective dorsal rhizotomy Removal/revision of pulse generator units	3 3 3
Professional Skills	Consent in children	4

Торіс	Advanced surgical techniques	Level
Category	Neuro-oncology	
Sub- category:	None	
Objective	To achieve competence in the application of advanced surgical techniques to the management of patients with brain tumours	
Knowledge	Indications for; applications of; advantages and disadvantages of various advanced surgical approaches and adjuncts	4
Clinical Skills	Assessment, counselling and pre-operative preparation of patients undergoing neuro-oncological surgery Selection of appropriate advanced techniques based on clinical and imaging information	4 4
Technical Skills and Procedures	Stereotactic craniotomy Advanced image guidance techniques Use of intraoperative chemotherapy wafers Third ventriculostomy Awake craniotomy Intraoperative neurophysiological monitoring	4 4 3 2 2
Professional Skills	Generic	

Торіс	Low-grade intrinsic tumours	Level
Category	Neuro-oncology	
Sub- category:	None	
Objective	Achieve competence in the surgical and clinical management of low grade intrinsic tumours	
Knowledge	Epidemiology, natural history, genetic characteristics, pathology and clinical features of low grade intrinsic cerebral tumours Surgical and non-surgical management options for low grade intrinsic tumours	4 4
Clinical Skills	Interpretation of CT, MRI and functional imaging in patients with low grade intrinsic tumours Assessment, counselling and pre-operative preparation of patients with low grade intrinsic tumours Continuing management of patients with low grade intrinsic tumours within a multidisciplinary team setting	4 4 4
Technical	Craniotomy for lobar low grade intrinsic tumours using appropriately selected	

Skills and Procedures	advanced surgical techniques	4
Professional Skills	Generic	

Торіс	Tumours of the ventricular system and pineal	Level
Category	Neuro-oncology	
Sub- category:	None	
Objective	To achieve competence in the management of patients with intraventricular and pineal region tumours.	
Knowledge	Epidemiology, natural history, genetic characteristics, pathology and clinical features of intraventricular and pineal region tumours Radiological and biochemical staging Surgical and non-surgical management options for low grade intrinsic tumours Surgical anatomy relevant to approaches to the lateral and third ventricles and the pineal region	4 4 4
Clinical Skills	Counselling of patients regarding surgical treatment options for pineal and intraventricular tumours Choice of operative approaches based on tumour location and imaging	4
Technical Skills and Procedures	Transcallosal and transcortical approaches to ventricular tumours Microsurgical resection of lateral intraventricular tumour Microsurgical resection of third ventricular tumour/colloid cyst Transfrontal endoscopic biopsy and third ventriculostomy Supracerebellar infratentorial approaches to the pineal Occipital transtentorial approaches to the pineal	3 3 2 3 2 2
Professional Skills	Generic	

Торіс	Brainstem tumours	Level
Category	Neuro-oncology	
Sub- category:	None	
Objective	To achieve competence in the surgical aspects of the multidisciplinary management of patients with intrinsic brainstem tumours	
Knowledge	Epidemiology, natural history, genetic characteristics, pathology and clinical features of brain stem tumours Management options for patient with brainstem tumours including open surgery, biopsy and radiotherapy	4
Clinical Skills	Selection of open surgery and stereotactic biopsy for patients with brainstem lesions	4
Technical Skills and Procedures	Stereotactic biopsy of brainstem lesions Open resection of exophytic brainstem tumours	4 1
Professional Skills	Generic	

Topic	Radiosurgery and stereotactic radiotherapy	Level
Category	Neuro-oncology	
Sub- category:	None	
Objective	To achieve competence in the neurosurgical aspects of the multidisciplinary management of patients undergoing radiosurgery and stereotactic radiotherapy	
Knowledge	The principles of radiosurgery and stereotactic radiotherapy The indications for their use as adjunctive and/or primary treatment modalities	4 4
Clinical Skills	Assessment of the suitability of these techniques for the treatment of metastatic and intrinsic tumours based on clinical presentation and imaging appearances Counselling potential patients on the role of these techniques in tumour treatment	4
Technical Skills and Procedures	Application of stereotactic frames for radiosurgical treatment	3
Professional Skills	None	

Торіс	Surgical management of pain	Level
Category	Functional Neurosurgery	
Sub- category:	None	
Objective	To achieve competence in the surgical aspects of the multi-disciplinary management of patients with chronic pain syndromes	
Knowledge	The aetiology and pathophysiology of chronic pain syndromes Indications for medical, minimally-invasive and surgical management Applied surgical anatomy Complications of surgery and their management	4 4 4 4
Clinical Skills	Surgical aspects of the multi-disciplinary assessment of chronic pain patients Pre-operative counselling and preparation	4
Technical Skills and Procedures	Spinal cord stimulation DREZ lesion Open cordotomy Deep brain stimulation for pain	4 2 2 2
Professional Skills	Generic	

Topic	Neurovascular compression syndromes	Level
Category	Functional Neurosurgery	
Sub- category:	None	
Objective	To achieve advanced competence in the surgical aspects of the multi- disciplinary management of patients with neurovascular compression syndromes	
Knowledge	Aetiology, epidemiology and natural history of trigeminal neuralgia, and glossopharyngeal neuralgia Differential diagnosis and management of related cranio-facial pain syndromes Medical management of cranio-facial pain	4 4 4

	Surface anatomy of the trigeminal nerve and microsurgical anatomy of the CP angle Indications for surgical management of trigeminal and glossopharyngeal neuralgia by peripheral neurectomy, percutaneous rhizotomy, radiofrequency rhizotomy, microvascular decompression Complications of surgery and their management	4 4 4
Clinical Skills	The assessment, counselling and pre-operative preparation of patients with trigeminal neuralgia Interpretation of posterior fossa CT an MR and scans including MR sequences demonstrating neurovascular compression Application and interpretation of intraoperative monitoring techniques	4 4 4
Technical Skills and Procedures	Percutaneous trigeminal rhizotomy Trigeminal microvascular decompression	3 4
Professional Skills	Generic	

Торіс	Spasticity	Level
Category	Functional Neurosurgery	
Sub- category:	None	
Objective	To achieve competence in the surgical aspects of the multi-disciplinary management of patients with spasticity	4
Knowledge	The aetiology and pathophysiology of spasticity Indications for medical, minimally-invasive and surgical management Applied surgical anatomy Complications of surgery and their management	4 4 4 4
Clinical Skills	Surgical aspects of the multi-disciplinary assessment of patients with spasticity Pre-operative counselling and preparation	4
Technical Skills and Procedures	Intrathecal drug delivery Deep brain stimulation	4 3
Professional Skills	Generic	

Торіс	Epilepsy	Level
Category	Functional Neurosurgery	
Sub- category:	None	
Objective	To achieve competence in the surgical aspects of the multi-disciplinary management of patients with epilepsy	
Knowledge	The pathophysiology of idiopathic and lesional epepilepsy Indications for medical and surgical management Principles of ictal, interictal, sphenoidal and intraoperative EEG Principles of video-EEG monitoring Applied surgical anatomy Complications of surgery and their management	4 4 3 3 4 4
Clinical Skills	Surgical aspects of the multi-disciplinary assessment of epilepsy patients Interpretation of CT, MRI and SPECT scans Pre-operative counselling and preparation	4 4 4
Technical	Stereotactic placement of depth electrodes	2

Skills and	Placement of subdural electrode-grids	3
Procedures	Image-guided resection of cortical lesions	3
	Mesial temporal resection	3
	Vagal nerve stimulation	3
	Functional hemispherectomy	1
	Corpus callosotomy	2
Professional Skills	Generic	

