

**SPECIALTY TRAINING CURRICULUM**

**FOR**

**CLINICAL NEUROPHYSIOLOGY**

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(WITH AMENDMENTS AUGUST 2012)

**Joint Royal Colleges of Physicians Training Board**

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## **1 Introduction**

Clinical Neurophysiology is a diagnostic specialty, which encompasses the use of electroencephalography (EEG), electromyography (EMG), nerve conduction studies (NCS), and evoked potentials (EP) to assess function in the nervous system. The Training Programme in Clinical Neurophysiology will equip trainees with the necessary knowledge and skill to become consultants providing the highest standards of service to patients who require Clinical Neurophysiological investigations. Implicit in the educational process is the need to develop positive attitudes towards lifelong learning, such that the practising consultant can adapt to technological advances and clinical developments.

The trainee will be taught how to apply Clinical Neurophysiological investigations in clinical practice and in clinical context, and the interaction of these investigations with procedures used by other disciplines, such as neuroradiology, neuroimmunology and neuropathology, to evaluate nervous system structure and function. Competence in Clinical Neurophysiology is underpinned by understanding of a wide range of relevant clinical conditions, as well as basic science, technology, electronics and data processing. Many medical and surgical specialities utilise Clinical Neurophysiology, and background knowledge/experience of neurology, paediatrics, neurosurgery, orthopaedics, rheumatology and ophthalmology is particularly desirable. Acquisition of good communication and reporting skills is essential.

The ability to work in a multidisciplinary team with clinical physiologists, clinical scientists, medical engineers and other ancillary staff, and to provide leadership where appropriate, is fundamental to the Clinical Neurophysiologist. Additionally, the trainee will need to develop teaching skills, which encompass this broad range of health care professionals, as well as undergraduates and postgraduates in medicine.

## **2 Rationale**

### **2.1 Purpose of the curriculum**

The purpose of this curriculum is to define the process of training and the competencies needed for the award of a certificate of completion of training (CCT) in Clinical Neurophysiology. The curriculum is also to inform trainers and trainees of the intended aims and objectives, content, experiences, outcomes and processes of the educational programme to train a specialist in Clinical Neurophysiology.

The curriculum describes the competencies required to complete a Certificate in Training (CCT) and to be registered on the Specialist Register in Clinical Neurophysiology. The CCT specialist will have the knowledge, skills and behaviours required to be able to work as a consultant specialist within the National Health Service.

The Curriculum sets out the entry requirements, duration of training and structure of the programme and the methods of learning, teaching, assessment, feedback and supervision expected. The curriculum covers training for all four nations of the UK.

### **2.2 Development**

This curriculum was developed by the Specialty Advisory Committee for Clinical Neurophysiology under the direction of the Joint Royal Colleges of Physicians Training Board (JRCPTB). It replaces the previous version of the curriculum dated May 2007, with changes to ensure the curriculum meets GMC's standards for

Curricula and Assessment, and to incorporate revisions to the content and delivery of the training programme. Major changes from the previous curriculum include the incorporation of leadership, health inequalities and common competencies.

This document has been revised in 2009 from the previous curriculum by a working group of the SAC in Clinical Neurophysiology comprising members of the committee, consultants in the specialty with experience of developing curriculum and assessment methods, representatives of the current trainees and lay members. The process was informed by a survey of trainees experience in different aspects of the subject and discussion at national meetings of the British Society of Clinical Neurophysiology, attended by educational supervisors, programme directors, trainees and consultants in the specialty. Particular attention has been given to ensuring that the knowledge, skills and behaviours outlined in the curriculum are relevant to the current practice of Clinical Neurophysiology.

### **2.3 Training Pathway**

Specialty training in Clinical Neurophysiology consists of core and higher speciality training. Core training provides physicians with: the ability to investigate, treat and diagnose patients with acute and chronic medical symptoms; and with high quality review skills for managing inpatients and outpatients. Higher speciality training then builds on these core skills to develop the specific competencies required to practise independently as a consultant in Clinical Neurophysiology

Core training may be completed in a Core Medical Training (CMT), Acute Care Common Stem (ACCS) or Level 1 training in core paediatrics programme. The full curriculum for specialty training in Clinical Neurophysiology therefore consists of:

- the curriculum for CMT
- or the curriculum for ACCS
- or the Framework of Competences for Level 1 Training in Paediatrics

plus

- this training curriculum for Clinical Neurophysiology

The approved curriculum for CMT is a sub-set of the Curriculum for General Internal Medicine (GIM). A “Framework for CMT” has been created for the convenience of trainees, supervisors, tutors and programme directors. The body of the Framework document has been extracted from the approved curriculum but only includes the syllabus requirements for CMT and not the further requirements for acquiring a CCT in GIM.

