HST Training Programme and Curriculum

Neurosurgery

SAC MALTA
2014

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Definition of the Specialty

The specialty of Neurosurgery requires specialized knowledge on the diagnosis and management of congenital and acquired disorders of the nervous system. The specialty covers acute and non-acute pathologies and injuries as well as acute and elective surgical procedures carried out under the neurosurgical specialty.

Neurosurgeons generally work closely with their colleagues in Neurology, Oncology, Anaesthesia, Intensive Care and Rehabilitation Medicine. They have also close professional relationships with other non-medical staff, intensive care staff and operating department personnel.

The purpose of Training in the Specialty of Neurosurgery

The purpose of the training programme is to produce trained neurosurgeons, who will have the clinical knowledge, the surgical expertise and professional skills necessary for consultant practice in Malta.

This includes:

- Competence in the management of patients presenting with a range of symptoms and elective conditions as specified in the core syllabus for the specialty of neurosurgery.

- Competence to manage an additional range of elective and emergency conditions by virtue of appropriate training and assessment opportunities obtained during training

- Professional competences as specified in the syllabus derived from the General Medical Council of the UK

Programme Outline and Objectives

This curriculum was created to detail the body of knowledge that ideally should be attained by the trainee upon completion of the training program.

The director of training and respective trainers shall see that during the training period the trainee gets adequate experience as in this document.

The trainee shall participate in the departmental academic activities including those of other subspecialties.

For the purpose of completion of training a 40 hour week (full time) must be worked with on-call rota according to the Specialist Training framework document. Part-time trainees will have their training recognized pro-rata.

The trainee shall carry out on-site out-of-office hours experience (on-call duties) totalling a minimum of 5 duties per month.
The trainee must be in possession of a Certificate of Completion of Basic Surgical training (CCBST) by the Specialist Accreditation Committee of Malta or be in possession of a qualification equivalent to CCBST issued by a competent authority in another EU member state. Ideally, higher specialist neurosurgery trainees would have been exposed to Neurosurgery and ENT rotations during their Basic Surgical training.

The higher specialist training program is spread over a minimum of six years and shall be carried out at Mater Dei Hospital Malta and at recognised overseas Neurosurgery training institution/s in EU. At least one year of the six years is to be spent overseas acquiring specialist skills that the trainee will be less exposed to, locally. The final exit examinations may be completed during the last two years of training (Years 5 and 6).

**Annual Review of competence progression**

The trainee’s progress will be reviewed at the end of each HST year.

**Log book**

The trainee will keep a record of his clinical and operative activities on a log book. This should be continually available to the trainers and the director of training.

**Research, Audits and Publications**

Research and publications as well as participation in and scientific contribution at national and international meetings are strongly encouraged. The trainee should have performed a minimum of two audits and have at least two publications.

**Assessment of Training**

The trainee will be assessed periodically and an appraisal shall be carried out with the trainers on a yearly basis. The trainee can only progress into the next year of the training program upon obtaining a successful assessment.
Essential Competencies

To be eligible for the award of a CCT in Neurosurgery or to be considered for a Certificate of Eligibility for Specialist Registration trainees and applicants will be competent in all aspects of the clinical management of patients presenting with the following essential 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

Trainees and applicants will be competent to undertake the full range of emergency and urgent operative procedures specified in the final training stage curriculum set out in Table 1. 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).

Elective and Specialised Care Competencies

To be eligible for the award of a CCT in Neurosurgery or to be considered for a Certificate of Eligibility for Specialist Registration trainees and applicants will have acquired the skills, knowledge and professional attributes to participate in the provision of specialist elective services with appropriate support and mentoring. They will have demonstrated the potential to lead a clinical team and to undertake increasingly advanced specialist practice with post-CCT professional development.

The major areas of specialist practice in neurosurgery are summarised below. Consultants may develop expertise in several complementary disciplines.

- Paediatric neurosurgery
- Neuro-oncology
- Functional neurosurgery
- Neurovascular surgery
- Skull-base surgery
- Spinal surgery
- Traumatology
Academic Neurosurgery

The neurosurgical curriculum will accommodate a range of academic training pathways. The core neuroscience knowledge embodied in HST1 will provide an essential foundation for an academic career. The intermediate training stage (HST2, 3) will consolidate a trainee’s clinical and operative competencies. The specialist interest year may be taken flexibly during final training (HST4, 5, 6). However, trainees will not start specialist interest training until their programme director is satisfied with their general neurosurgical training and their acquisition of microsurgical and advanced operative skills.

Academic trainees will be expected to meet all of the essential competencies defined in the curriculum before award of a CCT in Neurosurgery.

Table 1. Schedule of Essential Operative Competencies

This table summarises the level of operative competence which should be attained at each stage of training using the four point scale: 1 – has observed; 2 – can do with assistance; 3 – can do whole but may need assistance; 4 – competent to do whole without assistance and manage complications.

<table>
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<tr>
<th>Surgical Approaches</th>
<th>Initial</th>
<th>Intermediate</th>
<th>Final</th>
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<td>Burr hole</td>
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<td>Craniotomy – convexity</td>
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<td>Craniotomy – midline posterior fossa</td>
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<td>Lumbar fenestration</td>
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<tr>
<td>Procedure</td>
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<td><strong>General Procedures</strong></td>
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<td>Insertion of lumbar drain</td>
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<td>Image Guidance/Stereotaxy set up</td>
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<td>Revision of VP shunt</td>
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<td>Craniotomy for supratentorial intrinsic tumour/metastasis</td>
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<tr>
<td>Procedure</td>
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<td>Anterior cervical discectomy</td>
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<tr>
<td>Evacuation of intracranial haematomata (ICH)</td>
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Completion of Training

The Certificate for Completion of Specialist Training (CCST) in Neurosurgery is awarded by the Specialist Accreditation Committee (SAC) of Malta after recommendation by the Association of Surgeons of Malta following the advice of the postgraduate training personnel in the Division of Neurosurgery. Eligibility for accreditation depends on achieving ALL of the following three requirements:

1. Confirmation of competence in the curriculum described below by the training consultants

2. Presentation of logbook

3. Successful attainment of the FRCS Neurosurgery exam by the end of the higher specialist training program
The Syllabus

Four point scales

What the 4 point scale means for Knowledge

1. Knows of
2. Knows basic concepts
3. Knows generally
4. Knows both specifically and broadly

What the 4 point scale means for Clinical Skills and Technical Skills and Procedures

1. Has observed
2. Can do with assistance
3. Can do whole but may need assistance
4. Competent to do whole without assistance, including managing complications
**Initial Training Stage HST 1**

During the initial training stage neurosurgical trainees will acquire a broad foundation of theoretical knowledge; clinical experience, skills and competence in:

- Basic and applied clinical neurosciences
- Basic neurosurgical care
- Neuro-intensive care
- Emergency (A&E) medicine
- Complementary surgical disciplines

On completion of initial neurosurgical training, trainees will be competent in all aspects of the assessment and initial clinical management of the major disorders of the nervous system specified in the core neuroscience syllabus.

They will be competent in the resuscitation, assessment, operative preparation and post-operative care of patients presenting with core neurosurgical conditions. They will be competent to undertake a range of basic procedures without direct supervision.

**Core Neuroscience Training**

The first year of the training programme will concentrate on core neuroscience training. During this year trainees will consolidate their knowledge and understanding of the applied neurosciences underpinning clinical practice.

Core Neuroscience Knowledge

- **Applied neuroanatomy:** embryology and mal-development of the neuraxis; anatomy of the skull, brain, and spine; anatomy of the autonomic and peripheral nervous system
- **Neurophysiology:** functional neurophysiology of the cortex, basal ganglia, brainstem, cerebellum, cranial nerve function, autonomic nervous system, spinal cord and peripheral nerves; principles of clinical neurophysiology
- **Pathophysiology of intracranial disorders:** cerebral blood flow and metabolism, cerebral oxygenation, intracranial pressure, intracranial compliance, CSF dynamics
- **Neuropsychology:** the principles of neuropsychology including the mechanism of action, pharmacodynamics and interactions of anticonvulsants, analgesics, anaesthetics, anti-emetics, antibiotics, and anticoagulants
- **Neuropathology**: including the pathology of infection, inflammation, ischaemia, neoplasia and trauma affecting the nervous system
- **Neuro-oncology**: the principles of radiation biology and chemotherapy
- **Neuroradiology**: the principles, application and interpretation of plain radiography, computed tomography and magnetic resonance imaging of the neuraxis
- **Neuropsychology**: the principles of neuropsychological assessment; psychological problems due to structural lesions (e.g. frontal lobe syndrome); common post-traumatic disorders; assessment of competence – application of the Mental Health Act
- **Neurological rehabilitation**: 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
- **Medical ethics**: an understanding of the ethical issues arising in the management of patients with neurological disorders with particular reference to patient confidentiality, informed consent, assessment of competence, withdrawal of treatment decisions, organ transplantation; the ethical basis of clinical research
- **Neurogenetics**: an understanding of the principles of neurogenetics and their application to clinical practice
- **Epidemiology**: an understanding of the epidemiology of neurological disorders

**Management of Common Neurological Disorders**

Trainees will be able to resuscitate when necessary; assess through a full neurological history and examination; establish a differential diagnosis; initiate and interpret investigations for patients presenting with:

- Impaired consciousness and non-traumatic coma (including blackouts *, collapse*, seizures* and confusion*)
- Headache – acute* and chronic
- Weakness and paralysis (including falls, dizziness and unsteadiness*)
- Pain and sensory loss (including acute back pain)
- Disorders of hearing and vision
- Language and speech disturbance
- Swallowing disorders
- Disorders of sphincter and sexual function
- Movement disorder
- Disorders of memory, cognition and behaviour
Conditions marked * form part of the “Top 20” Common Medical Presentations defined in the Curriculum for General Internal Medicine (Acute)

**Generic Surgical Skills and Knowledge**

- **Physiology**: including the physiology of homeostasis, thermoregulation, metabolic pathways, blood loss, sepsis, fluid balance and fluid replacement therapy, metabolic abnormalities
- **Pathology**: including the pathology of inflammation, wound healing, cellular injury, vascular disorders, disorders of growth, differentiation, and morphogenesis, tumours, surgical immunology, surgical haematology
- **Microbiology**: including the microbiology of surgically-important microorganisms, sources of infection, asepsis and antisepsis, sterilisation, antibiotics and high risk patient management
- **Basic surgical skills**: including incision and suturing, tissue handling and retraction, haemostasis, knotting and ligature, surgical assistance and exposure
- **Surgical care**: including pre, intra and postoperative management; assessment and management of the multiply-injured patient, management of bleeding diatheses; prevention and treatment of thromboembolism; nutritional care; pain management and palliative care.

**Basic Clinical Neurosurgery**

On completion of the initial training stage trainees will be competent in all aspects of the basic non-operative care of neurosurgical in-patients with particular reference to common neurosurgical presentations (see below). They will understand the importance of recognising and preventing secondary insults to the central nervous system. They will be capable of resuscitating, assessing and initiating the management of patients deteriorating as a result of intracranial and systemic complications. The will demonstrate sound judgement when seeking more senior support, prioritising medical interventions and escalating the level of medical care.

- **Cranial trauma**: including the resuscitation, assessment, investigation and continuing care of head-injured patients; the prevention and detection of secondary intracranial and systemic insults; insertion of an intracranial pressure monitor; burrhole drainage of a chronic subdural haematoma;
- **Spontaneous intracranial haemorrhage**: including the resuscitation, assessment and investigation of patients suffering a subarachnoid haemorrhage; the management of post-haemorrhagic hydrocephalus; the detection and management of delayed cerebral ischaemia; the management of systemic complications; diagnostic lumbar puncture
- **Hydrocephalus**: in particular 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 external ventricular drains
Intracranial tumours: including the assessment and peri-operative management of patients with intracranial tumours; the detection and management of post-operative cerebral swelling, intracranial haematomas and intracranial sepsis; the management of post-operative seizures; the management of post-operative metabolic and endocrine disorders

Acute spinal disorders: including 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 postoperative complications including compressing haematomas, CSF fistula and spinal sepsis
## Core Neuroscience knowledge HST 1

### Applied neuroanatomy

<table>
<thead>
<tr>
<th>Embryology and maldevelopment</th>
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<tr>
<td><strong>Objective</strong></td>
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<tr>
<td>To understand basic neuroembryology and its relevance to clinical practice</td>
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</tbody>
</table>

#### Knowledge

- Embryogenesis of the brain and spinal cord
- Embryogenesis of supporting structures - skull and vertebral column
- Common anatomical variations and developmental abnormalities

#### Clinical Skills

N/A

#### Technical Skills

N/A

#### Professional Skills

Generic

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<table>
<thead>
<tr>
<th>Anatomy of the skull</th>
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<tr>
<td><strong>Objective</strong></td>
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<tr>
<td>To understand the anatomy of the skull</td>
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</tbody>
</table>

#### Knowledge

- Structure, blood supply, innervation, surface and three-dimensional relationships of the:
  - scalp
  - skull
  - meninges
  - orbit
  - cranial fossae
  - cranial foraminae
  - cranial nerves

#### Clinical Skills

N/A

#### Technical Skills

N/A

#### Professional Skills

Generic scholar

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<table>
<thead>
<tr>
<th>Anatomy of the brain</th>
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<tr>
<td><strong>Objective</strong></td>
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<tr>
<td>To understand the structural anatomy of the brain</td>
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</table>

#### Knowledge

- Cortical topography
4 Projection and association tracts
4 Organisation of the basal ganglia
4 Structure, organisation and connections of the cerebellum, pons and brainstem
4 Cranial nerves and their relationships
4 Visual and auditory pathways
4 Ventricular system and choroid plexus
4 Subarachnoid space and cisterns
4 Circle of Willis and principle regional and segmental blood supply
4 Venous drainage and dural sinuses

Clinical Skills
N/A

Technical Skills
N/A

Professional Skills
Generic scholar

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Anatomy of the spine

Objective
To understand the anatomy of the spine

Knowledge
4 Structure, blood supply, innervation, surface and three-dimensional relationships of the:
   - vertebral column
   - spinal cord: ascending and descending tracts
   - spinal nerve roots
   - cauda equina

Clinical Skills
N/A

Technical Skills
N/A

Professional Skills
Generic scholar

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Anatomy of the autonomic and peripheral nervous system

Objective
To understand the anatomy of the autonomic and peripheral nervous system

Knowledge
4 Sympathetic and parasympathetic pathways
4 Visceral and pelvic innervation: control of sphincter function
4 Brachial plexus
4 Lumbosacral plexus
4 Course, distribution and innervation of the major peripheral nerves

Clinical Skills
N/A

Technical Skills N/A
# Neurophysiology

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<tr>
<th>Functional neurophysiology</th>
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<td></td>
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<tr>
<td>Knowledge</td>
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<tr>
<td>4 Structure and function of neurones and glial cells</td>
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<td>4 Synaptic function, action potentials and axonal conduction</td>
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<td>4 Higher cerebral functions</td>
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<td>4 Sleep and coma</td>
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<tr>
<td>4 Memory and disorders of the limbic system</td>
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<tr>
<td>4 Control of motor function: ascending and descending pathways, basal ganglia and cerebellar function</td>
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<tr>
<td>4 The special senses</td>
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<tr>
<td>4 Functions of the autonomic nervous system</td>
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<tr>
<td>4 Hypothalamic-pituitary function</td>
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# Principles of clinical neurophysiology

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<tr>
<td>To understand the basic principles of clinical neurophysiology</td>
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<tr>
<td>Knowledge</td>
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<tr>
<td>4 Principles of electroencephalography</td>
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<tr>
<td>4 Principles of somatosensory, motor and brainstem evoked potential monitoring</td>
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<td>4 Peripheral neuropathies and entrapment neuropathies including:</td>
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<tr>
<td>- structure and function of peripheral nerves</td>
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<td>- use of nerve conduction studies</td>
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<td>4 Disorders of the neuromuscular junction including:</td>
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<tr>
<td>- structure and function of smooth and striated muscle</td>
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<td>- use of electromyographic studies</td>
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<thead>
<tr>
<th>Clinical Skills</th>
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<tbody>
<tr>
<td>3 Interpretation of the results of EEG, EMG and NC studies</td>
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</table>
### Pathophysiology of intracranial disorders