Topic	Movement disorders	Level
Category	Functional Neurosurgery	
Sub- category:	None	
Objective	To achieve competence in the surgical aspects of the multi-disciplinary management of patients with movement disorders	
Knowledge	The aetiology and pathophysiology of movement disorders Indications for medical, minimally-invasive and surgical management Applied surgical anatomy Complications of surgery and their management	4 4 4 4
Clinical Skills	Surgical aspects of the multi-disciplinary assessment of patients with movement disorders Interpretation of CT and MRI scans Pre-operative counselling and preparation	4 4 4
Technical Skills and Procedures	Deep brain stimulation Microvascular decompression for hemi-facial spasm	3 3
Professional Skills	Generic	

Торіс	Surgery for mental illness	Level
Category	Functional Neurosurgery	
Sub- category:	None	
Objective	To be familiar with current surgical treatment options for treatment resistant mental illness and in particular depression and obsessive compulsive disorder	
Knowledge	Indications for surgical treatment of mental illness Ethical and regulatory aspects of surgical treatment of mental illness Surgical targets	3 3 3
Clinical Skills	None	
Technical Skills and Procedures	None	
Professional Skills	Generic	

Торіс	Intracranial aneurysms	Level
Category	Neurovascular surgery	
Sub-	None	

category:		
Objective	To achieve competence in the surgical aspects of the multi-disciplinary management of patients with intracranial aneurysms	
Knowledge	The epidemiology, natural history, aetiology and pathophysiology of unruptured and ruptured intracranial aneurysms Vascular anatomy of the central nervous system Indications for surgical and endovascular treatment of intracranial aneurysms The principles of endovascular treatment Indications for intra and extracranial bypass in the management of complex aneurysms	4 4 4 4 4
Clinical Skills	Clinical assessment and management of patients with ruptured and unruptured intracranial aneurysms	4
Technical Skills and Procedures	Pterional approach Interhemispheric approaches Temporo-zygomatic and related approaches Exposure of the basilar termination Exposure of the vertebral artery and PICA Clipping of saccular anterior circulation aneurysm Clipping of complex anterior circulation aneurysm Harvest of saphenous vein and radial artery grafts	4 3 2 2 3 2 3
Professional Skills	Generic	

Торіс	Intracranial arteriovenous malformations	Level
Category	Neurovascular surgery	
Sub- category:	None	
Objective	To achieve competence in the surgical aspects of the multi-disciplinary management of intracranial arteriovenous malformations (AVMs)	
Knowledge	The epidemiology, classification, natural history, embryogenesis and pathophysiology of AVMs of the brain The indications for surgical, radiosurgical and endovascular treatment of asymptomatic, symptomatic and ruptured brain AVMs	4 4
Clinical Skills	The assessment and clinical management of patients undergoing treatment of AVMs of the brain	4
Technical Skills and Procedures	Evacuation of intracerebral haematoma associated with an AVM Microsurgical resection of superficial cortical AVM Microsurgical resection of paraventricular and posterior fossa AVM	4 3 2
Professional Skills	Generic	

Торіс	Intracranial dural arteriovenous fistulae	Level
Category	Neurovascular surgery	
Sub- category:	None	
Objective	To achieve competence in the surgical aspects of the multi-disciplinary management of intracranial dural arteriovenous fistulae (dAVFs)	
Knowledge	Applied anatomy of the cerebral venous circulation The epidemiology, classification, natural history, pathogenesis and pathophysiology of intracranial dAVFs The indications for surgical and endovascular treatment of asymptomatic, symptomatic and ruptured intracranial dAVFs	4 4 4

Clinical Skills	The assessment and clinical management of patients undergoing treatment of intracranial dAVFs	4
Technical Skills and Procedures	Exploration and closure of supratentorial dAFV	2
Professional Skills	Generic	

Торіс	Cerebral ischaemia	Level
Category	Neurovascular surgery	
Sub- category:	None	
Objective	To achieve competence in the surgical aspects of the management of patients with acute and chronic cerebral ischaemia	
Knowledge	The epidemiology, natural history and pathophysiology of extra- and intracranial atherosclerotic occlusive disease The epidemiology, natural history and pathophysiology of non-atherosclerotic occlusive diseases Optimal medical management of occlusive and thrombo-embolic cerebrovascular disease Imaging of the acutely ischaemic brain using CT and MRI Principles of non-invasive and invasive imaging of the extra and intracranial vasculature using ultrasound, transcranial Doppler, CT, MRI and catheter angiography Principles of regional cerebral blood flow and metabolism measurement and imaging using CT and MRI perfusion techniques; SPECT and PET scanning Indications for endovascular intervention including intra-arterial thrombolysis; carotid angioplasty and stenting; intracranial angioplasty Principles of cerebral revascularisation by indirect synangiosis, low-flow EC-	4 4 3 4 3 4 3 4
Clinical Skills	The assessment and clinical management of patients with acute and chronic cerebral ischaemia	4
Technical Skills and Procedures	Carotid endarterectomy Saphenous and radial artery graft harvest Extracranial vascular anastomosis Intracranial microvascular anastomosis	2 3 2 1
Professional Skills	Generic	

Торіс	Cranial base meningiomas	Level
Category	Skull-base surgery	
Sub- category:	None	
Objective	To achieve competence in the neurosurgical aspects of the multidisciplinary management of cranial base meningiomas	
Knowledge	Epidemiology, natural history, pathology and clinical presentation of meningiomas of the anterior, middle and posterior fossae Indications for radical or subtotal resection of skull-base meningiomas Indications for radiosurgical treatment Applied surgical anatomy of the skull base and craniofacial skeleton	4 4 4 4
	Selection of optimal approaches in relation presenting pathology and imaging	4

Clinical Skills	Assessment and clinical management of patients with skull base meningiomas	4
Technical Skills and Procedures	Anterior interhemispheric, fronto-orbital, zygomatic and temporo-zygomatic approaches Resection of anterior fossa meningioma: olefactory, planum sphenoidale and outer sphenoid wing Resection of clinoidal and suprasellar meningioma Resection of occipital, lateral petrosal and tentorial meningioma Resection of cavernous sinus and petroclival meningioma	4 4 3 2
Professional Skills	None	

Topic	Pituitary and sellar region tumours	Level
Category	Skull-base surgery	
Sub- category:	None	
Objective	To achieve competence in the management of patients with pituitary and sellar region tumours	
Knowledge	Classification, epidemiology, natural history, pathology and clinical presentation of tumours of the pituitary and sellar region Pathophysiology of the hypothalamic-pituitary axis Investigation of the hypothalmic pituitary axis in patients with hypopituitarism and hypersecretion syndromes Indications for surgery, radiosurgery and adjuvant radiotherapy Selection of surgical approaches: sublabial, transnasal and endoscopic Applied surgical anatomy of the skull base Principles of peri-operative care Complications of surgery and their management	4 4 4 4 4 4 4
Clinical Skills	Peri-operative management of patients with established and threatened dysfunction of the hypothalamic-pituitary axis Neurosurgical aspects of the continuing care of patients with pituitary tumours	4
Technical Skills and Procedures	Transphenoidal exposure of the pituitary fossa (microsurgical transnasal or sublabial) Transphenoidal resection of non-functioning macroadenoma Transphenoidal selective microadenectomy Endoscopic transphenoidal resection of non-functioning adenoma Pterional craniotomy and microsurgical decompression of optic nerves and chiasm	4 4 3 2 3
Professional Skills	Generic	