There are common competencies that should be acquired by all physicians during their training period starting within the undergraduate career and developed throughout the postgraduate career, for example communication, examination and history taking skills. These are initially defined for CMT and then developed further in the specialty. This curriculum supports the spiral nature of learning that underpins a trainee’s continual development. It recognises that for many of the competences outlined there is a maturation process whereby practitioners become more adept and skilled as their career and experience progresses. It is intended that doctors should recognise that the acquisition of basic competences is often followed by an increasing sophistication and complexity of that competence throughout their career. This is reflected by increasing expertise in their chosen career pathway.

Clinical Neurophysiology welcomes applications with other training backgrounds. These applicants will need to achieve core general medical competencies at ST1 and

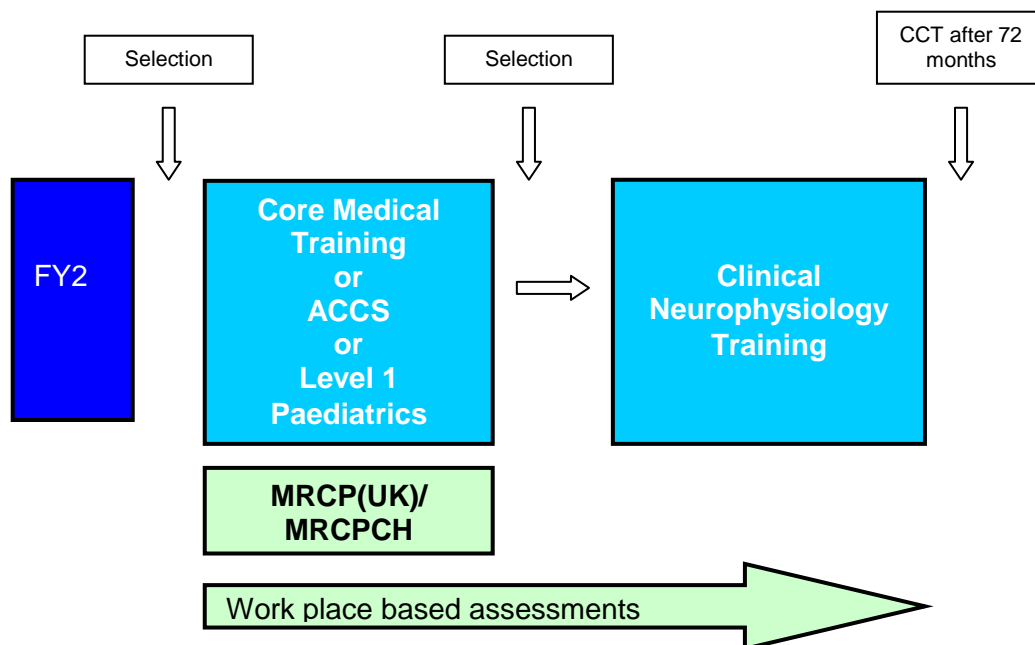
ST2 levels before entering Clinical Neurophysiology specialty training. Trainees are required to have completed the MRCP or MRCPCH diploma by the end of year ST2 to enable progress to speciality training.

## 2.4 Enrolment with JRCPTB

Trainees are required to register for specialist training with JRCPTB at the start of their training programmes. Enrolment with JRCPTB, including the complete payment of enrolment fees, is required before JRCPTB will be able to recommend trainees for a CCT. Trainees can enrol online at [www.jrcptb.org.uk](http://www.jrcptb.org.uk)

## 2.5 Duration of training

Although this curriculum is competency based, the duration of training must meet the European minimum of four years for full time specialty training adjusted accordingly for flexible training (EU directive 2005/36/EC). The SAC has advised that training from ST1 will usually be completed in 6 years in full time training (2 years core plus 4 years specialty training).



## 2.6 Less Than Full Time Training (LTFT)

Trainees who are unable to work full-time are entitled to opt for less than full time training programmes. EC Directive 2005/36/EC requires that:

- LTFT shall meet the same requirements as full-time training, from which it will differ only in the possibility of limiting participation in medical activities.
- The competent authorities shall ensure that the competencies achieved and the quality of part-time training are not less than those of full-time trainees.

The above provisions must be adhered to. LTFT trainees should undertake a pro rata share of the out-of-hours duties (including on-call and other out-of-hours commitments) required of their full-time colleagues in the same programme and at the equivalent stage.

EC Directive 2005/36/EC states that there is no longer a minimum time requirement on training for LTFT trainees. In the past, less than full time trainees were required to work a minimum of 50% of full time. With competence-based training, in order to

retain competence, in addition to acquiring new skills, less than full time trainees would still normally be expected to work a minimum of 50% of full time. If you are returning or converting to training at less than full time please complete the LTFT application form on the JRCPTB website [www.jrcptb.org.uk](http://www.jrcptb.org.uk) .