**Objective**
To understand the pathophysiology of intracranial disorders

**Knowledge**
- 4 Cerebral blood flow and metabolism
- 4 Cerebral autoregulation and vasospasm
- 4 Blood brain barrier and cerebral edema
- 4 Intracranial pressure dynamics
- 4 Cerebral ischaemia and neuroprotection
- 4 CSF hydrodynamics - production and absorption

**Clinical Skills**
N/A

**Technical Skills**
N/A

**Professional Skills**
Generic scholar

### Neuropharmacology

**Objective**
To understand the principles of neuropharmacology

**Knowledge**
- 4 Receptor and ion channel function
- 4 Neuropeptides and neurotransmitters
- 4 Principles of pharmacological neuroprotection
- 4 The pharmacology of anaesthetic agents, muscle relaxants, barbiturates, anticonvulsants and corticosteroids including:
  - mechanisms of action
  - pharmacodynamics
  - interactions

**Clinical Skills**
N/A

**Technical Skills**
N/A

**Professional Skills**
Generic scholar
Neuropathology and Neuro-oncology

Principles of neuropathology

Objective
To understand the neuropathology of infection, inflammation, ischaemia, neoplasia and trauma affecting the nervous system

Knowledge
4 Acute and chronic inflammatory processes in the CNS including demyelination
4 Bacterial, fungal and parasitic meningitis, encephalitis and abscess formation
4 Viral encephalitis
4 Slow viruses, CJD and vCJD
4 HIV associated infections, tumours and leucoencehalopathies
4 Cytopathology of neurones and glial in response to ischaemia, hypoxia and trauma
4 Diffuse axonal injury
4 Macroscopic brain and spinal cord injury including effects of brain shift, herniation and raised ICP
4 Classification, epidemiology and pathology of CNS tumours
4 Tumour biology, cell kinetics, tumour markers, immunocytochemistry

Clinical Skills
N/A

Technical Skills
None specified

Professional Skills
Generic Scholar
### Neuroradiology

<table>
<thead>
<tr>
<th>Principles of neuroradiology</th>
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<tr>
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### Neuropsychology

<table>
<thead>
<tr>
<th>Principles of neuropsychology</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>The principles of neuropsychological assessment; psychological problems due to structural lesions (e.g. frontal lobe syndrome); common post-traumatic disorders; assessment of competence – application of the Mental Health Act</td>
<td></td>
</tr>
</tbody>
</table>

| Knowledge | None |
| Clinical Skills | None |
| Technical Skills | None |
| Professional Skills | None |

### Neurological Rehabilitation

<table>
<thead>
<tr>
<th>Principles of neurological rehabilitation</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>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</td>
<td></td>
</tr>
</tbody>
</table>

| Knowledge | No content |
| Clinical Skills | No content |
| Technical Skills | No content |
| Professional Skills | No content |
**Medical ethics**

<table>
<thead>
<tr>
<th>Medical ethics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
</tr>
<tr>
<td>To understand the ethical issues that commonly arise in the management of patients with neurological disorders</td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
</tr>
<tr>
<td>4 Criteria for the diagnosis of brainstem death</td>
</tr>
<tr>
<td>3 Diagnosis and management of persistent vegetative states</td>
</tr>
<tr>
<td>3 Prognosis in chronic progressive neurological disorders</td>
</tr>
<tr>
<td><strong>Clinical Skills</strong></td>
</tr>
<tr>
<td>3 Ability to empathise with and support patients and carers</td>
</tr>
<tr>
<td><strong>Technical Skills</strong></td>
</tr>
<tr>
<td>None specified</td>
</tr>
<tr>
<td><strong>Professional Skills</strong></td>
</tr>
<tr>
<td>Generic</td>
</tr>
</tbody>
</table>
### Neurogenetics

**Principles of 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

**Clinical Skills**
N/A

**Technical Skills**
N/A

**Professional Skills**
Genetic Scholar

### Epidemiology

**Epidemiology of neurological conditions**

**Objective**
To understand the epidemiology of neurological disorders

**Knowledge**
None

**Clinical Skills**
None

**Technical Skills**
None

**Professional Skills**
None
### Management of Common Neurological Conditions

#### Impaired consciousness and non-traumatic coma

**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

**Clinical Skills**

- Neurological assessment and initial resuscitation of patients in coma or with impaired consciousness
- Indications for intubation and ventilation
- Treatment of seizures
- Establishing a neurological differential diagnosis
- Planning and interpreting scans and other investigations
- Presentation and summary of cases

**Technical Skills**

- Maintenance of airway
- Endotracheal intubation
- Central venous cannulation
- Lumbar puncture

**Professional Skills**

**Generic**

#### Headache - acute and chronic

**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
- trigeminal neuralgia
- atypical craniofacial pain syndrome

Indications for investigation including scanning, lumbar puncture and angiography

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

Technical Skills
4 Lumbar puncture

Professional Skills

Generic

Weakness and paralysis

Objective
To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with weakness and paralysis

Knowledge
4 Common causes of ocular, cranial nerve, limb, trunk and respiratory muscle weakness

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

Technical Skills
None specified

Professional Skills

Generic

Dizziness, unsteadiness and falls

Objective
To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with dizziness, unsteadiness and falls

Knowledge
4 Common causes of cerebellar, vestibular, extrapyramidal and autonomic dysfunction

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

Technical Skills
None specified

Professional Skills
Generic

Pain and sensory loss

Objective
To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with pain and sensory loss

Knowledge
4 Common causes of musculoskeletal, neurogenic and neuropathic pain and sensory loss

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

Technical Skills
None specified

Professional Skills
Generic

Hearing disorder

Objective
To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with hearing loss

Knowledge
No content

Clinical Skills
Neurological history taking
Neurological examination
Establishing a neurological differential diagnosis
Planning investigation
Interpretation of scans and other investigations including pure tone audiograms
Presentation and summary of cases
### Visual disorder

**Objective**
To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with visual disorders

**Knowledge**
- 4 Patterns of visual loss in relation to common bulbar, retrobulbar, sellar, parasellar and optic pathway disorders
- 4 Analysis of diplopia and nystagmus in relation to common cranial nerve and brainstem disorders

**Clinical Skills**
- 4 Neurological history taking
- 4 Neurological examination
- 4 Use of computerised visual field assessment
- 4 Detailed fundoscopy
- 4 Establishing a neurological differential diagnosis
- 4 Planning investigation
- 4 Interpretation of scans and other investigations
- 4 Presentation and summary of cases

**Technical Skills**
None specified

**Professional Skills**
Generic

### Language and speech disturbance

**Objective**
To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with disturbances of language and speech

**Knowledge**
- 2 Role of speech and language therapists in assessment and treatment

**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

**Technical Skills**
None specified

**Professional Skills**
None specified
### Swallowing disorders

**Objective**
To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with swallowing disorders

**Knowledge**
- 2 Indications for laryngoscopy, videofluoroscopy, nasogastric and percutaneous gastric feeding

**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

**Technical Skills**
- None specified

**Professional Skills**
- Generic

### Disorders of the Sphincteric and sexual function

**Objective**
To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with sphincteric disorders

**Knowledge**
- No content

**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

**Technical Skills**
- None specified

**Professional Skills**
- Generic

### Movement disorder

**Objective**
To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with movement disorders

**Knowledge**
- 4 Parkinson's disease
- 4 Iatrogenic movement disorders
- 2 Dystonic syndromes
- 2 Choreiform syndromes

**Clinical Skills**
Memory and cognitive disorders

Objective
To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with disorders of memory and cognition

Knowledge
No content

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

Technical Skills
None specified

Professional Skills
Generic

Behavioural disorders

Objective
To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with behavioural disorders

Knowledge
4 The common acute and chronic presentations of organic and psychiatric behavioural disorders relating to alcohol and drug abuse, encephalitis, organic dementia, and psychosis

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

Technical Skills
None specified
### Anxiety and depression

**Objective**
To understand the aetiology, differential diagnosis, investigation and initial management of patients presenting with anxiety and depression

**Knowledge**
No content

**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**

**Technical Skills**
None specified

**Professional Skills**
Generic
Generic Surgical Skills and Knowledge

<table>
<thead>
<tr>
<th>Basic sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective</td>
</tr>
<tr>
<td>Underpinning basic science knowledge appropriate for the practice of surgery.</td>
</tr>
</tbody>
</table>

| Applied anatomy: Knowledge of anatomy appropriate for surgery |
| Applied anatomy: Knowledge of anatomy appropriate for surgery |

| Physiology: Knowledge of physiology relevant to surgical practice |
| Physiology: Knowledge of physiology relevant to surgical practice |

| Pathology: Knowledge of pathological principles underlying system specific pathology |
| Pathology: Knowledge of pathological principles underlying system specific pathology |

| Microbiology: Knowledge of microbiology relevant to surgical practice |
| Microbiology: Knowledge of microbiology relevant to surgical practice |

| Radiology: Knowledge of diagnostic and interventional radiology |
| Radiology: Knowledge of diagnostic and interventional radiology |

| Knowledge Applied anatomy: |
| Knowledge Applied anatomy: |

| 4 Development, organs and structures, surface and imaging anatomy of thorax, abdomen, pelvis, perineum, limbs, neck as appropriate for surgical operations |
| 4 Development, organs and structures, surface and imaging anatomy of thorax, abdomen, pelvis, perineum, limbs, neck as appropriate for surgical operations |

| Physiology: |
| Physiology: |

| 4 Homeostasis |
| 4 Homeostasis |

| 3 Thermoregulation |
| 3 Thermoregulation |

| 3 Metabolic pathways |
| 3 Metabolic pathways |

| 4 Blood loss |
| 4 Blood loss |

| 4 Sepsis |
| 4 Sepsis |

| 4 Fluid balance and fluid replacement therapy |
| 4 Fluid balance and fluid replacement therapy |

| 3 Metabolic abnormalities |
| 3 Metabolic abnormalities |

| Pathology: |
| Pathology: |

| 4 Inflammation |
| 4 Inflammation |

| 4 Wound healing |
| 4 Wound healing |

| 4 Cellular injury |
| 4 Cellular injury |

| 4 Vascular disorders |
| 4 Vascular disorders |

| 4 Disorders of growth, differentiation and morphogenesis |
| 4 Disorders of growth, differentiation and morphogenesis |

| 4 Tumours |
| 4 Tumours |

| 3 Surgical immunology |
| 3 Surgical immunology |

| 3 Surgical haematology |
| 3 Surgical haematology |
Microbiology:

- 4 Surgically important microorganisms
- 4 Sources of infection
- 4 Asepsis and antisepsis
- 4 Sterilisation
- 4 Antibiotics
- 4 High risk patient management

Radiology:

- 3 Principles of diagnostic and interventional radiology
  Clinical Skills
  No content
  Technical Skills
  No content
  Professional Skills
  No content

Basic surgical skills

Objective
Acquisition of basic surgical skills in instrument and tissue handling.

Incision of skin and subcutaneous tissue: Ability to incise superficial tissues accurately with suitable instruments.

Closure of skin and subcutaneous tissue: Ability to close superficial tissues accurately.

Knot tying: Ability to tie secure knots.

Haemostasis: Ability to achieve haemostasis of superficial vessels.

Tissue retraction: Use of suitable methods of retraction.

Use of drains: Knowledge of when to use a drain and which to choose.

Tissue handling: Ability to handle tissues gently with appropriate instruments.

Skill as assistant: Ability to assist helpfully, even when the operation is not familiar.

Knowledge
Incision of skin and subcutaneous tissue:

- 4 Langer’s lines
- 4 Healing mechanism
- 4 Choice of instrument
Closure of skin and subcutaneous tissue:

4 Options for closure
4 Suture and needle choice
4 Safe practice

Knot tying:

4 Choice of material

Haemostasis:

4 Techniques

Tissue retraction:

4 Choice of instruments

Use of drains:

4 Indications
4 Types
4 Management/removal

Tissue handling:

4 Choice of instruments

Clinical Skills

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
4 Double handed
4 Instrument
4 Superficial
4 Deep

Haemostasis:
4 Control of bleeding vessel (superficial)
4 Diathermy
4 Suture ligation
4 Tie ligation
4 Clip application

Tissue retraction:
4 Tissue forceps
4 Placement of wound retractors

Use of drains:
4 Insertion
4 Fixation
4 Removal Tissue

Handling:
4 Appropriate application of instruments and respect for tissues Skill as assistant:
4 Anticipation of needs of surgeon when assisting

Technical Skills
No content

Professional Skills
No content

The assessment and management of the surgical patient Objective

Ability to assess the patient and manage the patient, and propose surgical or non-surgical management.

Knowledge
No content

Clinical Skills
3 Surgical history and examination (elective and emergency)
3 Construct a differential diagnosis
3 Plan investigations
3 Clinical decision making
3 Case work up and evaluation; risk management
3 Active participation in MDTs
3 Taking consent for intermediate level intervention; emergency and elective

3 Written clinical communication skills
3 Interactive clinical communication skills: patients
3 Interactive clinical communication skills: colleagues

Technical Skills
<table>
<thead>
<tr>
<th>Perioperative care</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective</td>
<td>Ability to manage patient care in the perioperative period.</td>
</tr>
<tr>
<td></td>
<td>Preoperative assessment and management: Ability to assess the patient adequately prior to operation and manage any preoperative problems appropriately.</td>
</tr>
<tr>
<td></td>
<td>Intraoperative care: Ability to conduct safe surgery in the operating theatre environment.</td>
</tr>
<tr>
<td></td>
<td>Postoperative care: Ability to care for the patient in the postoperative period.</td>
</tr>
<tr>
<td>Blood Products</td>
<td>Appropriate use of blood products.</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>Appropriate use of antibiotics.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Preoperative assessment and management:</td>
</tr>
<tr>
<td></td>
<td>4 Cardiorespiratory physiology</td>
</tr>
<tr>
<td></td>
<td>3 Diabetes mellitus</td>
</tr>
<tr>
<td></td>
<td>3 Renal failure</td>
</tr>
<tr>
<td></td>
<td>4 Pathophysiology of blood loss</td>
</tr>
<tr>
<td></td>
<td>4 Pathophysiology of sepsis</td>
</tr>
<tr>
<td></td>
<td>4 Risk factors for surgery and scoring systems</td>
</tr>
<tr>
<td></td>
<td>3 Principles of day surgery</td>
</tr>
<tr>
<td>Intraoperative care:</td>
<td></td>
</tr>
<tr>
<td>4 Safety in theatre</td>
<td></td>
</tr>
<tr>
<td>4 Sharps safety</td>
<td></td>
</tr>
<tr>
<td>4 Diathermy, laser use</td>
<td></td>
</tr>
<tr>
<td>4 Infection risks</td>
<td></td>
</tr>
<tr>
<td>3 Radiation use and risks</td>
<td></td>
</tr>
<tr>
<td>4 Tourniquets</td>
<td></td>
</tr>
<tr>
<td>3 Principles of local, regional and general anaesthesia</td>
<td></td>
</tr>
<tr>
<td>Postoperative care:</td>
<td></td>
</tr>
<tr>
<td>4 Cardiorespiratory physiology</td>
<td></td>
</tr>
<tr>
<td>3 Diabetes mellitus</td>
<td></td>
</tr>
<tr>
<td>3 Renal failure</td>
<td></td>
</tr>
<tr>
<td>4 Pathophysiology of blood loss</td>
<td></td>
</tr>
<tr>
<td>4 Pathophysiology of sepsis</td>
<td></td>
</tr>
</tbody>
</table>
4 Complications specific to particular operation
2 Critical care

Blood Products:

4 Components of blood
4 Alternatives to use of blood products

Antibiotics:

4 Common pathogens in surgical patients
4 Antibiotic sensitivities
4 Antibiotic side-effects
4 Principles of prophylaxis and treatment

Clinical Skills
Preoperative assessment and management:

4 History and examination
4 Interpretation of preop investigations
3 Management of comorbidity
4 Resuscitation

Intraoperative care:

4 Safe conduct of intraoperative care

Postoperative care:

4 Assessment of patient’s condition
4 Postoperative analgesia
4 Fluid and electrolyte management
4 Monitoring of postoperative patient
4 Detection of impending organ failure
4 Initial management of organ failure
4 Use of MDT meetings

Blood Products:

4 Appropriate use of blood products
4 Management of the complications of blood product transfusion

Antibiotics:

4 Appropriate prescription of antibiotics

Technical Skills
No content

Professional Skills
Preoperative assessment and management:
0 Communication with patient and relatives
0 Liaison with physicians and ITU staff

Intraoperative care:
0 Communication with other staff members

Postoperative care:
0 Communication with patient and relatives
0 Liaison with physicians and ITU staff

Blood Products:
0 Communication with patient and relatives

Assessment of multiple injured patients including children

Objective
Safely assess the multiply injured patient.