Торіс	Acoustic neuromas	Level
Category	Skull-base surgery	
Sub- category:	None	
Objective	To achieve competence in the neurosurgical aspects of the multidisciplinary management of patients with acoustic neuromas	
Knowledge	Epidemiology, natural history, pathology and clinical presentation of sporadic and NFII-related acoustic neuromas4 Relative indications for surgery,	4

	radiosurgery and conservative management Principles of intra-operative facial nerve and BAEP monitoring Applied microsurgical anatomy of the CP angle, brainstem and lower cranial nerves Relative indications for retrosigmoid, middle fossa, and translabyrinthine approaches with respect to hearing preservation, tumour size and position	4 4 4
Clinical Skills	Neurosurgical aspects of the assessment and clinical management of patients undergoing acoustic neuroma surgery	4
Technical Skills and Procedures	Retrosigmoid approach Retrosigmoid subtotal resection of acoustic neuroma Retrosigmoid radical resection Translabyrinthine resection of acoutic tumour	4 3 2 2
Professional Skills	Multidisciplinary working with neuro-otologists and oncologists Role of hearing therapy	4 3

Торіс	Other skull-base tumours	Level
Category	Skull-base surgery	
Sub- category:	None	
Objective	To achieve competence in the neurosurgical aspects of the multidisciplinary management of patients with benign and malignant cranial base tumours	
Knowledge	Epidemiology, natural history, pathology and clinical presentation of benign and malignant tumours of the skull base including cranial nerve schwannomas, chordomas, paragangliomas, adenoid cystic carcinomas, angiofibromas and nasopharyngeal carcinomas Indications for radical or subtotal resection of skull-base tumours Indications for radiosurgical treatment Applied surgical anatomy of the skull base and craniofacial skeleton Selection of optimal approaches in relation presenting pathology and imaging	4 4 4 4
Clinical Skills	Neurosurgical aspects of the mutidisciplinary assessment and clinical management of patients with rarer skull base tumours	4
Technical Skills and Procedures	Frontobasal approaches to the anterior fossa and orbito-ethmoidal complex Transfacial and mid-face approaches to the skull base Lateral approaches to the infratemporal fossa and pterygo-palatine fossa Transtemporal approaches to the jugular bulb and petrous apex	3 2 2 2
Professional Skills	Multidisciplinary working with neurotologists, maxillofacial surgeons and oncologists	4

Торіс	Craniofacial repair	Level
Category	Skull-base surgery	
Sub- category:	None	
Objective	To achieve competence in the repair of skull base defects and the closure of CSF fistulae	
Knowledge	Applied surgical anatomy of the cranial base floor and paranasal sinus Indications for open surgical and endoscopic repair of spontaneous, post- traumatic and post-surgical skull base defects and CSF fistulae Principles of simple, pedicled and free vascularised tissue transfer	4 4 4
Clinical Skills	Neurosurgical aspects of the multi-disciplinary management of patients with skull base defects	4
Technical Skills and	Use of simple autologous grafts and substitutes (fascia, pericranium, fat etc) in closing small defects	4

Procedures	Use of vascularised pericranial, temporalis muscle and galeal flaps for major defects	4
	Endoscopic repair of anterior fossa defects Free vascularised flap reconstruction following major cranio-facial resections	1 1
Professional Skills	Multi-disciplinary working with neurotologists and plastic surgeons	4

Торіс	Spinal trauma	Level
Category	Spinal Surgery	
Sub- category:	None	
Objective	To achieve competence in the operative management of fracture- subluxations of the cervical and thoracolumbar spine	
Knowledge	Pathophysiology of spinal cord injury Classification of cervical and thoracolumbar fracture dislocations Biomechanics of spinal instability Indications for halo traction and external stabilisation Indications for and principles of open reduction and stabilisation Applied surgical anatomy of cervical and thoracolumbar fracture-subluxations Relative indications for operative reduction and stabilisation by anterior and posterior approaches Management of post-traumatic spinal deformity and delayed sequelae	4 4 4 4 4 4
Clinical Skills	Assessment and clinical management of patients with spinal injuries	4
Technical Skills and Procedures	Application of cranial-cervical traction Instrumented stabilisation of subaxial fracture-dislocation by anterior cervical plate and/or lateral mass screws Instrumented stabilisation of atlanto-axial fracture dislocation by anterior odonto-axial screws and/or posterior atlantoaxial screws/wiring Application of halo-body jacket Posterior reduction of thoracolumbar fractures by pedicle screw instrumentation and ligamentotaxis Combined anterior and posterior reduction and instrumented stabilisation of thoracolumbar fractures	4 3 2 4 3 2
Professional Skills	Generic	

Торіс	Metastatic spinal disease	Level
Category	Spinal Surgery	
Sub- category:	None	
Objective	To achieve competence in the management of patients with malignant secondary spinal cord compression	
Knowledge	The pathophysiology of spinal cord compression The classification, aetiology and natural history of vertebral metastases Spinal instability associated with vertebral malignancy Indications for percutanous and open spinal biopsy Role of primary radiotherapy and adjuvant radiotherapy or chemotherapy Indications for spinal decompression with and without instrumented spinal stabilisation	4 4 4 4 4 4
Clinical Skills	Clinical assessment of patients with malignant spinal cord compression Interpretation of plain radiology, CT and MRI scans	4 4

	Liaison with medical oncologists and radiotherapist Counselling and pre-operative preparation of patients with malignant spinal cord compression	4 4
Technical Skills and Procedures	Decompressive thoracic and lumbar laminectomy with extradural tumour resection and pedicle screw stabilisation Anterior cervical corporectomy with anterior column re-construction and anterior cervical plating Cervical lateral mass stabilisation Posterior corporectomy with anterior column replacement and posterior stabilisation Combined anterior and posterior total vertebrectomy with stabilisation	4 4 3 2 2
Professional Skills	Generic	

Topic	Primary spinal tumours	Level
Category	Spinal Surgery	
Sub- category:	None	
Objective	N/A	
Knowledge	N/A	
Clinical Skills	N/A	
Technical Skills and Procedures	N/A	
Professional Skills	N/A	

Торіс	Intradural tumours	Level
Category	Spinal Surgery	
Sub- category:	None	
Objective	To achieve competence in the management of patients with intradural spinal tumours	
Knowledge	Classification, epidemiology, natural history and pathology of intradural spinal tumours Pathophysiology of spinal cord compression Indications for biopsy, subtotal and radical surgery Selection of surgical approaches Applied surgical anatomy Principles of peri-operative care Complications of surgery and their management Role of adjuvant treatment	4 4 4 4 4 4 4
Clinical Skills	None	
Technical Skills and Procedures	Microsurgical excision of intradural extramedullary tumours Microsurgical biopsy of intramedullary spinal cord tumour Subtotal microsurgical resection of intramedullary tumour Duroplasty	4 3 3 4
Professional Skills	Generic	

Topic	Syringomyelia and hind brain anomalies	Level
Category	Spinal Surgery	
Sub- category:	None	
Objective	To achieve competence in the management of craniocervical stenosis and hindbrain herniation	
Knowledge	The pathogenesis and natural history of hindbrain herniation, craniocervical stenosis, syringomyelia and syringobulbia Indications for foramen magnum decompression Applied surgical anatomy of the craniocervical junction Selection of surgical approaches Principles of peri-operative care Complications of surgery	4 4 4 4 4 4
Clinical Skills	Assessment and clinical management of patients with hindbrain herniation and syringomyelia	4
Technical Skills and Procedures	Foramen magnum decompression Syringostomy and syringo-pleural shunting	4 3
Professional Skills	Generic	