Funding for LTFT is from deaneries and these posts are not supernumerary. Ideally therefore 2 LTFT trainees should share one post to provide appropriate service cover.

Less than full time trainees should assume that their clinical training will be of a duration pro-rata with the time indicated/recommended, but this should be reviewed during annual appraisal by their TPD and chair of STC and Deanery Associate Dean for LTFT training. As long as the statutory European Minimum Training Time (if relevant), has been exceeded, then indicative training times as stated in curricula may be adjusted in line with the achievement of all stated competencies.

## **2.7 Dual CCT**

Trainees who wish to achieve a CCT in Neurology as well as Clinical Neurophysiology must have applied for and successfully entered a training programme which was advertised openly as a dual training programme. Trainees will need to achieve the competencies, with assessment evidence, as described in both the Clinical Neurophysiology and Neurology curricula. Individual assessments may provide evidence towards competencies from both curricula. Postgraduate Deans wishing to advertise such programmes should ensure that they meet the requirements of both SACs.

Alternatively, trainees may apply in open competition for a post in the second specialty, having completed training in the first. If successful, the Specialist Advisory Committee would advise on how much time and competence from the first specialty training could be allowed towards the second. Normally trainees having successfully completed a training programme in Neurology will require 2 further years in Clinical Neurophysiology to achieve dual CCT.

## **3 Content of learning**

### **3.1 Programme content and objectives**

The content of the specialist syllabus is set out in detail to include basic and advanced areas of Electroencephalography, Evoked Potentials and Peripheral Neurophysiological techniques, as well as a supporting framework of neuroscience, health and safety, information, management and Neurology. The Specialty syllabus outlines required competencies to be acquired by the trainee, expressed in terms of knowledge, skills, and behaviours.

The educational process in Clinical Neurophysiology aims to produce physicians who:

1. Execute basic neurophysiological techniques competently, as well as more advanced techniques (see summary of syllabus, section 3.3).
2. Are able to act as independent practitioners who can make a clinical assessment where necessary; formulate a differential diagnosis; choose relevant techniques appropriate to the clinical context; and interpret and report on the results.

3. Understand basic relevant science including physics and electronics, and are competent in information technology.
4. Have managerial and leadership skills appropriate to administration of a department of Clinical Neurophysiology, including evaluation of equipment and preparation of bids for funding.
5. Have the values, behaviours and relationships with patients and colleagues that underpin medical professionalism and good medical practice.

### **3.2 Good Medical Practice**

In preparation for the introduction of licensing and revalidation, the General Medical Council has translated Good Medical Practice into a Framework for Appraisal and Assessment which provides a foundation for the development of the appraisal and assessment system for revalidation. The Framework can be accessed at [http://www.gmc-uk.org/Framework\\_4\\_3.pdf\\_25396256.pdf](http://www.gmc-uk.org/Framework_4_3.pdf_25396256.pdf)

The Framework for Appraisal and Assessment covers the following domains:

Domain 1 – Knowledge, Skills and Performance

Domain 2 – Safety and Quality

Domain 3 – Communication, Partnership and Teamwork

Domain 4 – Maintaining Trust

The “GMP” column in the syllabus defines which of the 4 domains of the Good Medical Practice Framework for Appraisal and Assessment are addressed by each competency. Most parts of the syllabus relate to “Knowledge, Skills and Performance” but some parts will also relate to other domains.

### **3.3 Syllabus**

In the tables below, the “Assessment Methods” shown are those that are appropriate as **possible** methods that could be used to assess each competency. It is not expected that all competencies will be assessed and that where they are assessed not every method will be used. See section 5.2 for more details.

“GMP” defines which of the 4 domains of the Good Medical Practice Framework for Appraisal and Assessment are addressed by each competency. See section 3.2 for more details.

Where there is a \* in the syllabus this competency will be assessed, in the future, by a knowledge-based assessment method.

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# 1. MANAGEMENT FOR CLINICAL NEUROPHYSIOLOGISTS

To enable the trainee to lead and manage a department of Clinical Neurophysiology and represent it in the wider health environment

Knowledge	Assessment Methods	GMP
Training system, career structure, clinical and managerial roles of Clinical Physiologists and Clinician Scientists	CbD, *	1,2,3
Costing of investigations and departments, financial targets and commissioning for Clinical Neurophysiology	CbD, *	1,2,3
Resource management of physical and staff capacity, and implications for workflow and non-financial targets	CbD, *	1,2,3
National and international quality standards	CbD, *	1,2,3
Skills		
Understands how to manage a departmental budget	CbD, *	1
Appreciates the process of advising purchasers and providers on commissioning and tendering to different manufacturers	CbD, *	1
Maintains quality control of laboratory aspects of Clinical Neurophysiology including maintenance of equipment, and liaising with engineers	CbD, *	1,2
Maintains confidentiality and security of recorded data, clinical databases and paper notes	CbD, *	1,4
Contributes to integrated care with other clinical teams	CbD	1,3
Provides leadership for the Clinical Neurophysiology team of physicians, Health Care Scientists, secretaries.	CbD	1,3
Understands the training structures and educational requirements of Health Care Scientists in Clinical Neurophysiology and assists in development of Health Care Scientist careers, in conjunction with the Service Lead.	CbD, *	1,3
Delegates effectively and ensures proper supervision of staff	CbD	1,3
Behaviours		
Works with colleagues to best serve patient interests	MSF	1,3,4
Acts with honesty and is trustworthy	MSF	1,3,4
Puts into effect systems to protect patients and improve health care	MSF	1,3,4