Knowledge
3 Anatomy
3 Pathogenesis of shock
1 Differences in Children

Clinical Skills
4 History and examination
3 Investigation
4 Resuscitation and early management according to ATLS and APLS guidelines
3 Referral to appropriate surgical subspecialties

Technical Skills
3 Central venous line insertion
3 Chest drain insertion
2 Diagnostic peritoneal lavage

Professional Skills
No content

Bleeding diathesis

Objective
Understand, Recognise and Manage bleeding diathesis in the surgical patient.

Diagnosis: Diagnose possible bleeding diathesis in the surgical patient.

Treatment: Manage bleeding diathesis in the surgical patient.

Knowledge
Diagnosis:
3 Mechanism of haemostasis
3 Pathology of impaired haemostasis e.g. haemophilia, liver disease, massive haemorrhage

Treatment:

3 Understands use of blood products

Clinical Skills
Diagnosis:

4 Recognition of conditions likely to lead to the diathesis 3
Recognition of abnormal bleeding during surgery

Treatment:

3 Avoidance by correct surgical techniques
3 Corrective measures, e.g. warming, packing

Technical Skills
No content

Professional Skills
Diagnosis:

0 Communication with laboratory staff

Treatment:

0 Communication with anaesthetist, theatre team and laboratory staff

**Venous thrombosis + embolism**

Objective
Understanding of practice in the prevention and management of Venous thrombosis and Embolism.

Coagulation: Understanding of the physiology and pathophysiology of coagulation.

Diagnosis: Able to arrange basic investigation of patients with suspected venous thrombosis and embolism.

Treatment: Ability to initiate treatment of venous thrombosis and embolism.

Prophylaxis: Use of common methods of prophylaxis against venous thrombosis and embolism.

Knowledge
Coagulation:
2 Clotting mechanism (Virchow Triad)
2 Effect of surgery and trauma on coagulation
2 Tests for thrombophilia and other disorders of coagulation

Diagnosis:

2 Methods of investigation for suspected thromboembolic disease

Treatment:

4 Anticoagulation, heparin and warfarin
2 Role of V/Q scanning, CT angiography and thrombolysis
2 Place of pulmonary embolectomy

Prophylaxis:

3 Knowledge of methods of prevention, mechanical and pharmacological
Clinical Skills
Coagulation:

4 Recognition of patients at risk

Diagnosis:

3 Awareness of symptoms and signs associated with pulmonary embolism and DVT
2 Role of duplex scanning, venography and d-dimer measurement

Treatment:

3 Initiate and monitor treatment

Prophylaxis:

4 Awareness at all times of the importance of prophylaxis
Technical Skills
No content
Professional Skills
Coagulation:

0 Protocol management

Diagnosis:

0 Ability to organise and time appropriate investigation

Treatment:
Prioritisation of investigation and treatment
Patient counselling

Prophylaxis:
Able to implement in the team setting the culture of prophylaxis

Nutrition

Objective
Recognise the need for artificial nutritional support and arrange enteral nutrition.

Knowledge
3 Effects of malnutrition, both excess and depletion
3 Methods of screening and assessment

Clinical Skills
3 Arrange access to suitable artificial nutritional support, preferably via a nutrition team: Dietary supplements
2 Arrange access to suitable artificial nutritional support, preferably via a nutrition team: Enteral nutrition
1 Arrange access to suitable artificial nutritional support, preferably via a nutrition team: Parenteral nutrition

Technical Skills
No content

Professional Skills
No content

Academic activity

Objective
An introduction to research methodology and to teaching others.

Research: Ability to perform a simple research study and present the results.

Teaching: Ability to teach small groups such as medical students.

Knowledge

Research:

2 Research methodology

Teaching:

2 Teaching methods

Clinical Skills

Research:

2 Ability to analyse published evidence

Teaching:
<table>
<thead>
<tr>
<th>3 Ability to teach small groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Skills</td>
</tr>
<tr>
<td>No content</td>
</tr>
<tr>
<td>Professional Skills</td>
</tr>
<tr>
<td>No content</td>
</tr>
<tr>
<td>0 Learn to cope with crisis and mortality</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Management of the dying patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective</td>
</tr>
<tr>
<td>Ability to manage the dying patient appropriately.</td>
</tr>
</tbody>
</table>

Palliative Care: Good management of the dying patient in consultation with the palliative care team.

Principles of organ donation: Knowledge of the principles of organ donation.

Knowledge
Palliative Care:

3 Care of the terminally ill
4 Analgesia
3 Antiemetics
3 Laxatives

Principles of organ donation:

3 Circumstances in which consideration of organ donation is appropriate
3 Principles of brain death
3 Understanding the role of the coroner and the certification of death

Clinical Skills
Palliative Care:

3 Symptom control in the terminally ill patient

Technical Skills
No content

Professional Skills
Palliative Care:

0 Communication with the patient and relatives
0 Liaison with the palliative care team

Principles of organ donation:

0 Communication with relatives
0 Liaison with the transplant team
Endocrine and metabolic disorders

Objective
To identify, investigate and manage surgical patients with common metabolic disorders
- To identify, investigate and manage surgical patients with Thyrotoxicosis
- To identify, investigate and manage surgical patients with Hypothyroidism
- To identify, investigate and manage surgical patients with Hypercalcaemia
- Knowledge of the significance of corticosteroid therapy in patient care
- To identify, investigate and manage surgical patients with diabetes mellitus
- To identify, investigate and manage surgical patients with Hyponatraemia

Knowledge
Thyrotoxicosis
4 Pathophysiology of thyroid hormone excess and associated risks from surgery

Hypothyroidism
4 Pathophysiology of thyroid hormone deficiency and associated risks from surgery

Hypercalcaemia
3 Causes and effects of hypercalcaemia

Cortico-steroid therapy
4 Complications
4 Steroid insufficiency

Diabetes Mellitus
4 Complications

Hyponatraemia
4 Pathophysiology of fluid and electrolyte balance
4 Causes of hyponatraemia

Clinical Skills
Thyrotoxicosis
4 History and examination
3 Investigation of thyrotoxicosis

Hypothyroidism
4 History and examination
4 Investigation

Hypercalcaemia
### 3 Investigation of hypercalcaemia

3 Treatment of hypercalcaemia

Cortico-steroid therapy
4 Peri-operative management of patients on steroid therapy

Diabetes Mellitus
4 Peri-operative management of diabetic patients

**Hypernatraemia**
4 Treatment

### Technical Skills

No content

### Professional Skills

Liaise with endocrinologists
Liaise with diabetic team

### Child Protection

**Objective**
No content

**Knowledge**
4 Working knowledge of Trust and ACPC Child Protection Procedures
4 Basic understanding of child protection law
4 Understanding of Children's rights
4 Working knowledge of types and categories of child maltreatment, presentations, signs and other features (primarily physical, emotional, sexual, neglect, professional)
4 Understanding of one personal role, responsibilities and appropriate referral patterns in child protection
4 Understanding of the challenges of working in partnership with children and families

**Clinical Skills**

Ability to:
4 recognise the possibility of abuse or maltreatment
4 recognise limitations of own knowledge and experience and seek appropriate expert advice
4 urgently consult immediate senior in surgery to enable referral to paediatricians
4 keep appropriate written documentation relating to child protection matters

4 Communicate effectively with those involved with child protection, including children and their families

**Technical Skills**
No content

**Professional Skills**
No content
## Cranial Trauma

### General management of the head injured patient

**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:
  - 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
- Natural history of recovery from head injury including neurological, cognitive and behavioural disability and post-traumatic epilepsy
- Role of neurological rehabilitation

### 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

### Technical Skills

- No procedures specified

### Professional Skills

- Generic skills - in particular:
  - Accurate documentation
  - Ability to communicate effectively and concisely with medical and nursing staff

---

### Insertion of ICP monitor

**Objective**

To achieve competence in the insertion of subdural and intraparenchymal ICP monitors

**Knowledge**

- Indications for ICP monitoring
### Applied anatomy of the skull vault

4 Calibration, zeroing and interpretation of ICP traces
4 Potential complications of the procedure

### Clinical Skills
Non specified

### Technical Skills
4 Insertion of frontal subdural and intraparenchymal ICP monitors using a standard frontal burr hole and/or twist drill craniostomy.

### Professional Skills
Generic

## Burr hole evacuation of chronic subdural haematoma

### Objective
To achieve competence in burr hole evacuation of chronic subdural haematomas

### Knowledge
4 Pathophysiology of chronic subdural haematomas
4 Applied anatomy of the skull vault and subdural space
4 Indications for surgery
4 Surgical options
4 Complications of surgery
4 Management of anti-platelet and anti-coagulant medication

### Clinical Skills
4 Neurological assessment of patients with a CSDH
3 Interpretation of CT scans
4 Obtaining informed consent
4 Post-operative assessment and management

### Technical Skills
3 Performance of single and multiple frontal and parietal burrhole evacuation of CSDHs

### Professional Skills
Generic

## Management of soft tissue trauma

### Objective
To achieve competence in the management of cranial soft tissue trauma

### Knowledge
4 Anatomy and blood supply of the scalp
4 Indications for primary and secondary closure of wounds
4 Indications for antibiotic prophylaxis

### Clinical Skills
4 Assessment of tissue perfusion and viability

### Technical Skills
4 Wound exploration under local and general anaesthesia
3 Wound debridement
4 Arrest of scalp haemorrhage
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>4</td>
<td>Layered closure of the scalp without tension</td>
</tr>
<tr>
<td>3</td>
<td>Suturing technique</td>
</tr>
<tr>
<td>4</td>
<td>Wound drainage and head bandaging</td>
</tr>
<tr>
<td>Professional Skills</td>
<td></td>
</tr>
<tr>
<td>Generic</td>
<td></td>
</tr>
</tbody>
</table>
### General management of subarachnoid haemorrhage Objective

To achieve competence in the general management of subarachnoid haemorrhage (SAH)

**Knowledge**
- 4 Aetiology of SAH
- 4 Pathophysiology of SAH
- 4 WFNS grading of SAH
- 4 Principles of resuscitation and timing of interventions.
- 4 Indications for CT scanning, diagnostic lumbar puncture, CT angiography and digital subtraction angiography.
- 4 Principles of management of post-haemorrhagic hydrocephalus
- 4 Indications for endovascular and surgical intervention

**Clinical Skills**
- 3 Interpretation of CT scans including assessment of intracranial blood load, haematomas and hydrocephalus
- 3 Basic interpretation of cerebral angiography

**Technical Skills**
- 4 Lumbar puncture

**Professional Skills**
- Generic

### Diagnostic lumbar puncture

**Objective**
To understand the indications for diagnostic lumbar puncture To undertake an atraumatic lumbar puncture

**Knowledge**
- 4 Indications for diagnostic lumbar puncture
- 4 Interpretation of basic microscopy and biochemistry
- 3 Principles of spectrophotometry

**Clinical Skills**
- None specified

**Technical Skills**
- 4 Lumbar puncture

**Professional Skills**
- Generic

### Management of delayed secondary ischaemia Objective

To recognise and manage delayed cerebral ischaemia following subarachnoid haemorrhage

**Knowledge**
- 4 Pathophysiology of delayed cerebral ischaemia including the impact of secondary insults
- 4 Principles governing the augmentation of cerebral blood flow
Clinical Skills
4 Assessment of a deteriorating patient
4 Recognition and management of secondary insults
4 Interpretation of CT scans
3 Management of hypervolaemic hypertension

Technical Skills
3 Insertion of central venous catheter
3 Insertion of lumbar drain
3 Insertion of external ventricular drain

Professional Skills
Generic

Management of post-haemorrhagic hydrocephalus Objective

To achieve competence in the management of post-haemorrhagic hydrocephalus

Knowledge
4 Pathophysiology of hydrocephalus
4 Indications for external ventricular drainage and lumbar subarachnoid drainage
4 Applied anatomy of the skull vault, subdural space and ventricular system

4 Complications of surgery

Clinical Skills
4 Assessment of the unconscious and deteriorating SAH patient
3 Interpretation of CT scans

Technical Skills
4 Insertion of lumbar drain
3 Insertion of external ventricular drain

Professional Skills
Generic

Generic
### Hydrocephalus

<table>
<thead>
<tr>
<th>Adult hydrocephalus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
</tr>
<tr>
<td>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</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Knowledge</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The pathophysiology of CSF circulation</td>
</tr>
<tr>
<td>Applied surgical anatomy of the ventricular system</td>
</tr>
<tr>
<td>Indications for external ventricular drainage, ventriculoperitoneal shunting, lumbar CSF drainage and shunting, ventriculo-cisternostomy</td>
</tr>
<tr>
<td>Complications of surgery</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Clinical Skills</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
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</table>

<table>
<thead>
<tr>
<th><strong>Technical Skills</strong></th>
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</thead>
<tbody>
<tr>
<td>None</td>
</tr>
<tr>
<td>Insertion of ventricular drain/access device</td>
</tr>
<tr>
<td>Insertion of VP shunt</td>
</tr>
<tr>
<td>Revision of VP shunt</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Professional Skills</strong></th>
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<tbody>
<tr>
<td>None</td>
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</tbody>
</table>
### Intracranial Tumours

**Assessment and perioperative management of patients with space-occupying intracranial tumours**

**Objective**
To achieve competence in the assessment and peri-operative management of patients with intracranial tumours

**Knowledge**
3. The neuropathology of primary and secondary intracranial tumours including:
   - classification
   - epidemiology
   - natural history
4. Clinical presentations of intracranial tumours
4. Indications for neuroimaging
4. Management of raised intracranial pressure
3. Principles of operative management
4. Detection and management of post-operative complications

**Clinical Skills**
4. Neurological history taking and examination
4. Basic interpretation of CT and MRI scans

**Technical Skills**
None specified

**Professional Skills**
Generic skills - in particular:
- Case presentations to neuro-oncology MDTs
- Communication with patients and careers

---

### Image-guided biopsy of intracranial tumour Objective

To undertake image-guided biopsy of an intracranial tumour under supervision

**Knowledge**
4. Indications for biopsy of intracranial tumours
4. Risks of biopsy
4. Principles of image-guided surgery

**Clinical Skills**
3. Interpretation of CT and MRI scans and selection of biopsy targets

**Technical Skills**
3. 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
   - 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)
<table>
<thead>
<tr>
<th>Professional Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic skills</td>
</tr>
<tr>
<td>Obtaining informed consent</td>
</tr>
<tr>
<td>Acute Spinal Disorders</td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td><strong>Objective</strong></td>
</tr>
<tr>
<td>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 postoperative complications including compressing haematomas, CSF fistula and spinal sepsis</td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td><strong>Clinical Skills</strong></td>
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<tr>
<td>None</td>
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<tr>
<td><strong>Technical Skills</strong></td>
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<td>None</td>
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<tr>
<td><strong>Professional Skills</strong></td>
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<tr>
<td>None</td>
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</tbody>
</table>
Intermediate Stage (HST 2, 3)