Торіс	Advanced surgery of the ageing and degenerative spine	Level
Category	Spinal Surgery	
Sub- category:	None	
Objective	To achieve competence in the advanced surgery of the ageing and degenerative spine	
Knowledge	Techniques for operative stabilization of the osteoporotic spine Principles of surgery for degenerative scoliosis Biomechanical principles of and indications for cervical and lumbar disc replacement Biomechanical principles of and indications for non-fusion spinal stabilisation Indications for, techniques and complications of vertebroplasty and Kyphoplasty Principles of thoracoscopic and laparoscopic surgical techniques	4 4 4 3 2
Clinical Skills	Assessment and clinical management of patients with degenerative spinal disorders	4
Technical Skills and Procedures	Pedicle screw instrumentation of the thoracic and lumbar spine Lumbar interbody fusion by posterior(PLIF) and postero-lateral (TLIF) fusion Lumbar anterior interbody fusion Single and multi-level cervical corporectomy with anterior cervical plating Anterior cervical discectomy and cervical arthroplasty Cervical laminectomy with lateral mass and/or pedicle screw stabilisation Cervical laminoplasty Postero-lateral thoracic discectomy Anterior (transthoracic) discectomy Thoracoscopic techniques	3 3 2 3 3 3 3 3 2 1
Professional Skills	Generic	
Topic	Surgery of the rheumatoid spine	Level
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Category	Spinal Surgery	
Sub- category:	None	
Objective	To achieve competence in the management of rheumatoid atlanto-axial subluxation, cranial settling and related disorders	
Knowledge	The pathology and natural history of rheumatoid spondylopathy Indications for operative management of atlanto-axial subluxation, cranial settling and related disorders Applied surgical anatomy of the craniocervical junction Selection of surgical approaches Principles of peri-operative care Complications of surgery	4 4 4 4 4 4
Clinical Skills	Assessment and clinical management of patients with spinal complications of rheumatoid arthritis	4
Technical Skills and Procedures	Atlanto-axial wiring for reducible atlanto-axial subluxation Atlantoaxial stabilisation using transarticular screws or pedicle and lateral mass screws and rods Instrumented atlanto-occipital fusion Transoral odontoidectomy	3 3 3 2
Professional Skills	Generic	

Professional Behaviour and Leadership

Professional Behaviour and Leadership Syllabus

The Professional Behaviour and leadership elements are mapped to the leadership curriculum as laid out by the Academy of Medical Royal Colleges and General Medical Council (GMC).

	Professional Behaviour and Leadership	Mapping to Leadership Curriculum
Category	 Good Clinical Care, to include: History taking (GMP Domains: 1, 3, 4) Physical examination (GMP Domains: 1, 2,4) Time management and decision making (GMP Domains: 1,2,3) Clinical reasoning (GMP Domains: 1,2, 3, 4) Therapeutics and safe prescribing (GMP Domains: 1, 2, 3) Patient as a focus of clinical care (GMP Domains: 1, 3, 4) Patient safety (GMP Domains: 1, 2, 3) Infection control (GMP Domains: 1, 2, 3) 	Area 4.1
Objective	To achieve an excellent level of care for the individual patient To achieve an excellent level of care for the individual patient To elicit a relevant focused history (See modules 2, 3, 4,5) To perform focused, relevant and accurate clinical examination (See modules 2,3,4,5) To prioritise the diagnostic and therapeutic plan for a patient based upon the clinic findings (See modules 2,3,4,5) To prioritise the diagnostic and therapeutic plan (See modules 2,3,4,5) To communicate a diagnostic and therapeutic plan appropriately (See modules 2,3,4,5) To produce timely, complete and legible clinical records to include case-note records, handover notes, and operation notes To prescribe, review and monitor appropriate therapeutic interventions relevant to clinical practice including non – medication based therapeutic and preventative indications (See module 1,2,3,4,5) To prioritise and organise clinical and clerical duties in order to optimise patient care To make appropriate clinical and clerical decisions in order to optimise the effectiveness of the clinical team resource. To prioritise the patient's agenda encompassing their beliefs, concerns expectations and needs To prioritise and maximise patient safety: • To understand that patient safety depends on • The effective and efficient organisation of care • Health care staff working well together • Safe systems, individual competency and safe practice • To understand the risks of treatments and to discuss these honestly and openly with patients • To systematic ways of assessing and minimising risk • To ensure that all staff are aware of risks and work together to minimise risk To manage and control infection in patients, including: • Controlling the risk of cross-infection • Appropriately managing infection in individual patients • Working appropriately within the wider community to manage the risk posed by communicable diseases	Area 4.1
Knowledge	Patient assessment Knows likely causes and risk factors for conditions relevant to mode of	

	presentation	
	presentation Inderstands the basis for clinical signs and the relevance of positive and	
	negative physical signs	
	Recognises constraints and limitations of physical examination	
	Recognises the role of a chaperone is appropriate or required	
	Understand health needs of particular populations e.g. ethnic minorities	
	Recognises the impact of health beliefs, culture and ethnicity in	
	presentations of physical and psychological conditions	
	Clinical reasoning	
	 Interpret history and clinical signs to generate hypothesis within context of 	
	clinical likelihood	
	Understands the psychological component of disease and illness	
	presentation	
	 Lest, refine and verify hypotheses 	
	Develop problem list and action plan	
	Recognise now to use experi advice, clinical guidelines and algorithms	
	by national appropriately respond to sources of information accessed	
	Recognises the need to determine the best value and most effective	
	treatment both for the individual patient and for a patient cohort	
	Record keeping	
	Understands local and national guidelines for the standards of clinical	
	record keeping in all circumstances, including handover	
	Understanding of the importance of high quality and adequate clinical	
	record keeping and relevance to patient safety and to litigation	
	 Understand the primacy for confidentiality 	
	Time management	
	Inderstand that effective organisation is key to time management	
	Inderstand that some tasks are more urgent and/or more important than	
	others	
	Understand the need to prioritise work according to urgency and	
	importance	
	Maintains focus on individual patient needs whilst balancing multiple	
	competing pressures	
	 Outline techniques for improving time management 	
	Patient safety	
	Outline the features of a safe working environment	
	Understand principles of rick accessment and management	
	Understand principles of risk assessment and management	
	clinical and organisational settings	
	Outline local procedures and protocols for optimal practice e.g. Gl bleed	
	protocol, safe prescribing	
	Understands the investigation of significant events, serious untoward	A
	incidents and near misses	Area 4.1
	Intection control	
	Understand the principles of intection control	
	Understands the principles of preventing infection in high risk groups	
	Understand the role of the Health Protection Aconsultants in	
	Health Protection	
Skille	Detient economent	
SKIIIS	Fallen assessment Takes a history from a patient with appropriate use of standardized	
	questionnaires and with appropriate input from other parties including	
	family members, carers and other health professionals	
	Performs an examination relevant to the presentation and risk factors that	