Four point scales

What the 4 point scale means for Knowledge

1. Knows of
2. Knows basic concepts
3. Knows generally
4. Knows both specifically and broadly

What the 4 point scale means for Clinical Skills and Technical Skills and Procedures

1. Has observed
2. Can do with assistance
3. Can do whole but may need assistance
4. Competent to do whole without assistance, including managing complications
Intermediate Stage HST 2, 3

During the intermediate stage trainees will consolidate the theoretical knowledge and clinical skills gained during the initial training stage. They will develop their surgical judgement, decision making and operative competencies in the following conditions:

- **Cranial trauma**: including the general management of the head injured patient; surgical management of cranial trauma; neuro-intensive care of the head-injured patient; the role of post-traumatic neurological rehabilitation
- **Intracranial haemorrhage**: including the operative management of space-occupying spontaneous intracerebral haematomas; surgical aspects of the multi-disciplinary management of aneurysmal subarachnoid haemorrhage SAH
- **Hydrocephalus**: including the assessment and operative management of adult patients with communicating and non communicating hydrocephalus; the assessment of children with hydrocephalus; emergency external ventricular drainage in children with acute hydrocephalus
- **Neuro-oncology**: including the multi-disciplinary management of patients with intracranial neoplasia; image-guided surgery applied to the management of patients with intracranial tumours; the operative management of supra-tentorial intrinsic tumours; the operative management of convexity meningiomas
- **CNS sepsis**: including the general management of CNS infections e.g. ventriculitis, cerebral abscess, subdural empyema and spinal epidural abscess; the operative management of cerebral abscess by burr hole aspiration
- **Spinal trauma**: all aspects of the non-operative management of spinal injury patients
- **Spinal oncology**: including the general management of patients with malignant spinal cord compression and basic surgical management of patients with malignant spinal cord compression
- **Degenerative spinal disorders**: including the surgical management of lumbar compressive radiculopathies by lumbar microdiscectomy and associated microsurgical decompressions; the surgical management of compressive cervical myeloradiculopathies

By the end of the intermediate stage trainees will have acquired the necessary clinical and operative skills with sufficient experience to manage without direct supervision a range of adult emergency conditions together with selected, life saving emergency intervention in children. They will be competent to undertake all the common surgical approaches and to perform selected microsurgical procedures included in the Operative Competency Schedule.
Cranial Surgery

Cranial Trauma

<table>
<thead>
<tr>
<th>Objective</th>
<th>General management of the head injured patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>To achieve competence in all aspects of the general management of head-injured patients</td>
</tr>
<tr>
<td>4 Pathophysiology of head injury and of multiple trauma</td>
<td></td>
</tr>
<tr>
<td>4 Prevention of secondary insults</td>
<td></td>
</tr>
<tr>
<td>4 Indications for operative intervention</td>
<td></td>
</tr>
<tr>
<td>4 Medical management of acutely raised intracranial pressure</td>
<td></td>
</tr>
<tr>
<td>Clinical Skills</td>
<td>4 Clinical assessment of the head-injured and multiply-injured patient</td>
</tr>
<tr>
<td>4 Prioritisation of clinical risk</td>
<td></td>
</tr>
<tr>
<td>4 Interpretation of CT scans and plain radiology</td>
<td></td>
</tr>
<tr>
<td>4 Interpretation of multi-modality cerebral monitoring</td>
<td></td>
</tr>
<tr>
<td>4 Ability to assess and advise on the transfer of head-injured patient using image-transfer and telemedicine</td>
<td></td>
</tr>
<tr>
<td>Technical Skills</td>
<td>None specified</td>
</tr>
<tr>
<td>Professional Skills</td>
<td>Communication with referring specialists</td>
</tr>
<tr>
<td>Generic skills</td>
<td>Decision making under pressure</td>
</tr>
</tbody>
</table>

Surgical management of cranial trauma Objective

To achieve competence in the operative management of head-injured patients

Knowledge

4 Pathophysiology of raised intracranial pressure and space occupying haematomas

4 Applied surgical anatomy

4 Principles of peri-operative care

4 Indications for surgery and appropriate surgical approaches

Clinical Skills

4 Assessment of the head-injured patient

4 Interpretation of trauma CT scans

Technical Skills

3 Craniotomy for supratentorial traumatic haematoma, in particular: 3 Planning and siting of craniotomies for evacuation of extradural and subdural haematomas

3 Handling the "tight" brain
3 Achieving haemostasis in the coagulopathic patient
3 Achieving haemostasis from the skull base and venous sinuses
3 Elevation of compound depressed skull fracture with dural repair
3 Delayed cranioplasty of skull vault

Professional Skills
Generic skills - in particular:
Multidisciplinary working with medical and paramedical colleagues
Communication with relatives and carers
Working effectively and quickly under pressure

Neuro-intensive care of the head-injured patient Objective

To achieve competence in the neurointensive care of head-injured patients

Knowledge
4 Pathophysiology of head injury
4 The management of raised intracranial pressure, impaired intracranial compliance, and cerebral ischaemia
4 Prevention and management of secondary insults

Clinical Skills
4 Assessment of the unconscious patient
4 Use and interpretation of multimodality monitoring
4 Interpretation of CT scans
4 Ability to advise on management of secondary complications and further surgical intervention

Technical Skills
None specified

Professional Skills
Generic skills - in particular:
Ability to contribute to the multi-disciplinary intensive care of head-injured patients

Neurological rehabilitation

Objective
To understand the role of post-traumatic neurological rehabilitation

Knowledge
4 The natural history of recovery from head injury
4 Understanding of neurological, cognitive and behavioural disabilities following mild and severe head injury
4 Risks of post-traumatic epilepsy and its management

Clinical Skills
4 Ability to contribute to the multi-disciplinary assessment of head injured patients
4 Ability to advise family and carers regarding prognosis, professional and lay support
Intracranial Haemorrhage

Primary intracerebral haematomas

Objective
To achieve competence in the operative management of space-occupying spontaneous intracerebral haematomas

Knowledge
4 Aetiology of supra and infratentorial intracerebral haemorrhage
4 Pathophysiology of spontaneous intracerebral haemorrhage
4 Indications for surgical evacuation
4 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

Clinical Skills
4 Assessment of patients with intracerebral haematomas and raised intracranial pressure
4 Interpretation of CT and MRI scans and identification of probable aetiology
4 Indications for pre-operative CT angiography, MRA and digital subtraction angiography

Technical Skills
3 Craniotomy for supratentorial haematoma including:
3 Planning and siting of craniotomies
3 Use of ventricular drainage
3 Intracerebral haemostasis in the coagulopathic patient

Professional Skills
Generic skills

Aneurysmal subarachnoid haemorrhage Objective

To achieve competence in the surgical aspects of the multi-disciplinary management of aneurysmal subarachnoid haemorrhage SAH

Knowledge
4 Pathophysiology of SAH
4 Prevention and management of delayed cerebral ischaemia, cerebral vasospasm and hydrocephalus
4 Relative indications for endovascular and surgical interventions

Clinical Skills
4 Clinical assessment of patients with aneurysmal SAH
4 Non operative management of patients undergoing endovascular coiling
4 Management of delayed cerebral ischaemia

Technical Skills
4 External ventricular drainage
4 Lumbar subarachnoid drainage
4 Ventriculoperitoneal shunting
Professional Skills
Generic skills
### Hydrocephalus

#### Adult 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, lumbar CSF drainage and shunting, ventriculo-cisternostomy
- Complications of surgery

**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

**Technical Skills**
- Lumbar subarachnoid drainage
- External ventricular drainage
- Primary ventriculoperitoneal shunt
- Revision of ventriculoperitoneal shunt
- Lumbo-peritoneal shunt

**Professional Skills**

### Paediatric 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

**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

**Technical Skills**
- Taping and draining from an Ommaya reservoir
- Taping a shunt
- External ventricular drainage

**Professional Skills**

**Generic**
## Neuro-oncology

**General principles of neuro-oncology**

**Objective**
To achieve competence in the multi-disciplinary management of patients with intracranial neoplasia

**Knowledge**

4. Classification, natural history and pathology of benign and malignant intracranial neoplasia
4. Pathophysiology of raised intracranial pressure associated with space occupying tumours
4. Diagnostic imaging of intracranial tumours including the interpretation of CT and MRI scans and the role of MRS
4. Principles of fractionated radiotherapy, stereotactic radiotherapy and radiosurgery
4. Role of adjuvant chemotherapy
4. Principles of clinical trials and their application to neuro-oncology

**Clinical Skills**

4. Clinical assessment of patients with raised intracranial pressure and space occupying lesions
4. Ability to contribute to the multi-disciplinary management of patients with intracranial neoplasia
4. Empathetic communication with patients and families

**Professional Skills**

None specified

**Generic**

Principles of image-guided surgery

**Objective**
To achieve competence in image-guided surgery applied to the management of patients with intracranial tumours

**Knowledge**

4. An understanding of the principles and practice of frameless image-guided surgery and the principles of frame-based stereotactic surgery

**Clinical Skills**

4. Interpretation of CT and MRI scans

**Technical Skills**

3. Image-guided biopsy of supratentorial intrinsic tumour
3. Ability to import, check and interrogate image data sets on a standard work station
3. Setting up an image-guidance system and obtaining satisfactory intra-operative registration
3. Planning and siting burr holes and craniotomy flaps using image-guidance
3. Identification of an intra-cranial tumour and its margins using image-guidance
### Professional Skills

#### Generic

##### Supra-tentorial intrinsic tumours Objective

To achieve competence in the operative management of supra-tentorial intrinsic tumours

Knowledge
- 4 Indications for surgery
- 4 Applied surgical anatomy
- 4 Principles of peri-operative care
- 4 Complications of surgery

Clinical Skills
- 4 The assessment, counselling and pre-operative preparation of patients with supratentorial intrinsic tumours

Technical Skills
- 3 Craniotomy for superficial, lobar supratentorial intrinsic tumour In particular:
  - 3 safe patient positioning
  - 3 planning and siting of craniotomy with and without image-guidance
  - 3 intra-operative management of raised ICP
  - 3 appropriate exposure of the tumour, using operating microscope as necessary
  - 3 safe use of fixed retractors
  - 3 precise use of suction, electo-coagulation and ultrasonic aspiration

### Convexity meningioma

Objective

To achieve competence in the operative management of a convexity meningiomas

Knowledge
- 4 Indications for surgery
- 4 Applied surgical anatomy
- 4 Principles of peri-operative care
- 4 Complications of surgery

Clinical Skills
- 4 The assessment, counselling and pre-operative preparation of patients with convexity meningiomas

Technical Skills

Resection of a convexity meningioma, in particular: 3 safe patient positioning
- 3 planning and siting of craniotomy with and without image-guidance
- 3 intra-operative management of raised ICP
- 3 appropriate exposure of the tumour
- 3 precise use of suction, electo-coagulation and ultrasonic aspiration
3 use of internal tumour decompression
3 dissection in the subarachnoid plane using the operating microscope as necessary
3 intracranial haemostasis
3 use of duraplasty and cranioplasty

Professional Skills
Generic
### CNS Sepsis

<table>
<thead>
<tr>
<th>General microbiological principles</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
</tr>
<tr>
<td>To achieve competence in the general management of CNS infections including ventriculitis, cerebral abscess, subdural empyema and spinal epidural abscess</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge</th>
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</thead>
<tbody>
<tr>
<td>4 The pathophysiology of intracranial and spinal sepsis</td>
</tr>
<tr>
<td>4 Principles of anti-microbial chemotherapy</td>
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<tr>
<td>4 Indications for operative intervention</td>
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</table>

<table>
<thead>
<tr>
<th>Clinical Skills</th>
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</thead>
<tbody>
<tr>
<td>4 Clinical assessment of patients with CNS infections</td>
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<tr>
<td>4 Interpretation of CT and MRI scans</td>
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<table>
<thead>
<tr>
<th>Technical Skills</th>
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<tbody>
<tr>
<td>None specified</td>
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<table>
<thead>
<tr>
<th>Professional Skills</th>
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<tbody>
<tr>
<td>Generic</td>
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### Management of intracerebral abscess

<table>
<thead>
<tr>
<th>Objective</th>
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<tbody>
<tr>
<td>To achieve competence in the operative management of cerebral abscess using burr hole aspiration</td>
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</table>

<table>
<thead>
<tr>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Indications for surgery</td>
</tr>
<tr>
<td>4 Applied surgical anatomy</td>
</tr>
<tr>
<td>4 Principles of peri-operative care</td>
</tr>
<tr>
<td>4 Complications of surgery</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 The assessment, counselling and pre-operative preparation of patients with a cerebral abscess</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Burr hole aspiration of a cerebral abscess with and without image-guidance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Professional Skills</th>
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<tbody>
<tr>
<td>Generic</td>
</tr>
</tbody>
</table>
Management of the spinal injury patient

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

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

Technical Skills
- Use of external mobilisation including cervical collars and spinal boards

- Application of halo traction
- Application of a halo-body jacket

Professional Skills

Generic
Spinal Oncology

### Malignant spinal cord compression

**Objective**

To achieve competence in the general management of patients with malignant spinal cord compression.

**Knowledge**

1. The pathophysiology of spinal cord compression
2. The classification, aetiology and natural history of vertebral metastases
3. Spinal instability associated with vertebral malignancy
4. Indications for surgical intervention
5. Role of primary radiotherapy and adjuvant radiotherapy or chemotherapy

**Clinical Skills**

1. Clinical assessment of patients with malignant spinal cord compression
2. Interpretation of plain radiology, CT and MRI scans
3. Liaison with medical oncologists and radiotherapist

**Technical Skills**

None specified

**Professional Skills**

Generic

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### Surgical management of thoraco-lumbar metastases

**Objective**

To achieve competence in the basic surgical management of patients with malignant spinal cord compression

**Knowledge**

1. Indications for surgery
2. The principles of operative spinal decompression and stabilisation of patients with spinal cord metastases.
3. Applied surgical anatomy
4. Principles of peri-operative care
5. Complications of surgery

**Clinical Skills**

1. The assessment, counselling and pre-operative preparation of patients with malignant spinal cord compression

**Technical Skills**

3. Extradural spinal biopsy and decompression by laminectomy in selected patients without segmental instability

**Professional Skills**

Generic
### Degenerative Spinal Disorders

#### Lumbar radiculopathies

**Objective**
To achieve competence in the surgical management of lumbar compressive radiculopathies by lumbar microdiscectomies and associated microsurgical decompressions.

**Knowledge**

1. **Indications for operative management of lumbar radiculopathies**
2. Applied surgical anatomy of the lumbar spine with particular reference to degenerative neural compression and morphological variations in vertebral anatomy
3. **Selection of minimally-invasive approaches**
4. Principles of peri-operative care
5. Complications of surgery

**Clinical Skills**

1. The assessment, counselling and pre-operative preparation of patients with lumbar radiculopathies
2. Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms

**Technical Skills**

1. Primary lumbar microdiscectomy
2. Primary posterior decompression (laminotomy, hemilaminectomy etc):
   - 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

**Professional Skills**

**Generic**

### Compressive cervical myeloradiculopathies

**Objective**
To achieve competence in the surgical management of compressive cervical myeloradiculopathies

**Knowledge**

1. **Indications for operative management of cervical myeloradiculopathies**
2. 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
3. **Selection of surgical approaches**
4. Principles of peri-operative care
5. Complications of surgery

**Clinical Skills**

1. The assessment, counselling and pre-operative preparation of
patients with cervical myeloradiculopathies
4 Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms
Technical Skills
3 Single level anterior cervical discectomy with and without fusion In particular:
3 Standard anterolateral approach to the cervical spine
3 Use of fluoroscopy or plain radiographs to confirm spinal level
3 Radical and subtotal excision of the cervical disc, PLL, central and unco-vertebral osteophytes
3 Protection and full decompression of the spinal cord and spinal nerve roots
3 Interbody fusion using autologous bone with or without interbody cages

Professional Skills
Generic
The Final Stage HST 4, 5, 6

Four point scales

What the 4 point scale means for Knowledge

1. Knows of  
2. Knows basic concepts  
3. Knows generally  
4. Knows both specifically and broadly

What the 4 point scale means for Clinical Skills and Technical Skills and Procedures

1. Has observed  
2. Can do with assistance  
3. Can do whole but may need assistance  
4. Competent to do whole without assistance, including managing complications
The Final Stage HST 4, 5, 6

The final stage syllabus is not intended to be a comprehensive training guide. Due to the nature of neurosurgical practice there will be conditions and procedures that are not individually specified in the syllabus and that will form part of a trainee’s experience. This clinical and operative experience will be taken into account when assessing the overall quality of advanced training.

However, by the time that trainees apply for special interest training or to take the FRCS (Neurosurgery) they must be competent in all aspects of the clinical management of patients presenting with the following essential 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

They must be competent to undertake the full range of operative procedures specified in the final training stage of the essential operative competency schedule (Table 1) without supervision and have sufficient operative experience to be able to manage operative difficulties and complications (Competence level 4).

Special Interest Training

To ensure the quality of emergency and continuing care of neurosurgical patients with appropriate liaison and cross referral all trainees are expected to have a basic understanding of the specialist areas of neurosurgical practice. During final stage training all trainees will undertake selected specialist operative procedures under direct supervision to consolidate their advanced operative skills.

Trainees in special interest training will develop a comprehensive and in-depth knowledge of their field. By the end of specialist interest training they will be competent to undertake selected operative procedures relating to the common presentations in their specialist field without direct supervision. They will be competent to undertake other procedures in their field under the mentorship of a senior colleague. The specialist interest summaries indicate the breath and depth of training required in a specialist interest fellowship.

Paediatric neurosurgery

All trainees will undertake a six month placement in a paediatric neurosurgery service under the direct supervision of paediatric neurosurgeons with a full-time or major commitment to paediatric surgery. The service must provide a comprehensive range of paediatric neurosurgical care.
On completion of general paediatric training trainees will be competent to assess and undertake the emergency neurosurgical management of the critically-ill child with raised intracranial pressure.

On completion of a special interest fellowship in paediatric neurosurgery trainees will be competent in all aspects of the non-operative neurosurgical management of children presenting with disorders of the nervous system. They will have detailed knowledge of the statutory framework governing the care of children, paediatric neurointensive care, the principles of paediatric neurorehabilitation and of the management of non-accidental injury. They will be competent to undertake all aspects of the emergency neurosurgical operative care of children and to undertake a range of elective procedures in the following fields with appropriate supervision:

- **Hydrocephalus:** including the insertion and revision of ventriculo-peritoneal, ventriculo-atrial and lumbo-peritoneal shunts; endoscopic third ventriculostomy; image-guided placement of ventricular catheters; management of neonatal post-haemorrhagic hydrocephalus
- **Paediatric neuro-oncology:** including stereotactic and image-guided biopsy of paediatric tumours; endoscopic biopsy of third ventricular tumours; resection of supratentorial and infratentorial intrinsic tumours; approaches to suprasellar, third ventricular and pineal tumours; management of spinal cord tumours
- **Paediatric head injury:** including decompressive craniectomy; cranioplasty; management of growing fractures; craniofacial reconstruction; management of CSF fistulae
- **Spinal dysraphism:** including the management of neonatal spina bifida, meningoceles and encephaloceles; spinal cord tethering syndromes
- **Congenital and acquired spinal deformity:** including the management of syndromic spinal deformity and post-operative spinal deformity
- **Craniofacial disorders:** including the management of simple craniosynostosis, syndromic craniosynostosis, post-traumatic deformity
Neuro-oncology

All trainees will be competent to manage patients with high grade intrinsic tumours, metastases and convexity meningiomas. Trainees with a special interest in neuro-oncology will participate fully in the multidisciplinary management of neuro-oncology patients and will be familiar with current developments in molecular neuro-oncology, emerging surgical techniques and the ethical, regulatory and practical considerations governing clinical trials in neuro-oncology. They will develop additional expertise as follows:

- **Advanced surgical techniques:** including awake craniotomy; stereotactic craniotomy, intraoperative neurophysiological monitoring; advanced image guidance with integration of functional data; intraoperative imaging techniques; the use of intraoperative chemotherapy wafers; third ventriculostomy
- **Low-grade intrinsic tumours:** the management of low grade intrinsic tumours using advanced techniques; optimal resection of lobar low grade intrinsic tumours
- **Tumours of the ventricular system and pineal:** including surgical approaches to the third ventricle and pineal; transfrontal transventricular excision of intraventricular tumours and cysts; transcallosal transventricular excision of lesions of the third ventricle and foramen of Munro
- **Brainstem tumours:** including the management options for intrinsic brainstem tumours; stereotactic biopsy of accessible lesions
- **Radiosurgery and stereotactic radiotherapy:** including the principles of radiosurgery and stereotactic radiotherapy and the indications for their use as adjunctive and/or primary treatment modalities.

Functional neurosurgery

Trainees with a special interest in functional neurosurgery will develop additional expertise as follows:

- **Surgical management of pain:** including the implantation of spinal cord stimulators; the insertion of intrathecal drug delivery systems; knowledge of ablative surgical treatment for pain including DREZ lesioning, cordotomy and myelotomy and of neuromodulatory techniques including peripheral nerve, motor cortex and deep brain stimulation.
- **Neurovascular compression syndromes:** including microvascular decompression of the trigeminal nerve; microvascular decompression of the facial nerve; percutaneous trigeminal rhizotomy
- **Spasticity:** including an in-depth understanding of medical and surgical treatments for spasticity; implantation of intrathecal drug delivery systems; knowledge of other surgical treatments for spasticity including phenol blocks, neurectomies and rhizotomy.
- **Epilepsy**: including the multidisciplinary assessment and preparation of patients for epilepsy surgery; stereotactic placement of depth electrodes and placement of subdural electrode grids; temporal lobectomy; selective amygdalohippocampectomy; callosotomy; insertion of vagal nerve stimulators; hemispherectomy; multiple subpial transections

- **Movement disorders**: including the multidisciplinary assessment and selection of patients with movement disorders e.g. Parkinson's disease and dystonia; selection, targeting and placement of deep brain stimulation electrodes; management of neuro-stimulators; radiofrequency lesioning

**Neurovascular surgery**

Special interest training will take place in units with extensive experience in the multi-disciplinary management of all common intracranial vascular disorders. These units should manage a minimum of 120 aneurysmal subarachnoid haemorrhages a year. Trainees with a special interest in neurovascular surgery will develop additional expertise in:

- **Intracranial aneurysms**: including surgical and endovascular strategies for the management of ruptured and unruptured intracranial aneurysms; surgical treatment of ruptured aneurysms of the anterior circulation; principles of microvascular reconstruction and bypass for complex aneurysms
- **Intracranial vascular malformations**: including surgical, endovascular and radiosurgical strategies for the management of arteriovenous malformations; surgical treatment of superficial cortical arteriovenous malformations, surgical and endovascular treatment of dural arteriovenous fistulae, image-guided resection of cavernomas
- **Other vascular disorders**: including the management of primary intracerebral haematomas; the management of venous occlusive disorders
- **Acute and chronic cerebral ischaemia**: including the medical, surgical and endovascular management of extracranial arterial occlusive disease

**Skull-base surgery**

Special interest training in skull base surgery will take place in units with extensive multi-disciplinary experience in the management of all common skull-base disorders. Trainees with a special interest in skull-base surgery will develop additional expertise as follows:
- **Skull-base and craniofacial surgical access**: including standard variations of fronto-basal, fronto-orbital, trans-zygomatic, infratemporal, transtemporal, far-lateral, transphenoidal and transmaxillary approaches
- **Cranial base meningiomas**: including resection of anterior fossa (olfactory groove and suprasellar) meningiomas; tentorial and petrous temporal meningiomas; petroclival meningiomas
- **Pituitary and sellar tumours**: including microsurgical and endoscopic transphenoidal resection of pituitary tumours; pterional, subfrontal, interhemispheric and transventricular approaches to suprasellar tumours
- **Acoustic neuromas**: including retrosigmoid, translabyrinthine and middle fossa resection of acoustic neuromas
- **Other skull-base tumours**: including the management of other cranial nerve schwannomas, glomus tumours and malignant primary and secondary tumours of the skull-base
- **Management of cranio-facial trauma**: including multidisciplinary management of fronto-orbital disruption
- **Repair of CSF fistulae**: including the management of post-operative CSF fistulae; indications for endoscopic repair of basal CSF fistula; techniques for open repair and skull-base reconstruction

**Spinal surgery**

On completion of a special interest fellowship in spinal surgery trainees will be competent in all aspects of the emergency and urgent operative care of patients with spinal disorders. They will develop additional expertise as follows:

- **Spinal trauma**: including reduction and internal stabilisation of atlanto-axial, sub-axial and thoraco-lumbar fractures and dislocations
- **Metastatic disease of the spine**: including posterior decompression and stabilisation using pedicle screw, hook and sub-laminar wire constructs; corporectomy and instrumented reconstruction of the anterior column
- **Primary tumours of the spine**: including techniques for local ablation of benign lesions and en bloc resections of malignant tumours
- **Intradural tumours**: including the radical resection of intradural, extra-medullary tumours; biopsy and optimal resection of intramedullary tumours
- **Syringomyelia and hind brain anomalies**: including foramen magnum decompression, syringostomy, syringopleural shunting, detethering and duroplasty
- **Advanced surgery of the ageing and degenerative spine**: including the management of osteoporotic collapse, vertebroplasty, kyphoplasty; stabilisation of the osteoporotic spine; operative management degenerative spondylolisthesis and scoliosis
The rheumatoid and ankylosed spine: including the management of atlanto-axial subluxation; cranial settling and odontoid migration; sub-axial degeneration; cervico-dorsal kyphosis

Spinal deformity: including the multidisciplinary management of patients with spinal dysraphism, diastematomyelia etc
Cranial Surgery

Cranial Trauma

<table>
<thead>
<tr>
<th>Management of head injured patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective</td>
</tr>
<tr>
<td>To achieve competence in all aspects of the advanced operative management of head-injured patients</td>
</tr>
</tbody>
</table>

Knowledge

4 Pathophysiology of raised intracranial pressure and space occupying haematomas
4 Applied surgical anatomy
4 Principles of peri-operative care
4 Indications for surgery and appropriate surgical approaches
4 Indications for open and endoscopic closure of traumatic CSF fistulae
4 Complications of surgery and their management

Clinical Skills

4 Competence in all aspects of peri-operative management of head-injured patients
4 Ability to diagnose and confirm brain death

Technical Skills

4 Craniotomy for supra and infratentorial extradural, subdural and intracerebral haematomas
4 Lobectomy for haemorrhagic contusion
4 Vault cranioplasty using in-situ or preformed prostheses
4 Decompressive bifrontal craniotomy with extensive durotomy
4 Subfrontal extradural or subdural repair of anterior fossa fractures

Combined craniofacial repair of fronto-orbito-maxillary injuries (fellowship)

Professional Skills

Generic skills
Spontaneous Intracranial Haemorrhage

<table>
<thead>
<tr>
<th>Objective</th>
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</thead>
<tbody>
<tr>
<td>To achieve competence in the surgical aspects of the multi-disciplinary management of aneurysmal subarachnoid haemorrhage SAH</td>
</tr>
</tbody>
</table>

Knowledge
4 Pathophysiology of SAH
4 Prevention and management of delayed cerebral ischaemia, cerebral vasospasm and hydrocephalus
4 Relative indications for endovascular and surgical interventions

Clinical Skills
4 Clinical assessment of patients with aneurysmal SAH
4 Non operative management of patients undergoing endovascular coiling
4 Management of delayed cerebral ischaemia

Technical Skills
4 External ventricular drainage
4 Lumbar subarachnoid drainage
4 Ventriculoperitoneal shunting

Professional Skills
None
<table>
<thead>
<tr>
<th>Hydrocephalus</th>
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</thead>
<tbody>
<tr>
<td><strong>Adult hydrocephalus</strong></td>
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<tr>
<td><strong>Objective</strong></td>
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<tr>
<td>To achieve competence in all aspects of the management of adult patients with hydrocephalus</td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
</tr>
<tr>
<td>4 The pathophysiology of CSF circulation</td>
</tr>
<tr>
<td>4 Applied surgical anatomy of the ventricular system</td>
</tr>
<tr>
<td>4 Indications for external ventricular drainage, shunting, lumbar CSF drainage and shunting, ventriculo-cisternostomy</td>
</tr>
<tr>
<td>4 Surgical complications and their management</td>
</tr>
<tr>
<td><strong>Clinical Skills</strong></td>
</tr>
<tr>
<td>4 The assessment, counselling and pre-operative preparation of patients with hydrocephalus</td>
</tr>
<tr>
<td>4 Interpretation of pressure studies and CSF infusion studies</td>
</tr>
<tr>
<td>4 Interpretation of CT and MRI scans and identification of shunt malfunction</td>
</tr>
<tr>
<td><strong>Technical Skills</strong></td>
</tr>
<tr>
<td>Competence in all aspects of primary and revisional shunt surgery including:</td>
</tr>
<tr>
<td>1 Use of 3-D image-guidance or ultrasound for difficult ventricular cannulation</td>
</tr>
<tr>
<td>4 Intra-operative testing of shunt function</td>
</tr>
<tr>
<td>4 Selection of appropriate shunts</td>
</tr>
<tr>
<td>4 Management of peri-operative ventricular haemorrhage</td>
</tr>
<tr>
<td>4 Lumbo-peritoneal shunt</td>
</tr>
<tr>
<td>1 Third ventriculo-cisternostomy</td>
</tr>
<tr>
<td><strong>Professional Skills</strong></td>
</tr>
<tr>
<td><strong>Generic</strong></td>
</tr>
</tbody>
</table>
# Intracranial tumours

## Anterior and middle fossa skull base tumours

### Objective
To achieve competence in the surgical management of patients with anterior and middle fossa tumours

### Knowledge
1. Indications for selected approaches in relation to pathology and surgical goals
2. Applied microsurgical anatomy of the anterior and middle cranial fossae
3. 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
4. Complications of surgery and their management

### Clinical Skills
1. The assessment, counselling and pre-operative preparation of patients with anterior and middle fossa tumours
2. Interpretation of CT and MRI scans

### Technical Skills
- **Non-fellowship**
  1. 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
  2. Bi-Frontal/Frontal and parietal parafalcine approaches
- **Fellowship**
  1. Microsurgical resection of superficial skull base meningioma
  2. Anterior interhemispheric, fronto-orbital, zygomatic and temporo-zygomatic approaches

### Professional Skills
- **Generic**
  1. Transphenoidal surgery

### Transphenoidal surgery

#### Objective
To achieve competence in transphenoidal approaches to the pituitary fossa and resection of pituitary adenomas

#### Knowledge
1. Pathophysiology of the hypothalamic-pituitary axis
2. Indications for surgery
4 Selection of surgical approaches: sublabial, transnasal and endoscopic
4 Applied surgical anatomy of the skull base
4 Principles of peri-operative care
4 Complications of surgery and their management

**Clinical Skills**
4 The assessment, counselling and pre-operative preparation of patients with pituitary, sellar and parasellar tumours
4 Interpretation of CT and MRI scans

**Technical Skills**

**Non-fellowship**
1 Microsurgical transphenoidal approach
1 Transphenoidal resection of non-functioning macroadenoma

**Fellowship**
4 Transphenoidal resection of non-functioning macroadenoma
3 Transphenoidal selective microadenectomy
3 Endoscopic transphenoidal resection of non-functioning adenoma