	is valid, targeted and time efficient and which actively elicits important	
	clinical findings	
	Give adequate time for patients and carers to express their beliefs ideas,	
	Respond to questions honestly and seek advice if unable to answer	
	Develop a self-management plan with the patient	
	Encourage patients to voice their preferences and personal choices about	
	their care	
	Clinical reasoning	
	Interpret clinical features, their reliability and relevance to clinical scenarios	
	including recognition of the breadth of presentation of common disorders	
	Incorporates an understanding of the psychological and social elements of clinical scenarios into decision making through a robust process of clinical	
	reasoning	
	Recognise critical illness and respond with due urgency	
	Generate plausible hypothesis(es) following patient assessment	
	Construct a concise and applicable problem list using available information Construct an appropriate management plan in conjunction with the patient	
	carers and other members of the clinical team and communicate this	
	effectively to the patient, parents and carers where relevant	
	Record keeping	
	Producing legible, timely and comprehensive clinical notes relevant to the	
	setting	
	Formulating and implementing care plans appropriate to the clinical	
	incorporating assessment, investigation, treatment and continuing care	
	Presenting well documented assessments and recommendations in written	
	and/or verbal form	
	Time management	
	Identifies clinical and clerical tasks requiring attention or predicted to arise	
	Group together tasks when this will be the most effective way of working	
	 Organise, prioritise and manage both team-members and workload 	
	enectively and headbry	
	Patient safety	
	Recognise and practise within limits of own professional competence	
	situation, and encourage others to do so	
	Ensure the correct and safe use of medical equipment	
	Improve patients' and colleagues' understanding of the side effects and	
	contraindications of therapeutic intervention	
	near incident, to encourage improvement in practice of individual and unit	
	Recognise and respond to the manifestations of a patient's deterioration or	
	lack of improvement (symptoms, signs, observations, and laboratory	
	results) and support other members of the team to act similarly	
	Infection control	Area 4.1
	Recognise the potential for infection within patients being cared for	nita 4.1
	Actively engage in local infection control procedures	
	Prescribe antibiotics according to local guidelines and work with	
	microbiological services where appropriate	
	Recognise potential for cross-infection in clinical settings Practice asoptic technique whenever relevant	
Pohoviewa		
Denaviour	 Snows respect and benaves in accordance with Good Medical Practice Ensures that patient assessment, while clinically appropriate considers 	
	social, cultural and religious boundaries	
	-	

	 Support patient self-management Recognise the duty of the medical professional to act as patient advocate Ability to work flexibly and deal with tasks in an effective and efficient fashion Remain calm in stressful or high pressure situations and adopt a timely, rational approach Show willingness to discuss intelligibly with a patient the notion and difficulties of prediction of future events, and benefit/risk balance of therapeutic intervention Show willingness to adapt and adjust approaches according to the beliefs and preferences of the patient and/or carers Be willing to facilitate patient choice Demonstrate ability to identify one's own biases and inconsistencies in clinical reasoning Continue to maintain a high level of safety awareness and consciousness Encourage feedback from all members of the team on safety issues Reports serious untoward incidents and near misses and co-operates with the investigation of the same. Show willingness to take action when concerns are raised about performance of members of the healthcare team, and act appropriately when these concerns are voiced to you by others Continue to be aware of one's own limitations, and operate within them Encourage all staff, patients and relatives to observe infection control principles Recognise the risk of personal ill-health as a risk to patients and colleagues in addition to its effect on performance 	
Evamples	Patient assessment	
and descriptors for Core Surgical Training	 Obtains, records and presents accurate clinical history and physical examination relevant to the clinical presentation, including an indication of patient's views Uses and interprets findings adjuncts to basic examination appropriately e.g. internal examination, blood pressure measurement, pulse oximetry, peak flow Responds honestly and promptly to patient questions Knows when to refer for senior help Is respectful to patients by Introducing self clearly to patients and indicates own place in team Checks that patients comfortable and willing to be seen Informs patients about elements of examination and any procedures that the patient will undergo 	
	 Clinical reasoning In a straightforward clinical case develops a provisional diagnosis and a differential diagnosis on the basis of the clinical evidence, institutes an appropriate investigative and therapeutic plan, seeks appropriate support from others and takes account of the patients wishes Record keeping Is able to format notes in a logical way and writes legibly Able to write timely, comprehensive, informative letters to patients and to GPs Time management Works systematically through tasks and attempts to prioritise 	

Patient safety Patietizates in clinical governance processes Respects and follows local protocols and guidelines Takes direction from the team members on patient safety Discusses risks of treatments with patients and is able to help patients make decisions about their treatment Ensures the safe use of equipment Acts promptly when patient condition deteriorates Always escalates concerns promptly Infection control Performs simple clinical procedures whilst maintaining full aseptic precautions Follows local infection control protocols Examples and descriptors for CCT Oundertakes patient assessment (including history and examination) under difficult circumstances. Examples include: o Limited time available (Emergency situations, Outpatients, ward referral), o Severely ill patients o Angry or distressed patients or relatives Uses and interprets findings adjuncts to basic examination appropriately e.g. electrocardiography, spirometry, ankle brachial pressure index, fundoscopy, sigmiodescopy Recognises and deals with complex situations of communication, accommodates disparate needs and develops strategies to cope Is sensitive to patients cultural concerns and norms Is able to explain diagnoses and medical procedures in ways that enable patients understand and make decisions about their own health care. Clinical reasoning
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Time management
Organises, prioritises and manages daily work efficiently and effectively
Works with guides supervises and supports junior colleagues
Starting to lead and direct the clinical team in effective fashion
Patient safety
Leads team discussion on risk assessment, risk management, clinical
v vorks to make organisational changes that will reduce risk and improve
Salely Dromotos patiente safetute more junier collegatues
Perognises and reports untoward or significant events
Indertakes a root cause analysis
Shows support for junior colleagues who are involved in untoward events

Infection control Performs complex clinical procedures whilst maintaining full aseptic precautions Manages complex cases effectively in collaboration with infection control specialists 	
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	Professional Behaviour and Leadership	Mapping to Leadership Curriculum
Category	Being a good communicator	N/A
	Communication with patients (GMP Domains: 1, 3, 4)	
	Breaking bad news (GMP Domains: 1, 3, 4)	
	Communication with colleagues (GMP Domains: 1, 3)	
Objective	Communication with patients To establish a doctor/patient relationship characterised by understanding, trust, respect, empathy and confidentiality To communicate effectively by listening to patients, asking for and respecting their views about their health and responding to their concerns and preferences	
	To cooperate effectively with healthcare professionals involved in patient	
	To provide appropriate and timely information to patients and their families	
	Breaking bad news To deliver bad news according to the needs of individual patients	
	Communication with Colleagues	
	To recognise and accept the responsibilities and role of the doctor in	
	To communicate succinctly and effectively with other professionals as	
	appropriate	
	To present a clinical case in a clear, succinct and systematic manner	
Knowledge	Communication with patients	
	Understanding that poor communication is a cause of complaints/ litigation	
	Breaking had now	
	breaking bad news	
	• The delivery of bad news affects the relationship with the patient	
	 Patient have different responses to bad news Bad news is confidential but the national max wish to be 	
	accompanied	
	 Once the news is given, patients are unlikely to take in anything 	
	 Breaking bad news can be extremely stressful for both parties 	
	 It is important to prepare for breaking bad news 	
	Communication and working with colleagues	
	Understand the importance of working with colleagues, in particular:	
	 I he roles played by all members of a multi-disciplinary team The features of good team dynamics 	
	 The principles of effective inter-professional collaboration 	
	 The principles of confidentiality 	

Skills	Communication with patients	
	Establish a rapport with the patient and any relevant others (eg carers)	
	Listen actively and question sensitively to guide the patient and to clarify	
	information	
	individual patient and others and using interpreters when indicated	
	Deliver information compassionately being alert to and managing their	
	and your emotional response (anxiety, antipathy etc)	
	Use, and refer patients to appropriate written and other evidence based	
	information sources	
	Check the patient's understanding, ensuring that all their	
	Concerns/questions have been covered	
	Make accurate contemporaneous records of the discussion Manage follow-up effectively and safely utilising a variety if methods (eq.	
	phone call, email, letter)	
	Ensure appropriate referral and communications with other healthcare	
	professional resulting from the consultation are made accurately and in a	
	timely manner	
	Breaking bad news	
	Demonstrate to others good practice in breaking bad news	
	Recognises the impact of the bad news on the patient, carer, supporters,	
	staff members and self	
	Act with empathy, honesty and sensitivity avoiding undue optimism or	
	pessimism	
	Communication with colleagues	
	Communicate with colleagues accurately, clearly and promptly	
	Utilise the expertise of the whole multi-disciplinary team	
	Participate in, and co-ordinate, an effective hospital at night or hospital out	
	OF NOURS Team	
	organisations	
	Prevent and resolve conflict and enhance collaboration	
Behaviour	Communication with patients	
	Approach the situation with courtesy, empathy, compassion and	
	professionalism	
	Demonstrate and inclusive and patient centred approach with respect for the diversity of values in patients, carers and colleagues	
	the diversity of values in patients, carers and concagues	
	Breaking bad news	
	Behave with respect, honest ant empathy when breaking bad news	
	Respect the different ways people react to bad news	
	Communication with colleagues	
	Be aware of the importance of, and take part in, multi-disciplinary	
	teamwork, including adoption of a leadership role	
	Foster an environment that supports open and transparent communication	
	Ensure confidentiality is maintained during communication with the team	
	Be prepared to accept additional duties in situations of unavoidable and	
	unpredictable absence of colleagues	
Examples	Conducts a simple consultation with due empathy and sensitivity and	
and	writes accurate records thereof	
descriptors	Recognises when bad news must be imparted.	
Surgical	Able to break bad news in planned settings following preparatory discussion with seniors	
Training	Accepts his/her role in the healthcare team and communicates	
	appropriately with all relevant members thereof	

Examples	Shows mastery of patient communication in all situations, anticipating and	
and	managing any difficulties which may occur	
descriptors	Able to break bad news in both unexpected and planned settings	
for CCT	Fully recognises the role of, and communicates appropriately with, all	
	relevant team members	
	Predicts and manages conflict between members of the healthcare team	
	Beginning to take leadership role as appropriate, fully respecting the skills,	
	responsibilities and viewpoints of all team members	

	Professional Behaviour and Leadership	Mapping to Leadership Curriculum
Category	Teaching and Training (GMP Domains: 1, 3)	N/A
Objective	 To teach to a variety of different audiences in a variety of different ways To assess the quality of the teaching To train a variety of different trainees in a variety of different ways To plan and deliver a training programme with appropriate assessments 	
Knowledge	 Understand relevant educational theory and principles relevant to medical education Understand the structure of an effective appraisal interview Understand the roles to the bodies involved in medical education Understand learning methods and effective learning objectives and outcomes Differentiate between appraisal, assessment and performance review Differentiate between formative and summative assessment Understand the role, types and use of workplace-based assessments Understand the appropriate course of action to assist a trainee in difficulty 	
Skills	 Critically evaluate relevant educational literature Vary teaching format and stimulus, appropriate to situation and subject Provide effective feedback and promote reflection Conduct developmental conversations as appropriate eg: appraisal, supervision, mentoring Deliver effective lecture, presentation, small group and bed side teaching sessions Participate in patient education Lead departmental teaching programmes including journal clubs Recognise the trainee in difficulty and take appropriate action Be able to identify and plan learning activities in the workplace 	
Behaviour	 In discharging educational duties respect the dignity and safety of patients at all times Recognise the importance of the role of the physician as an educator Balances the needs of service delivery with education Demonstrate willingness to teach trainees and other health workers Demonstrates consideration for learners Acts to endure equality of opportunity for students, trainees, staff and professional colleagues Encourage discussions with colleagues in clinical settings to share understanding Maintains honesty, empathy and objectivity during appraisal and assessment 	
Examples and descriptors for Core Surgical Training	 Prepares appropriate materials to support teaching episodes Seeks and interprets simple feedback following teaching Supervises a medical student, nurse or colleague through a simple procedure Plans, develops and delivers small group teaching to medical students, nurses or colleagues 	

Examples and	 Performs a workplace based assessment including giving appropriate feedback 	
descriptors for CCT	 Devises a variety of different assessments (eg MCQs, WPBAs) Appraises a medical student, nurse or colleague Acts as a mentor to a medical student, nurses or colleague Plans, develops and delivers educational programmes with clear objectives and outcomes Plans, develops and delivers an assessment programme to support 	

	Professional Behaviour and Leadership	Mapping to Leadership Curriculum
Category	 Keeping up to date and understanding how to analyse information Including Ethical research (GMP Domains: 1) Evidence and guidelines (GMP Domains: 1) Audit (GMP Domains: 1, 2) Personal development 	Area 1.3
Objective	 To understand the results of research as they relate to medical practise To participate in medical research To use current best evidence in making decisions about the care of patients To construct evidence based guidelines and protocols To complete an audit of clinical practice At actively seek opportunities for personal development To participate in continuous professional development activities 	Area 1.3 Area 1.3
Knowledge	 Understands GMC guidance on good practice in research Understands the principles of research governance Understands research methodology including qualitative, quantitative, bio- statistical and epidemiological research methods Understands of the application of statistics as applied to medical practise Outline sources of research funding Understands the principles of critical appraisal Understands guideline development together with their roles and limitations Understands the of audit in improving patient care and risk management Understands the audit cycle Understands the working and uses of national and local databases used for audit such as specialty data collection systems, cancer registries etc To demonstrate knowledge of the importance of best practice, transparency and consistency 	Area 1.3
Skills	Develops critical appraisal skills and applies these when reading literature	Area 1.3
	 Develops chical appliasal skills and applies these when reading literature Devises a simple plan to test a hypothesis Demonstrates the ability to write a scientific paper Obtains appropriate ethical research approval Uses literature databases 	

	 Contribute to the construction, review and updating of local (and national) guidelines of good practice using the principles of evidence based medicine Designs, implements and completes audit cycles Contribute to local and national audit projects as appropriate To use a reflective approach to practice with an ability to learn from previous experience To use assessment, appraisal, complaints and other feedback to discuss and develop an understanding of own development needs 	Area 1.3 Area 1.3
Behaviour	 Follows guidelines on ethical conduct in research and consent for research Keep up to date with national reviews and guidelines of practice (e.g. NICE) Aims for best clinical practice at all times, responding to evidence based medicine while recognising the occasional need to practise outside clinical guidelines Recognise the need for audit in clinical practice to promote standard setting and quality assurance To be prepared to accept responsibility Show commitment to continuing professional development 	Area 1.3 Area 1.3
Examples and descriptors for Core Surgical Training	 Defines ethical research and demonstrates awareness of GMC guidelines Differentiates audit and research and understands the different types of research approach e.g. qualitative and quantitative Knows how to use literature databases Demonstrates good presentation and writing skills Participates in departmental or other local journal club Critically reviews an article to identify the level of evidence Attends departmental audit meetings Contributes data to a local or national audit Identifies a problem and develops standards for a local audit Describes the audit cycle and take an audit through the first steps Seeks feedback on performance from clinical supervisor/mentor/patients/carers/service users 	Area 1.3
Examples and descriptors for CCT	 Demonstrates critical appraisal skills in relation to the published literature Demonstrates ability to apply for appropriate ethical research approval Demonstrates knowledge of research organisation and funding sources Demonstrates ability to write a scientific paper Leads in a departmental or other local journal club Contributes to the development of local or national clinical guidelines or protocols Organise or lead a departmental audit meeting Lead a complete clinical audit cycle including development of conclusions, the changes needed for improvement, implementation of findings and re-audit to assess the effectiveness of the changes Seeks opportunity to visit other departments and learn from other professionals 	Area 1.3 Area 1.3