**Professional Skills**

**Generic**

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### Midline tumours

**Objective**
To achieve competence in the management of patients with midline sellar, parasellar, pineal and third ventricular tumours

**Knowledge**
4 Indications for surgery
4 Applied surgical anatomy of midline structures
4 Selection of surgical approaches including principles of endoscopic biopsy and/or resection
4 Principles of intra-operative management of patients undergoing resection of midline sellar, para-sellar, pineal and third ventricular tumours including colloid cysts
4 Complications of surgery and their management

**Clinical Skills**
4 The assessment, counselling and pre-operative preparation of patients with midline tumours tumours
4 Interpretation of CT and MRI scans

**Technical Skills**

**Non-fellowship**
1 Transfrontal, transcortical approach to the lateral and third ventricle
1 Microsurgical resection of lateral intraventricular tumour
1 Transfrontal endoscopic biopsy

**Fellowship**
3 Microsurgical resection of lateral intraventricular tumour
3 Microsurgical resection of third ventricular tumour/colloid cyst
3 Transfrontal endoscopic biopsy and third ventriculostomy
# Malignant posterior fossa 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

**Clinical Skills**

- The assessment, counselling and pre-operative preparation of patients with posterior fossa malignant tumours
- Interpretation of CT and MRI scans

**Technical Skills**

- 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

**Professional Skills**

**Generic**
<table>
<thead>
<tr>
<th>tumour size and position</th>
</tr>
</thead>
</table>

**Clinical Skills**

4 The assessment, counselling and pre-operative preparation of patients with CP angle tumours
4 Interpretation of CT and MR scans

**Technical Skills**

Non-fellowship
4 Retrosigmoid approach
1 Subarachnoid dissection and exposure of the tumour and lower cranial nerves
1 Subtotal resection of acoustic neuroma by microsurgical dissection

**Fellowship**
2 Initial Microsurgical resection of tumour

**Professional Skills**

**Generic**
CNS Sepsis

Intracerebral abscess and subdural empyema

Objective
To achieve competence in the management of patients with CNS infections including ventriculitis, cerebral abscess and subdural empyema

Knowledge
4 The aetiology and pathophysiology of intracranial sepsis
4 Indications for burr hole drainage, ventricular drainage and craniotomy in the management of intracranial sepsis
4 Indications for combined otorhinological procedures
4 Applied surgical anatomy
4 Principles of peri-operative care
4 Surgical complications

Clinical Skills
4 The assessment, counselling and pre-operative preparation of patients with intracranial sepsis
4 Interpretation of CT and MRI scans
3 Management of anti-microbial therapy

Technical Skills
4 Burr hole drainage of intracerebral abscess
4 Ventricular drainage
4 Craniotomy for subdural empyema, including frontal and parietal parafalcine approaches
4 Craniotomy and resection of frontal, temporal and cerebellar abscess
3 Anterior and middle fossa extradural and subdural duroplasty

Professional Skills
Generic
## Neurovascular surgery

### Intracranial aneurysms

**Objective**
To achieve competence in the surgical aspects of the multi-disciplinary management of ruptured and unruptured intracranial aneurysms

**Knowledge**
1. Aetiology, epidemiology and natural history of unruptured and ruptured intracranial aneurysms
2. Pathophysiology and general management of subarachnoid haemorrhage
3. Angiographic and microsurgical anatomy of the cerebral circulation
4. Indications for surgical management of intracranial aneurysms by clipping, trapping, microsurgical reconstruction and microvascular bypass
5. Complications of surgery and their management

**Clinical Skills**
1. The assessment, counselling and pre-operative preparation of patients with ruptured and unruptured aneurysms
2. Interpretation of CT, MR and catheter angiography

**Technical Skills**
1. Standard pterional and subfrontal approaches
2. Anterior interhemispheric, fronto-orbital, fronto-zygomatic, temporo-zygomatic, subtemporal, retrosigmoid and far-lateral posterior fossa approaches (fellowship)
3. Anterior circulation aneurysm clipping
4. Saphenous vein and radial artery graft harvest (fellowship)
5. Microsurgical vascular anastomosis (fellowship)

**Professional Skills**

### Intracranial vascular malformations

**Objective**
To achieve competence in the surgical aspects of the multi-disciplinary management of intracranial vascular malformations

**Knowledge**
1. Pathogenesis, aetiology, epidemiology and natural history of intracranial vascular malformations including AVMs, A-V fistula, cavernomas and venous malformations
2. Pathophysiology and general management of intracranial haemorrhage
3. Angiographic and microsurgical anatomy of the cerebral circulation
4. Indications for embolisation and radiosurgery
5. Indications for surgical management of malformations
4 Complications of surgery and their management, including hyperperfusion syndromes

Clinical Skills
4 The assessment, counselling and pre-operative preparation of patients with vascular malformations
4 Interpretation of CT, MR and catheter angiography

Technical Skills
Non-fellowship
1 Image-guided craniotomy and exposure of supratentorial AVM
1 Microsurgical resection of superficial gyral or sulcal AVM

Fellowship
3 Microsurgical resection of superficial gyral or sulcal AVM
2 Microsurgical resection of paraventricular and posterior fossa AVM
2 Image-guided resection of infratentorial cavernoma

Professional Skills
Generic

<table>
<thead>
<tr>
<th>Occlusive cerebrovascular disease</th>
</tr>
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<tbody>
<tr>
<td><strong>Objective</strong></td>
</tr>
<tr>
<td>To achieve competence in the management of occlusive cerebrovascular disease</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Pathophysiology of cerebral ischaemia</td>
</tr>
<tr>
<td>4 Pathogenesis of extracranial atherosclerosis</td>
</tr>
<tr>
<td>4 Epidemiology, investigation and medical management of stroke</td>
</tr>
<tr>
<td>4 Principles of diffusion and perfusion weighted MRI</td>
</tr>
<tr>
<td>4 Principles of PET and HMPAO scanning</td>
</tr>
<tr>
<td>4 Principles of Doppler/duplex ultrasound scanning of extra and intra-cranial vessel</td>
</tr>
<tr>
<td>4 Indications for and operative principles of carotid endarterectomy, carotid angioplasty and stenting</td>
</tr>
<tr>
<td>4 Indications for and operative principles of high and low flow cerebral re-vascularisation</td>
</tr>
<tr>
<td>4 Indications for and operative principles of re-vascularisation by encephalosynangiosis</td>
</tr>
<tr>
<td>4 Surgical complications and their management</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 The assessment, counselling and pre-operative preparation of patients undergoing surgery for occlusive cerebrovascular diseasewith ruptured and unruptured aneurysms</td>
</tr>
<tr>
<td>4 Interpretation of Doppler ultrasound studies</td>
</tr>
<tr>
<td>4 Interpretation of CT, MR and catheter angiography</td>
</tr>
</tbody>
</table>

Technical Skills
Fellowship
3 Carotid endarterectomy
2 Extracranial-intracranial bypass surgery

Professional Skills
## Functional neurosurgery

### Chronic pain

**Objective**

To understand the management of patients with chronic pain syndromes (non-fellowship)

To achieve competence in the surgical aspects of the multi-disciplinary management of patients with chronic pain syndromes (fellowship)

**Knowledge**

**Non-fellowship**

1. The aetiology and pathophysiology of chronic pain syndromes
2. Indications for medical, minimally-invasive and surgical management

**Fellowship**

4. The aetiology and pathophysiology of chronic pain syndromes
4. Indications for medical, minimally-invasive and surgical management
4. Applied surgical anatomy
4. Complications of surgery and their management

**Clinical Skills**

**Fellowship**

4. Surgical aspects of the multi-disciplinary assessment of chronic pain patients
4. Preoperative counselling and preparation

**Technical Skills**

**Fellowship**

4. Dorsal column stimulator
2. DRE2 Lesion
2. Open Cordotomy
2. Deep Brain Stimulation

**Professional Skills**

**Generic**


### Trigeminal neuralgia

**Objective**

To achieve competence in the surgical aspects of the multi-disciplinary management of patients with trigeminal neuralgia and related cranio-facial pain syndromes

**Knowledge**

4. Aetiology, epidemiology and natural history of trigeminal neuralgia
4. Differential diagnosis and management of related cranio-facial pain syndromes

4. Medical management of cranio-facial pain
4. Surface anatomy of the trigeminal nerve and microsurgical anatomy of the CP angle
4. Indications for surgical management of trigeminal neuralgia by
peripheral neurectomy, percutaneous rhizotomy, radiofrequency rhizotomy, microvascular decompression
4 Complications of surgery and their management

Clinical Skills
4 The assessment, counselling and pre-operative preparation of patients with trigeminal neuralgia
4 Interpretation of posterior fossa CT an MR and scans

Technical Skills
Non-fellowship
1 Retrosigmoid microsurgical approach to the CP angle and trigeminal nerve
1 Trigeminal microvascular decompression

Fellowship
3 Percutaneous trigeminal rhizotomy
4 Trigeminal microvascular decompression

Professional Skills

Epilepsy
Objective
To understand the management of patients with idiopathic and lesional epilepsy (non-fellowship)
To achieve competence in the surgical aspects of the multi-disciplinary management of patients with epilepsy (fellowship)

Knowledge
Non-fellowship
2 The aetiology and pathophysiology of idiopathic and lesional epilepsy
2 Indications for medical and surgical management

Fellowship
4 The pathophysiology of idiopathic and lesional epilepsy
4 Indications for medical and surgical management
3 Principles of ictal, interictal, sphenoidal and intraoperative EEG
3 Principles of video-EEG monitoring
4 Applied surgical anatomy
4 Complications of surgery and their management

Clinical Skills
Fellowship
4 Surgical aspects of the multi-disciplinary assessment of epilepsy patients
4 Interpretation of CT, MRI and SPECT scans
4 Preoperative counselling and preparation

Technical Skills
Fellowship
2 Stereotactic placement of depth electrodes
3 Placement of subdural electro-grids
3 Image-guided resection of cortical lesions
3 Mesial temporal resection
### Movement disorders

**Objective**
- To understand the management of patients with movement disorders (non-fellowship)
- To achieve competence in the surgical aspects of the multi-disciplinary management of patients with movement disorders (fellowship)

**Knowledge**
- Non-fellowship
  - 2 The aetiology and pathophysiology of movement disorders
  - 2 Indications for medical, minimally-invasive and surgical management
- Fellowship
  - 4 The aetiology and pathophysiology of movement disorders
  - 4 Indications for medical, minimally-invasive and surgical management
  - 4 Applied surgical anatomy
  - 4 Complications of surgery and their management

**Clinical Skills**
- Fellowship
  - 4 Surgical aspects of the multi-disciplinary assessment of patients with movement disorders
  - 4 Interpretation of CT and MRI scans
  - 4 Preoperative counselling and preparation

**Technical Skills**
- Fellowship
  - 3 Deep brain stimulation
  - 3 Microvasculaue decomposition for hemi-facial spasm

### Spasticity

**Objective**
- To understand the management of patients with chronic pain syndromes (non-fellowship)
- To achieve competence in the surgical aspects of the multi-disciplinary management of patients with chronic pain syndromes (fellowship)

**Knowledge**
- Non-fellowship
  - 2 The aetiology and pathophysiology of spasticity
  - 2 Indications for medical and surgical management
- Fellowship
  - 4 The aetiology and pathophysiology of spasticity
  - 4 Indications for medical, minimally-invasive and surgical management
  - 4 Applied surgical anatomy
| 4 Complications of surgery and their management |
| Clinical Skills |
| Fellowship |
| 4 Surgical aspects of the multi-disciplinary assessment of patients with spasticity |
| 4 Preoperative counselling and preparation |
| Technical Skills |
| 4 Intrathecal drug delivery |
| 3 Deep brain stimulation |
| Professional Skills |
| Generic |
## Spinal Surgery

### Spinal Trauma

<table>
<thead>
<tr>
<th>Cervical spine fracture-subluxation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
</tr>
<tr>
<td>To achieve competence in the general management of fracture-subluxations of the cervical spine (non-fellowship)</td>
</tr>
<tr>
<td>To achieve competence in the operative management of fracture-subluxations of the cervical spine (fellowship)</td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
</tr>
<tr>
<td>Non-fellowship</td>
</tr>
<tr>
<td>4 Pathophysiology of spinal cord injury</td>
</tr>
<tr>
<td>4 Classification of cervical spinal fracture dislocations</td>
</tr>
<tr>
<td>4 Biomechanics of spinal instability</td>
</tr>
<tr>
<td>4 Indications for halo traction and external stabilisation</td>
</tr>
<tr>
<td>4 Indications for and principles of open reduction and stabilisation</td>
</tr>
<tr>
<td><strong>Fellowship</strong></td>
</tr>
<tr>
<td>4 Applied surgical anatomy of cervical fracture-subluxations</td>
</tr>
<tr>
<td>4 Relative indications for operative reduction and stabilisation by anterior and posterior approaches</td>
</tr>
<tr>
<td><strong>Clinical Skills</strong></td>
</tr>
<tr>
<td>4 Clinical assessment of the spinal injury patient</td>
</tr>
<tr>
<td>4 Management of spinal shock</td>
</tr>
<tr>
<td>4 Interpretation of plain radiology, CT and MRI scans</td>
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<td>4 Liaison with spinal injury units</td>
</tr>
<tr>
<td>4 Counselling and pre-operative preparation of spinal injury patients</td>
</tr>
<tr>
<td><strong>Technical Skills</strong></td>
</tr>
<tr>
<td>Non-fellowship</td>
</tr>
<tr>
<td>1 Application of Cranial-cervical traction</td>
</tr>
<tr>
<td><strong>Fellowship</strong></td>
</tr>
<tr>
<td>3 Instrumented stabilisation of subaxial fracture-dislocation by anterior cervical plate and/or lateral mass screws</td>
</tr>
<tr>
<td>2 Instrumented stabilisation of atlanto-axial fracture dislocation by anterior odonto-axial screws and/or posterior atlantoaxial screws/wiring</td>
</tr>
<tr>
<td>4 Application of halo-body jacket</td>
</tr>
<tr>
<td><strong>Professional Skills</strong></td>
</tr>
<tr>
<td><strong>Generic</strong></td>
</tr>
</tbody>
</table>

### Thoraco-lumbar fractures

<table>
<thead>
<tr>
<th>Objective</th>
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</thead>
<tbody>
<tr>
<td>To achieve competence in the general management of thoracolumbar fractures (non-fellowship)</td>
</tr>
<tr>
<td>To achieve competence in the operative management of thoracolumbar</td>
</tr>
<tr>
<td>Knowledge</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>4 Pathophysiology of spinal cord injury</td>
</tr>
<tr>
<td>4 Biomechanics of spinal instability</td>
</tr>
<tr>
<td>Fellowship</td>
</tr>
<tr>
<td>4 Relative indications for operative reduction and stabilisation by anterior and posterior approaches</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical Skills</th>
<th>Non-fellowship</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Clinical assessment of the spinal injury patient</td>
<td>4 Management of spinal shock</td>
</tr>
<tr>
<td>4 Interpretation of plain radiology, CT and MRI scans</td>
<td>4 Liaison with spinal injury units</td>
</tr>
<tr>
<td>4 Counselling and pre-operative preparation of spinal injury patients</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical Skills</th>
<th>Non-fellowship</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Posterior reduction of thoracolumbar fractures by pedicle screw instrumentation and ligamentotaxis</td>
<td></td>
</tr>
<tr>
<td>Fellowship</td>
<td>3 Posterior reduction of thoracolumbar fractures by pedicle screw instrumentation and ligamentotaxis</td>
</tr>
<tr>
<td>2 Combined anterior and posterior reduction and instrumented stabilisation of thoracolumbar fractures</td>
<td></td>
</tr>
</tbody>
</table>

| Professional Skills | Generic |
### Benign Intradural Tumours

#### Intramedullary spinal cord 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

**Clinical Skills**
- Assessment, counselling and pre-operative preparation of patients with intramedullary spinal cord tumours
- Interpretation of spinal MRI scans