Professional Behaviour and Leadership	Mapping to Leadership
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		Curriculum
Sub- category:	Manager including Self Awareness and self management (GMP Domains: 1)	Area 1.1 and 1.2
	 Team-working (GMP Domains: 1, 3) 	Area 2
	Leadership (GMP Domains: 1, 2, 3)	
	Principles of quality and safety improvement (GMP Domains: 1, 3, 4)	Area 4.2, 4.3, 4.4
	 Management and NHS structure (GMP Domains: 1) 	Area 3
Objective	Self awareness and self management To recognise and articulate one's own values and principles, appreciating how these may differ from those of others To identify one's own strengths, limitations and the impact of their behaviour	Area 1.1 and 1.2
	 To identify their own emotions and prejudices and understand how these can affect their judgement and behaviour To obtain, value and act on feedback from a variety of sources To manage the impact of emotions on behaviour and actions To be reliable in fulfilling responsibilities and commitments to a consistently high standard To ensure that plans and actions are flexible, and take into account the needs and requirements of others To plan workload and activities to fulfil work requirements and commitments with regard to their own personal health 	
	 To identify opportunities where working with others can bring added benefits To work well in a variety of different teams and team settings by listening to others, sharing information, seeking the views of others, empathising with others, communicating well, gaining trust, respecting roles and expertise of others, encouraging others, managing differences of opinion, adopting a team approach 	Area 2
	 Leadership To develop the leadership skills necessary to lead teams effectively. These include: Identification of contexts for change Application of knowledge and evidence to produce an evidence based challenge to systems and processes Making decision by integrating values with evidence Evaluating impact of change and taking corrective action where necessary 	Area 5
	 Principles of quality and safety improvement To recognise the desirability of monitoring performance, learning from mistakes and adopting no blame culture in order to ensure high standards of care and optimise patient safety To critically evaluate services To identify where services can be improved To support and facilitate innovative service improvement 	Area 4 2 4 2
	 Management and NHS culture To organise a task where several competing priorities may be involved To actively contribute to plans which achieve service goals To manage resources effectively and safely To manage people effectively and safely To manage performance of themselves and others To understand the structure of the NHS and the management of local healthcare systems in order to be able to participate fully in managing 	and 4.4

	healthcare provision	
		Area 3
Knowledge	 Demonstrate knowledge of ways in which individual behaviours impact on others; 	Areas 1.1 and 1.2
	 Demonstrate knowledge of personality types, group dynamics, learning styles, leadership styles 	
	 Demonstrate knowledge of methods of obtaining feedback from others Demonstrate knowledge of tools and techniques for managing stress Demonstrate knowledge of the role and responsibility of occupational health and other support networks 	
	Team working	
	Outline the components of effective collaboration and team working Demonstrate knowledge of specific techniques and methods that facilitate effective and empathetic communication	
	 Demonstrate knowledge of techniques to facilitate and resolve conflict Describe the roles and responsibilities of members of the multidisciplinary 	Area 2
	Outline factors adversely affecting a doctor's and team performance and methods to rectify these	
	Demonstrate knowledge of different leadership styles	
	Leadership	
	Demonstrate knowledge of patient outcome reporting systems within surgery, and the organisation and how these relate to national programmes.	
	 Understand how decisions are made by individuals, teams and the organisation 	
	 Understand effective communication strategies within organisations Demonstrate knowledge of impact mapping of service change, barriers to change, qualitative methods to gather the experience of patients and carers 	Area 5
	Quality and safety improvement	
	Understand the elements of clinical governance and its relevance to clinical care	
	Understands significant event reporting systems relevant to surgery Understands the importance of evidence-based practice in relation to clinical effectiveness	
	Understand risks associated with the surgery including mechanisms to reduce risk	
	 Outline the use of patient early warning systems to detect clinical deterioration 	
	Understand quality improvement methodologies including feedback from patients, public and staff	
	Understand the role of audit, research, guidelines and standard setting in improving quality of care	
	 Understand methodology of creating solutions for service improvement Understand the implications of change 	
		Area 4.2, 4.3, 4.4

		[]
		Area 3
Skills	 Self awareness and self management Demonstrate the ability to maintain and routinely practice critical self awareness, including able to discuss strengths and weaknesses with supervisor, recognising external influences and changing behaviour accordingly Demonstrate the ability to show awareness of and sensitivity to the way in which cultural and religious beliefs affect approaches and decisions, and to respond respectfully Demonstrate the ability to recognise the manifestations of stress on self and others and know where and when to look for support	Area 1.2 and 1.2
	Team working Preparation of patient lists with clarification of problems and ongoing care	
	 plan Detailed hand over between shifts and areas of care Communicate effectively in the resolution of conflict, providing feedback Develop effective working relationships with colleagues within the multidisciplinary team Demonstrate leadership and management in the following areas: Education and training of junior colleagues and other members of the team Deteriorating performance of colleagues (e.g. stress, fatigue) Effective handover of care between shifts and teams Lead and participate in interdisciplinary team meetings Provide appropriate supervision to less experienced colleagues 	Area 2
l	Timely preparation of tasks which need to be completed to a deadline	
	 Leadersnip Identify trends, future options and strategy relevant to surgery Compare and benchmark healthcare services Use a broad range of scientific and policy publications relating to delivering healthcare services Prepare for meetings by reading agendas, understanding minutes, action points and background research on agenda items Work collegiately and collaboratively with a wide range of people outside the immediate clinical setting Evaluate outcomes and re-assess the solutions through research, audit and quality assurance activities Understand the wider impact of implementing change in healthcare 	Area 5

	provision and the potential for opportunity costs	
	Quality and safety improvement Adopt strategies to reduce risk e.g. Safe surgery Contribute to quality improvement processes e.g. Audit of personal and departmental performance Errors / discrepancy meetings Critical incident and near miss reporting Unit morbidity and mortality meetings Local and national databases Maintenance of a personal portfolio of information and evidence Creatively question existing practise in order to improve service and propose solutions	
		Area 4.2, 4.3, 4.4
		Area 3
Behaviour	 Self awareness and self management To adopt a patient-focused approach to decisions that acknowledges the right, values and strengths of patients and the public To recognise and show respect for diversity and differences in others To be conscientious, able to manage time and delegate To recognise personal health as an important issue Team working Encourage an open environment to foster and explore concerns and issues about the functioning and safety of team working Recognise limits of own professional competence and only practise within these. Recognise and respect the skills and expertise of others Recognise the importance of induction for new members of a team Recognise the importance of prompt and accurate information sharing with Primary Care team following hospital discharge 	Area 1.1 and 1.2 Area 2
	Leadership Demonstrate compliance with national guidelines that influence healthcare	

	 provision Articulate strategic ideas and use effective influencing skills Understand issues and potential solutions before acting Appreciate the importance of involving the public and communities in developing health services Participate in decision making processes beyond the immediate clinical care setting Demonstrate commitment to implementing proven improvements in clinical practice and services Obtain the evidence base before declaring effectiveness of changes Quality and safety improvement Participate in safety improvement strategies such as critical incident reporting Develop reflection in order to achieve insight into own professional practice Demonstrates personal commitment to improve own performance in the light of feedback and assessment Engage with an open no blame culture Respond positively to outcomes of audit and quality improvement Co-operate with changes necessary to improve service quality and safety 	Area 5 Area 4.2, 4.3, 4.4
Examples and descriptors for Core Surgical Training	 Self awareness and self management Obtains 360° feedback as part of an assessment Participates in peer learning and explores leadership styles and preferences Timely completion of written clinical notes Through feedback discusses and reflects on how a personally emotional situation affected communication with another person Learns from a session on time management Team working Works well within the multidisciplinary team and recognises when assistance is required from the relevant team member Invites and encourages feedback from patients Demonstrates awareness of own contribution to patient safety within a team and is able to outline the roles of other team members. Keeps records up-to-date and legible and relevant to the safe progress of the patient. Hands over care in a precise, timely and effective manner Supervises the process of finalising and submitting operating lists to the theatre suite 	Area 1.1 and 1.2 Area 2
	 Complies with clinical governance requirements of organisation Presents information to clinical and service managers (eg audit) Contributes to discussions relating to relevant issues e.g. workload, cover 	

	arrangements using clear and concise evidence and information	Area 5
	 Quality and safety improvement Understands that clinical governance is the over-arching framework that unites a range of quality improvement activities Participates in local governance processes Maintains personal portfolio Engages in clinical audit Questions current systems and processes Management and Healthcare Structures Participates in audit to improve a clinical service Works within corporate governance structures Demonstrates ability to manage others by teaching and mentoring juniors, medical students and others, delegating work effectively, Highlights areas of potential waste 	Area 4.2, 4.3, 4.4
		Area 3
Examples and descriptors for CCT	 Self awareness and self management Participates in case conferences as part of multidisciplinary and multi agency team Responds to service pressures in a responsible and considered way Liaises with colleagues in the planning and implementation of work rotas 	Area 1.1 and 1.2
	 Team working Discusses problems within a team and provides an analysis and plan for change Works well in a variety of different teams Shows the leadership skills necessary to lead the multidisciplinary team Beginning to leads multidisciplinary team meetings Promotes contribution from all team members Fosters an atmosphere of collaboration Ensures that team functioning is maintained at all times. Recognises need for optimal team dynamics Promotes conflict resolution Recognises situations in which others are better equipped to lead or where delegation is appropriate 	Area 2
	 Leadership Attends multi-agency conference Uses and interprets departments performance data and information to debate services Participates in clinical committee structures within an organisation Quality and safety improvement Able to define key elements of clinical governance Demonstrates personal and service performance Designs audit protocols and completes audit cycle Identifies areas for improvement and initiates improvement projects Supports and participates in the implementation of change Leads in review of patient safety issue Understands change management 	Area 5 Area 4.2, 4.3, 4.4

	Professional Behaviour and Leadership	Mapping to Leadership Curriculum
Sub- category:	Promoting good health (GMP Domains: 1, 2, 3)	
Objective	 To demonstrate an understanding of the determinants of health and public policy in relation to individual patients To promote supporting people with long term conditions to self-care To develop the ability to work with individuals and communities to reduce levels of ill health and to remove inequalities in healthcare provision To promote self care 	N/A
Knowledge	 Understand guidance documents relevant to the support of self care Recognises the agencies that can provide care and support out with the hospital Understand the factors which influence the incidence and prevalence of common conditions including psychological, biological, social, cultural and economic factors Understand the possible positive and negative implications of health promotion activities Demonstrate knowledge of the determinants of health worldwide and strategies to influence policy relating to health issues Outline the major causes of global morbidity and mortality and effective, affordable interventions to reduce these 	
Skills	 Adapts assessment and management accordingly to the patients social circumstances Assesses patient's ability to access various services in the health and social system and offers appropriate assistance Ensures appropriate equipment and devices are discussed and where appropriate puts the patient in touch with the relevant agency Facilitating access to appropriate training and skills to develop the patients' confidence and competence to self care Identifies opportunities to promote change in lifestyle and to prevent ill health Counsels patients appropriately on the benefits and risks of screening and health promotion activities 	
Behaviour	Recognises the impact of long term conditions on the patient, family and friends Put patients in touch with the relevant agency including the voluntary sector from where they can access support or equipment relevant to their care Show willingness to maintain a close working relationship with other members of the multi-disciplinary team, primary and community care Recognise and respect the role of family, friends and carers in the management of the patient with a long term condition Encourage where appropriate screening to facilitate early intervention	
Examples and descriptors for Core Surgical Training	 Understands that "quality of life" is an important goal of care and that this may have different meanings for each patient Promotes patient self care and independence Helps the patient to develop an active understanding of their condition and how they can be involved in self management Discusses with patients those factors which could influence their health 	
Examples and descriptors	 Demonstrates awareness of management of long term conditions Develops management plans in partnership with the patient that are pertinent to the patients long term condition 	

for CCT	Engages with relevant external agencies to promote improving patient care Support small groups in a simple health promotion activity Discuss with small groups the factors that have an influence on their health and describe steps they can undertake to address these Provide information to an individual about a screening programme offering specific guidance in relation to their personal health and circumstances concerning the factors that would affect the risks and benefits of screening to hem as an individual.	
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	Professional Behaviour and Leadership	Mapping to Leadership Curriculum
Sub-	Probity and Ethics	
category:	To include	
	Acting with integrity	Area 1.4
	Medical Error	
	Medical ethics and confidentiality (GMP Domains: 1, 2, 3, 4)	
	Medical consent (GMP Domains: 1. 3, 4)	
	Legal framework for medical practise (GMP Domains: 1, 2, 3)	
Objective	To uphold personal, professional ethics and values, taking into account the values of the organisation and the culture and beliefs of individuals	Area 1.4
	To communicate openly, honestly and inclusively	
	To act as a positive role model in all aspects of communication	
	To take appropriate action where ethics and values are compromised	
	To recognise and respond the causes of medical error	
	To respond appropriately to complaints	
	To know, understand and apply appropriately the principles, guidance and	
	laws regarding medical ethics and confidentiality as they apply to surgery	
	To understand the necessity of obtaining valid consent from the patient	
	and how to obtain	
	To recognise, analyse and know how to deal with unprofessional	
	behaviours in clinical practice, taking into account local and national	
	regulations	
	Understand ethical obligations to patients and colleagues	
	I o appreciate an obligation to be aware of personal good health	
Knowledge	 Understand local complaints procedure 	
	 Recognise factors likely to lead to complaints 	
	 Understands the differences between system and individual errors 	
	 Outline the principles of an effective apology 	
	 Understands of the principles of medical ethics 	
	 Understands the principles of confidentiality 	
	Understands the legal framework for patient consent in relation to medical	
	practise	
	Recognises the factors influencing ethical decision making including	
	religion, personal and moral beliefs, cultural practices	
	•	
Skills	To recognise, analyse and know how to deal with unprofessional behaviours in clinical practice taking into account local and national regulations	Area 1.4
	To create open and nondiscriminatory professional working relationships	Area 1.4
	with colleagues awareness of the need to prevent bullying and barassment	
	Contribute to processes whereby complaints are reviewed and learned	
	from	
	Evolution Evolution comprehensibly to the patient the events leading up to a medical	
	error or serious untoward incident, and sources of support for patients and	
	their relatives	
	Deliver an appropriate apology and explanation relating to error	
	Use and share information with the highest regard for confidentiality both	

	 within the team and in relation to patients Counsel patients, family, carers and advocates tactfully and effectively when making decisions about resuscitation status, and withholding or withdrawing treatment Present all information to patients (and carers) in a format they understand, checking understanding and allowing time for reflection on the decision to give consent Provide a balanced view of all care options 	
Behaviour	 To demonstrate acceptance of professional regulation To promote professional attitudes and values To demonstrate probity and the willingness to be truthful and to admit errors Adopt behaviour likely to prevent causes for complaints Deals appropriately with concerned or dissatisfied patients or relatives Contribute to a fair and transparent culture around complaints and errors Recognise the rights of patients to make a complaint Identify sources of help and support for patients and yourself when a complaint is made about yourself or a colleague Share patient information as appropriate, and taking into account the wishes of the patient Show willingness to seek the opinion of others when making decisions about resuscitation status, and withholding or withdrawing treatment Seeks and uses consent from patients for procedures that they are competent to perform while Respecting the patient's autonomy Respecting the scope of authority given by the patient Not exceeding the scope of authority given by the patient Not withholding relevant information 	Area 1.4 Area 1.4 Area 1.4