**Technical Skills**
- Microsurgical biopsy of intramedullary spinal cord tumour
- Subtotal microsurgical resection of intramedullary tumour

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#### Intradural extramedullary tumours

**Objective**
To achieve competence in the management of patients with intradural extramedullary tumours including schwannomas, 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
- Applied surgical anatomy
- Principles of peri-operative care
- Complications of surgery and their management

**Clinical Skills**
- Assessment, counselling and pre-operative preparation of patients with intradural spinal tumours
- Interpretation of spinal MRI scans

**Technical Skills**
- Microsurgical excision of posterior and postero-lateral intradural extramedullary tumours
- Microsurgical excision of anterior intradural extramedullary tumours

**Generic**
| 4 Duroplasty |
| Professional Skills |
| Generic |
**Malignant Spinal Cord Compression**

<table>
<thead>
<tr>
<th>Malignant spinal cord compression</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
</tr>
<tr>
<td>To achieve competence in the management of patients with malignant secondary spinal cord compression</td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
</tr>
<tr>
<td>4 The pathophysiology of spinal cord compression</td>
</tr>
<tr>
<td>4 The classification, aetiology and natural history of vertebral metastases</td>
</tr>
<tr>
<td>4 Spinal instability associated with vertebral malignancy</td>
</tr>
<tr>
<td>4 Indications for percutaneous and open spinal biopsy</td>
</tr>
<tr>
<td>4 Role of primary radiotherapy and adjuvant radiotherapy or chemotherapy</td>
</tr>
<tr>
<td>4 Indications for spinal decompression with and without instrumented spinal stabilisation</td>
</tr>
<tr>
<td><strong>Clinical Skills</strong></td>
</tr>
<tr>
<td>4 Clinical assessment of patients with malignant spinal cord compression</td>
</tr>
<tr>
<td>4 Interpretation of plain radiology, CT and MRI scans</td>
</tr>
<tr>
<td>4 Liaison with medical oncologists and radiotherapist</td>
</tr>
<tr>
<td>4 Counselling and pre-operative preparation of patients with malignant spinal cord compression</td>
</tr>
<tr>
<td><strong>Technical Skills</strong></td>
</tr>
<tr>
<td>Non fellowship</td>
</tr>
<tr>
<td>4 Decompressive thoracic and lumbar laminectomy with extradural tumour resection</td>
</tr>
<tr>
<td>1 Lumbosacral pedicle screw stabilisation</td>
</tr>
<tr>
<td>1 Anterior cervical corporectomy with anterior column re-construction and anterior cervical plating</td>
</tr>
<tr>
<td>Fellowship</td>
</tr>
<tr>
<td>3 Lumbosacral pedicle screw stabilisation</td>
</tr>
<tr>
<td>3 Thoracic pedicle screw stabilisation</td>
</tr>
<tr>
<td>3 Cervical lateral mass stabilisation</td>
</tr>
<tr>
<td>2 Posterior corporectomy with anterior column replacement and posterior stabilisation</td>
</tr>
<tr>
<td>2 Combined anterior and posterior total vertebrectomy with stabilisation</td>
</tr>
<tr>
<td><strong>Professional Skills</strong></td>
</tr>
<tr>
<td>Generic</td>
</tr>
</tbody>
</table>
### Degenerative Spinal Disorders

#### Lumbar radiculopathies

**Objective**
To achieve competence in the surgical management of lumbar compressive radiculopathies by lumbar microdiscectomies and associated microsurgical decompressions.

**Knowledge**

4. Indications for operative management of lumbar radiculopathies
4. Applied surgical anatomy of the lumbar spine with particular reference to degenerative neural compression and morphological variations in vertebral anatomy
4. Selection of minimally-invasive approaches
4. Principles of peri-operative care
4. Complications of surgery

**Clinical Skills**
4. The assessment, counselling and pre-operative preparation of patients with lumbar radiculopathies
4. Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms

**Technical Skills**
4. Lumbar microdiscectomy
4. Microsurgical lateral recess decompression
4. Posterior decompression (laminotomy, hemilaminectomy etc)
4. Revisional lumbar microsurgical discectomy with and without decompression
4. Microsurgical lumbar discectomy for central disc protrusion with cauda equina compression

**Professional Skills**

Generic

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#### Cervical myeloradiculopathy

**Objective**
To achieve competence in the management of cervical radiculopathy

**Knowledge**

4. Indications for operative management of cervical radiculopathies
4. Applied surgical anatomy of the cervical spinal column, spinal cord, nerve roots and vertebral arteries
4. Selection of surgical approaches
4. Principles of peri-operative care
4. Complications of surgery

**Clinical Skills**
4. The assessment, counselling and pre-operative preparation of patients with cervical myeloradiculopathies
4. Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms

**Technical Skills**

Non-fellowship
<table>
<thead>
<tr>
<th>1</th>
<th>Single and multi-level anterior cervical discectomy with and without fusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Anterior cervical plating</td>
</tr>
<tr>
<td>4</td>
<td>Posterior cervical microforaminotomy and microdiscectomy</td>
</tr>
<tr>
<td>4</td>
<td>Posterior cervical decompression (laminotomy, hemilaminectomy etc.)</td>
</tr>
</tbody>
</table>

**Fellowship**

<table>
<thead>
<tr>
<th>3</th>
<th>Single and multi-level corporectomy with anterior cervical plating</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Anterior cervical discectomy and cervical arthroplasty</td>
</tr>
<tr>
<td>3</td>
<td>Cervical laminectomy with lateral mass and/or pedicle screw stabilisation</td>
</tr>
<tr>
<td>3</td>
<td>Cervical laminoplasty</td>
</tr>
</tbody>
</table>

**Professional Skills**

Generic
### Craniocervical junction disorders

<table>
<thead>
<tr>
<th>Rheumatoid disease</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
</tr>
<tr>
<td>To understand the management of rheumatoid patients with atlanto-axial subluxation, cranial settling and related disorders (non-fellowship)</td>
</tr>
<tr>
<td>To achieve competence in the management of rheumatoid atlanto-axial subluxation, cranial settling and related disorders (fellowship)</td>
</tr>
</tbody>
</table>

**Knowledge**
- 4 The pathology and natural history of rheumatoid spondylopathy
- 4 Indications for operative management of atlanto-axial subluxation, cranial settling and related disorders
- 4 Applied surgical anatomy of the craniocervical junction
- 4 Selection of surgical approaches
- 4 Principles of peri-operative care
- 4 Complications of surgery

**Clinical Skills**
- 4 The assessment, counselling and pre-operative preparation of patients with cervical myeloradiculopathies
- 4 Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms and 3D spinal reconstructions

**Technical Skills**
- 3 Atlanto-axial wiring for reducible atlanto-axial subluxation
- 3 Atlantoaxial stabilisation using transarticular screws or pedicle and lateral mass screws and rods
- 3 Instrumented atlanto-occipital fusion
- 3 Transoral odontoidectomy

**Professional Skills**
- **Generic**

### Hindbrain herniation

<table>
<thead>
<tr>
<th>Hindbrain herniation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
</tr>
<tr>
<td>To achieve competence in the management of craniocervical stenosis and hindbrain herniation</td>
</tr>
</tbody>
</table>

**Knowledge**
- 4 The pathogenesis and natural history of hindbrain herniation, craniocervical stenosis, syringomyelia and syringobulbia
- 4 Indications for foramen magnum decompression
- 4 Applied surgical anatomy of the craniocervical junction
- 4 Selection of surgical approaches
- 4 Principles of peri-operative care
- 4 Complications of surgery

**Clinical Skills**
- 4 The assessment, counselling and pre-operative preparation of patients with hindbrain anomalies
- 4 Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms and 3D spinal reconstructions

**Technical Skills**
- 3 Atlanto-axial wiring for reducible atlanto-axial subluxation
- 3 Atlantoaxial stabilisation using transarticular screws or pedicle and lateral mass screws and rods
- 3 Instrumented atlanto-occipital fusion
- 3 Transoral odontoidectomy
<table>
<thead>
<tr>
<th>myelograms and 3D spinal reconstructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Skills</td>
</tr>
<tr>
<td>3 Foramen magnum decompression</td>
</tr>
<tr>
<td>Professional Skills</td>
</tr>
<tr>
<td>Generic</td>
</tr>
</tbody>
</table>
## Spinal Infection

<table>
<thead>
<tr>
<th>Spinal epidural abscess</th>
<th>Objective</th>
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<tbody>
<tr>
<td></td>
<td>To achieve competence in the operative management of spinal epidural abscess</td>
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</table>

<table>
<thead>
<tr>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 The aetiology and pathophysiology of spinal sepsis</td>
</tr>
<tr>
<td>4 Indications for drainage of spinal epidural abscess by laminectomy and multiple laminotomies</td>
</tr>
<tr>
<td>4 Applied surgical anatomy</td>
</tr>
<tr>
<td>4 Principles of peri-operative care</td>
</tr>
<tr>
<td>4 Surgical complications and their management</td>
</tr>
<tr>
<td>4 Principles of peri-operative care</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 The assessment, counselling and pre-operative preparation of patients with spinal sepsis</td>
</tr>
<tr>
<td>4 Interpretation of spinal CT and MRI scans</td>
</tr>
<tr>
<td>3 Management of anti-microbial therapy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Drainage of spinal epidural abscess by laminectomy and/or multiple laminotomies</td>
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<table>
<thead>
<tr>
<th>Professional Skills</th>
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<tbody>
<tr>
<td>Generic</td>
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</tbody>
</table>

## Vertebral osteomyelitis and discitis

<table>
<thead>
<tr>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>To achieve competence in the operative management of vertebral osteomyelitis and discitis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 The aetiology and pathophysiology of vertebral osteomyelitis and discitis, including pyogenic, tuberculous and atypical infections</td>
</tr>
<tr>
<td>4 Indications for percutaneous and open biopsy</td>
</tr>
<tr>
<td>4 Indications for spinal stabilisation</td>
</tr>
<tr>
<td>4 Principles of peri-operative care</td>
</tr>
<tr>
<td>4 Surgical complications and their management</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 The assessment, counselling and pre-operative preparation of patients with spinal sepsis</td>
</tr>
<tr>
<td>4 Interpretation of spinal CT and MRI scans</td>
</tr>
<tr>
<td>3 Management of anti-microbial therapy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Transpedicular and open vertebral and disc biopsy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Professional Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic</td>
</tr>
</tbody>
</table>
### Peripheral Nerve Surgery

**Carpal tunnel compression**

**Objective**
- To achieve competence in carpal tunnel decompression

**Knowledge**
- Presentation, differential diagnosis and management of carpal tunnel syndrome
- Interpretation of nerve conduction studies
- Indications for surgery
- Applied surgical anatomy

**Clinical Skills**
- Assessment and counselling of patients with carpal tunnel syndrome

**Technical Skills**
- Carpal tunnel decompression

**Professional Skills**
- Generic

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**Ulnar neuropathy**

**Objective**
- To achieve competence in the management of ulnar neuropathy

**Knowledge**
- Presentation, differential diagnosis and management of ulnar neuropathies
- Interpretation of nerve conduction studies
- Indications for surgery
- Applied surgical anatomy

**Clinical Skills**
- Assessment and counselling of patients with an ulnar neuropathy

**Technical Skills**
- Cubital ulnar nerve decompression with and without transposition

**Professional Skills**
- Generic

---

**Peripheral nerve sheath tumours**

**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

**Clinical Skills**
- Assessment and counselling of patients with peripheral nerve sheath tumours
<table>
<thead>
<tr>
<th>Technical Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Microsurgical excision of peripheral nerve sheath tumour</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Professional Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic</td>
</tr>
</tbody>
</table>
### Emergency Paediatric Care

<table>
<thead>
<tr>
<th>Paediatric head injury</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td>Decompressive craniectomy; cranioplasty; management of growing fractures; craniofacial reconstruction; management of CSF fistulae</td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
<td>No content</td>
</tr>
<tr>
<td><strong>Clinical Skills</strong></td>
<td>No content</td>
</tr>
</tbody>
</table>
| **Technical Skills**   | 4 Insertion of EVD  
4 Evacuation of intracranial haematoma (ICH) |
| **Professional Skills**| No content |

<table>
<thead>
<tr>
<th>Paediatric hydrocephalus</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td>To achieve competence in the management of paediatric hydrocephalus</td>
</tr>
</tbody>
</table>
| **Knowledge**            | 4 The pathophysiology of CSF circulation  
4 Applied surgical anatomy of the ventricular system  
4 Indications for external ventricular drainage, lumbar CSF drainage and shunting, ventriculo-cisternostomy  
4 Indications for VP and VA shunting and  
4 Principles of shunt function and selection  
4 Surgical complications and their management |
| **Clinical Skills**      | 4 Assessment of the ill child with hydrocephalus, impaired conciousness and sepsis  
4 Differential diagnosis of shunt malfunction  
4 Interpretation of CT scans in shunted children |
| **Technical Skills**     | Non fellowship | 4 Insertion, tapping and draining from an CSF reservoir  
4 External ventricular drainage including externalisation of VP shunts |
| **Fellowship**           | Competence in all aspects of primary and revisional shunt surgery in children including: | 4 Use of 3-D image-guidance or ultrasound for difficult ventricular cannulation  
4 Intra-operative testing of shunt function  
4 Selection of appropriate shunts  
4 Management of peri-operative ventricular haemorrhage |
<table>
<thead>
<tr>
<th>3</th>
<th>Third ventriculo-cisternostomy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Professional Skills</td>
</tr>
<tr>
<td></td>
<td>Generic</td>
</tr>
</tbody>
</table>
Professional and Generic Skills

Initial

Professional Competencies to be acquired during the initial stage of surgical training.

Medical Expert (Good Clinical Care; Maintaining Good Medical Practice)

The specialty specific knowledge, clinical skills and technical skills and procedures relating to symptoms and conditions that a trainee will encounter during this stage of training are listed separately. The competencies listed below are generic competencies, which underpin the specialty specific competencies.

Skills

- Elicits a history that is relevant, concise, accurate and appropriate to the patient’s problem

Behaviour

- Demonstrates effective consultation skills in presenting well documented assessments and recommendations in written and/or verbal form in response to a request from another healthcare provider
- Demonstrates the attitudes and the skills necessary to retrieve and implement the information necessary to provide healthcare services to patients in meeting the needs and expectations of the community
- Demonstrates insight into his/her limitations by self assessment

Communicator (Good Clinical Care; Maintaining Good Medical Practice)

1. Effective doctor/patient communication

Objective

- To establish a doctor/patient relationship characterised by understanding, trust, respect, empathy and confidentiality
Skills

- Able to gather information regarding the patient’s beliefs, concerns and expectations about the condition and consider the influence of factors such as the patient’s age, gender, ethnic, cultural and socio-economic background and spiritual values on that illness.
- Able to elicit information regarding the beliefs, concerns and expectations of patients with regard to their presenting conditions.
- Able to evaluate factors such as the patient’s age, gender, ethnic, cultural, socio-economic and spiritual values and the impact that these may have on the management of that patient and condition.
- Able to deliver information to the patient and family humanely and in a way that is understandable, encourages discussion and promotes the patient’s participation in decision making to the level appropriate for the situation.
- Able to work with patients who present significant communication challenges such as anger or confusion, or an ethno-cultural background different from the doctor’s own.

1. Communication with Colleagues

Objective

- To appreciate the importance of co-operation with other healthcare professionals involved in patient care and to ensure that the roles of these professionals are clear, consistent, understood by all involved, and that, appropriate and timely information is delivered to patients and their families.

Skills

- Able to communicate effectively with colleagues within and outside of the team
- Able to evaluate the roles and responsibilities of individuals within the clinical team and to ensure that these are understood by all concerned in the context of individual and general patient care.

Collaborator (Good Clinical Care; Working with Colleagues)

Objective

- To achieve competence in the formulation and implementation of appropriate care plans in the clinical situation, in collaboration with members of an interdisciplinary team, incorporating assessment, investigation, treatment and continuing care.
Skills

- To achieve a goal related to patient care, a research problem, an educational activity or an administrative responsibility by using the expertise and being aware of the limitations of all members of an interdisciplinary team

Manager (Working with Colleagues; Probity)

Objective

- To be able to work effectively as a member of a team or a partnership and to accomplish tasks whether one is a team leader or a team member

Health Advocate (Good Clinical Care; Probity)

Objective

- To demonstrate an understanding of determinants of health and public policy in relation to individual patients by identifying the patient’s status with respect to one or more determinants of health (i.e. unemployment)

Skills

- Adapts the assessment and management accordingly (i.e. the medical history to the patient’s social circumstances); and
- Assesses the patient’s ability to access various services in the health and social system and offer appropriate assistance.

Scholar (Maintaining Good Medical Practice; Teaching and Training, Appraising and Assessing; Probity)

1. Clinical

Objective

- To demonstrate a rigorous approach to clinical problem solving

Skills

- Can pose a clinical question
- Recognises and identifies gaps in knowledge and expertise around a clinical question
- Formulates a plan to fill the gap by:
  - conducting an appropriate literature search based upon a clinical question
  - assimilating and critically appraise the literature
• developing a system to store and retrieve relevant literature
• consulting others (physicians and other healthcare professionals) in a collegiate manner
• Proposes a solution to the clinical question
• Implements the solution in practice. Evaluate the outcome and reassess the solution (re-enter the loop at c-i or c-ii)
• Identifies practice areas for research

1. Education and Teaching

Objective

• Can demonstrate an understanding of, and the ability to apply, the principles of adult education, with respect to oneself and others

Skills

• Uses his/her understanding of preferred learning methods in dealing with students, trainees and colleagues

Professional (Relationships with Patients; Probity)

1. Discipline-Based Objectives

Objective

• Displays attitudes commonly accepted as essential to Professionalism

Skills

• Use appropriate strategies to maintain and advance professional competence
• Continually evaluates one’s abilities, knowledge and skills and know one’s limitations of professional competence

1. Personal Professional Boundary Objectives

Objective

• To balance personal and professional roles and responsibilities and to demonstrate ways of attempting to resolve conflicts and role strain

Skills

• Adopts specific strategies to heighten personal and professional awareness and explore and resolve interpersonal difficulties in professional relationships
3. Ethics and Professional Bodies

Objective

- To recognise, analyse and know how to deal with unprofessional behaviours in clinical practice, taking into account local and national regulations

Knowledge

- Knows and understand the professional, legal and ethical codes of the Medical Council and any other codes to which the physician is bound

Skills

- Recognises, analyses and attempts to resolve in clinical practice ethical issues such as truth telling, consent, advanced directives, confidentiality, end-of-life care, conflict of interest, resource allocation, research ethics etc
- Understands and is able to apply relevant legislation that relates to the health care system in order to guide one's clinical practice
- Recognises, analyses and knows how to deal with unprofessional behaviours in clinical practice, taking into account local and national regulations
Intermediate

Professional Competencies to be acquired during the intermediate stage of surgical training. (New competencies are in bold)

<table>
<thead>
<tr>
<th>Medical Expert (Good Clinical Care; Maintaining Good Medical Practice)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The specialty specific knowledge, clinical skills and technical skills and procedures relating to symptoms and conditions that a trainee will encounter during this stage of training are listed separately. The competencies listed below are generic competencies, which underpin the specialty specific competencies.</td>
</tr>
</tbody>
</table>

Skills

- Elicits a history that is relevant, concise, accurate and appropriate to the patient’s problem

Behaviour

- Demonstrates effective consultation skills in presenting well documented assessments and recommendations in written and/or verbal form in response to a request from another healthcare provider
- Demonstrates the attitudes and the skills necessary to retrieve and implement the information necessary to provide healthcare services to patients in meeting the needs and expectations of the community
- Demonstrates insight into his/her limitations by self assessment

<table>
<thead>
<tr>
<th>Communicator (Good Clinical Care; Maintaining Good Medical Practice)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Effective doctor/patient communication</td>
</tr>
</tbody>
</table>

Objective

- To establish a doctor/patient relationship characterised by understanding, trust, respect, empathy and confidentiality

Skills

- Able to gather information regarding the patient’s beliefs, concerns and expectations about the condition and consider the influence of factors such as the patient’s age,
gender, ethnic, cultural and socio-economic background and spiritual values on that illness

Able to elicit information regarding the beliefs, concerns and expectations of patients with regard to their presenting conditions.

Able to evaluate factors such as the patient’s age, gender, ethnic, cultural, socio-economic and spiritual values and the impact that these may have on the management of that patient and condition.

Able to deliver information to the patient and family humanely and in a way that is understandable, encourages discussion and promotes the patient’s participation in decision making to the level appropriate for the situation.

Able to work with patients who present significant communication challenges such as anger or confusion, or an ethno-cultural background different from the doctor’s own.

1. Communication with Colleagues

Objective

To appreciate the importance of co-operation with other healthcare professionals involved in patient care and to ensure that the roles of these professionals are clear, consistent, understood by all involved, and that, appropriate and timely information is delivered to patients and their families.

Skills

Able to communicate effectively with colleagues within and outside of the team
Able to evaluate the roles and responsibilities of individuals within the clinical team and to ensure that these are understood by all concerned in the context of individual and general patient care.

Collaborator (Good Clinical Care; Working with Colleagues)

Objective

To achieve competence in the formulation and implementation of appropriate care plans in the clinical situation, in collaboration with members of an interdisciplinary team, following assessment, investigation, treatment and continuing care.

Skills

To achieve a goal related to patient care, a research problem, an educational activity or an administrative responsibility by using the
expertise and being aware of the limitations of all members of an interdisciplinary team

Manager (Working with Colleagues; Probity)

Objective

- To be able to work effectively as a member of a team or a partnership and to accomplish tasks whether one is a team leader or a team member.

Health Advocate (Good Clinical Care; Probity)

Objective

To demonstrate an understanding of determinants of health and public policy in relation to individual patients by identifying the patient’s status with respect to one or more determinants of health (i.e. unemployment)

Knowledge

- Demonstrates an understanding of determinants of health and public policy in relation to:
  - Practice populations by work with specialty society and other organizations in identifying current “at risk” groups within a given specialty practice and applying the available knowledge about prevention to “at risk” groups within the practice; and contributing “group data” for better understanding of health problems within the population
  - General Population by describing in broad terms the key issues currently under debate regarding changes in the National Health System, indicating how these might affect societal health care outcomes and advocating to decrease the burden of illness (at a community or societal level) of a condition or problem relevant to his/her specialty society, community based advocacy group, or other public education bodies, or private organizations

- Demonstrates an understanding of the determinants of health by identifying the most important determinants of health (i.e. poverty, unemployment, early childhood education, social support systems), being familiar with underlying research evidence, and applying this understanding to common problems and conditions in the trainees specialty

- Demonstrates an understanding of public health policy by describing how public policy is developed; identifying current policies that affect health,
either positively or negatively (i.e. communicable diseases, tobacco, substance abuse); and citing examples of how policy was changed as a result of actions by physicians.

Skills

- Adapts the assessment and management accordingly (i.e. the medical history to the patients social circumstances); and
- Assesses the patient’s ability to access various services in the health and social system and offer appropriate assistance.

Scholar (Maintaining Good Medical Practice; Teaching and Training, Appraising and Assessing; Probity)

1. Clinical

Objective

- To demonstrate a rigorous approach to clinical problem solving

Skills

- Can pose a clinical question
- Recognises and identifies gaps in knowledge and expertise around a clinical question
- Formulates a plan to fill the gap by:
  - conducting an appropriate literature search based upon a clinical question
  - assimilating and critically appraise the literature developing a system to store and retrieve relevant literature
  - consulting others (physicians and other healthcare professionals) in a collegiate manner
- Proposes a solution to the clinical question
- Implements the solution in practice. Evaluate the outcome and reassess the solution
- Identifies practice areas for research

1. Education and Teaching

Objective

- Can demonstrate an understanding of, and the ability to apply, the principles of adult education, with respect to oneself and others.
- To be able to develop and deliver a teaching module or unit and supporting lecture notes for an undergraduate or peer teaching session.
Skills

- Uses his/her understanding of preferred learning methods in dealing with students, trainees and colleagues
- Plans educational activities which clearly set out aims and intended learning outcomes
- Prepares appropriate teaching materials which meet learners’ needs

Behaviours

- Shows a commitment to teaching and learning

2. Research

Objective

- To demonstrate a rigorous approach to research through: a successful application to the ethics committee; or a successfully completing a formal audit application; or presenting to a local mortality and morbidity meeting; or presenting to a national meeting.

Skills

- To be able to pose a research question (clinical, basic or population health)
- Develops a proposal to solve the research question: Conduct an appropriate literature search on
  - the research question
  - Identify, consult and collaborate with appropriate content experts to conduct the research
  - Propose the methodological approach to solve the question
- Carries out the research outlined in the proposal
- Defends and disseminate the results of the research
- Identifies areas for further research that flow from the results

Professional (Relationships with Patients; Probity)

1. Discipline-Based Objectives

Objective

- Displays attitudes commonly accepted as essential to professionalism
Skills

- Use appropriate strategies to maintain and advance professional competence
- Continually evaluates one’s abilities, knowledge and skills and know one’s limitations of professional competence

1. Personal Professional Boundary Objectives

Objective

- To balance personal and professional roles and responsibilities and to demonstrate ways of attempting to resolve conflicts and role strain

Skills

- Adopts specific strategies to heighten personal and professional awareness and explore and resolve interpersonal difficulties in professional relationships

2. Ethics and Professional Bodies

Objective

- To recognise, analyse and know how to deal with unprofessional behaviours in clinical practice, taking into account local and national regulations

Knowledge

- Knows and understand the professional, legal and ethical codes of the Medical Council and any other codes to which the physician is bound

Skills

- Recognises, analyses and attempts to resolve in clinical practice ethical issues such as truth telling, consent, advanced directives, confidentiality, end-of-life care, conflict of interest, resource allocation, research ethics etc
- Understands and is able to apply relevant legislation that relates to the health care system in order to guide one’s clinical practice
- Recognises, analyses and knows how to deal with unprofessional behaviours in clinical practice, taking into account local and national regulations
Final

Professional Competencies to be acquired during the final stage of surgical training. (New competencies are in bold)

<table>
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<th>Medical Expert (Good Clinical Care; Maintaining Good Medical Practice)</th>
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The specialty specific knowledge, clinical skills and technical skills and procedures relating to symptoms and conditions that a trainee will encounter during this stage of training are listed separately. The competencies listed below are generic competencies, which underpin the specialty specific competencies.

Skills

- Elicits a history that is relevant, concise, accurate and appropriate to the patient’s problem

Behaviour

- Demonstrates effective consultation skills in presenting well documented assessments and recommendations in written and/or verbal form in response to a request from another healthcare provider
- Demonstrates the attitudes and the skills necessary to retrieve and implement the information necessary to provide healthcare services to patients in meeting the needs and expectations of the community
- Demonstrates insight into his/her limitations by self assessment
- Demonstrates medical expertise in situations other than those involving direct patient care

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<th>Communicator (Good Clinical Care; Maintaining Good Medical Practice)</th>
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1. Effective doctor/patient communication

Objective

- To establish a doctor/patient relationship characterised by understanding, trust, respect, empathy and confidentiality

Skills

- Able to gather information regarding the patient’s beliefs, concerns and expectations about the condition and consider the influence of factors such as the patient’s age, gender, ethnic,
cultural and socio-economic background and spiritual values on that illness

- Able to elicit information regarding the beliefs, concerns and expectations of patients with regard to their presenting conditions.
- Able to evaluate factors such as the patient’s age, gender, ethnic, cultural, socio-economic and spiritual values and the impact that these may have on the management of that patient and condition.
- Able to deliver information to the patient and family humanely and in a way that is understandable, encourages discussion and promotes the patient’s participation in decision making to the level appropriate for the situation.
- Able to work with patients who present significant communication challenges such as anger or confusion, or an ethno-cultural background different from the doctor’s own.

1. Communication with Colleagues

Objective

- To appreciate the importance of co-operation with other healthcare professionals involved in patient care and to ensure that the roles of these professionals are clear, consistent, understood by all involved, and that, appropriate and timely information is delivered to patients and their families.

Skills

- Communicates effectively with colleagues within and outside of the team
- Evaluates the roles and responsibilities of individuals within the clinical team and to ensure that these are understood by all concerned in the context of individual and general patient care.

Collaborator (Good Clinical Care; Working with Colleagues)

Objective

- To achieve competence in the formulation and implementation of appropriate care plans in the clinical situation, in collaboration with members of an interdisciplinary team, following assessment, investigation, treatment and continuing care.
- To understand how healthcare governance influences patient care, research and educational activities at a local, regional and national level.
Skills

- To achieve a goal related to patient care, a research problem, an educational activity or an administrative responsibility by using the expertise and being aware of the limitations of all members of an interdisciplinary team
- Ability to accept, consider and respect the opinion of others team members, while contributing specialty-specific expertise him/herself in an interdisciplinary team meeting
- Ability to communicate with members of an interdisciplinary team in the resolution of conflicts, provide feedback, and where appropriate, assume a leadership role

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Objectives

- To be able to work effectively as a member of a team or a partnership and to accomplish tasks whether one is a team leader or a team member.

- To make clinical decisions and judgments based upon sound evidence for the benefit of individuals and the population served.

Skills

- Is able to function effectively in a healthcare organization from individual clinical practice to organisations at the local, regional and national level
- Through understanding the structure, financing, and operation of the NHS and its facilities, is able to function effectively within it playing an active role in its change
- Ability to access and apply a broad base of information to the care of patients in community care, hospital and other healthcare settings
- Uses population based approaches to healthcare services and recognises their implication for medical practice
- Uses planning, budgeting, evaluation to maximise the outcomes of a patient care

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Objective

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status with respect to one or more determinants of health (i.e. unemployment)

Skills

- Adapts the assessment and management accordingly (i.e. the medical history to the patient's social circumstances); and
- Assesses the patient's ability to access various services in the health and social system and offer appropriate assistance.

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<tr>
<td>o To supervise and mentor learners (trainees) in a work setting.</td>
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• To teach trainees in a work setting

Skills

- Uses his/her understanding of preferred learning methods in dealing with students, trainees and colleagues
- Plans educational activities which clearly set out aims and intended learning outcomes
- Prepares appropriate teaching materials which meet learners’ needs
- Provides effective feedback to learners
- Optimises opportunistic teaching and learning in Operating theatre
  - Bedside
  - Outpatients
- Can highlight ways in which their clinical teaching might be improved
- Able to evaluate the use of reflective practice, learning agreements, portfolios and journals
- Uses different methods of assessment appropriate to what is being assessed e.g. knowledge, skills, judgment and professionalism
- Can differentiate between appraisal and assessment

Behaviours

- Shows a commitment to teaching and learning
- Shows a willingness to supervise the work of less experienced colleagues
- Shows sensitivity to the needs of learner and responds appropriately.

3. Research

Objective

To demonstrate a rigorous approach to research through: the publication of a paper in a peer review journal; or participation in a systematic review with defined outcomes; publishing guidance at trust, regional, specialty or national level.

Skills

- To be able to pose a research question (clinical, basic or population health)
- Develops a proposal to solve the research question: Conduct an appropriate literature search on the research question
  - Identify, consult and collaborate with appropriate
content experts to conduct the research
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- Recognises, analyses and knows how to deal with unprofessional behaviours in clinical practice, taking into account local and national regulations.