## 2. COMMON SKILLS FOR CLINICAL NEUROPHYSIOLOGY

**To demonstrate the personal qualities required to plan, deliver and develop Clinical Neurophysiology services.**

Knowledge	Assessment Methods	GMP
Systems which help the trainee and others to manage time and workload effectively, including prioritization and delegation	*	1, 3
Mechanisms for service and technological development	*	1,2,3
Continuous medical education, development and life long learning	*	1
Factors' adversely affecting a doctor's and team performance and methods to rectify these.	*	1,2,4
The local process for agreeing staff leave (annual/professional/sick/carer) to ensure adequate staffing.	*	1,3
Processes required for appraisal, revalidation and job planning.	*	1,4
Skills		
Identify own strengths and weaknesses.	MSF, PS	1,3,4
Develops understanding of personality styles and how different profiles fit into a team.	*	1,3
Demonstrates personal commitment to improve own performance in light of feedback and assessment.	MSF, PS	1,3,4
Regularly reviews and re-prioritises personal and team work load.	MSF	1,3
Obtains and acts upon feedback from variety of sources.	MSF	1,3
Works effectively with other professionals and support workers.	MSF	1,3
Participates in interdisciplinary team meetings.	MSF	1,3
Aware of the trainee's own values and principles and how these may differ from those of other individuals and groups.	MSF	1,3,4
Identifies clinical and clerical tasks requiring attention.	MSF	1,3
Estimates the time likely to be required for essential tasks and plans accordingly.	MSF	1,3
Organises and manages workload effectively and flexibly.	MSF	1,3
Shows willingness to act as a leader, mentor, educator and role model.	MSF	1,3
Behaviours		
Displays self awareness, being aware of own values, principles, assumptions, and by being able to learn from experiences.	MSF	1, 3
Remains calm in stressful or high pressure situations and adopts a timely, rational approach.	MSF	1,3
Recognises when self or others are falling behind and take steps to rectify the situation.	MSF	1,3,4
Demonstrates self management, organising and managing themselves while taking account of the needs and priorities of others.	MSF	1,3,4
Learns through participating in continuing professional development and from experience and feedback.	MSF	1,3

Acts with integrity, behaving in an open and ethical manner.	MSF	1,3,4
Reflects regularly on own standards of medical practice in accordance with guidance on licensing and revalidation.	MSF	1,4

## Audit and Clinical Governance

<b>To understand Audit and Clinical Governance for Clinical Neurophysiology</b>		
<b>Knowledge</b>		
The different methods of obtaining data for audit including patient feedback questionnaires, service sources and national reference data.	MSF, AA	1,2,3
The role of audit (improving patient care and services, risk management), and the steps involved in completing the audit cycle.	MSF, AA	1,2,3
Local clinical governance and complaints procedures.	MSF, *	1,2,4
The principles of risk assessment and management.	MSF, *	1,2,4
The investigation of significant events, serious untoward incidents and near misses, and learning from clinical incidents	MSF, *	1,2,4
<b>Skills</b>		
Able to design, implement, complete and report audit cycles, and to participate in local and national audit.	MSF, AA	1,3
Understands in clinical governance and to quality improvement processes	MSF, AA	1
Audit of personal and departmental/directorate/practice performance	MSF, AA	1
Errors / discrepancy meetings	MSF, AA	1
Critical incident and near miss reporting	MSF, AA	1
Local and national databases.	MSF, AA	1
<b>Behaviours</b>		
Contributes to local and national audit	AA	1, 3,4
Participates in clinical governance activities	AA	1,4

## Teaching and Training

<b>To develop the ability to teach to a variety of different audiences in a variety of different ways</b> <b>To be able to assess the quality of the teaching</b> <b>To be able to train a variety of different trainees in a variety of different ways</b> <b>To be able to plan and deliver a training programme with appropriate assessments</b>		
<b>Knowledge</b>	<b>Assessment Methods</b>	<b>GMP</b>
Describes relevant educational theories and principles	CbD	1
Demonstrates knowledge of literature relevant to developments and challenges in medical education and other sectors	CbD	1
Outlines the structure of an effective appraisal interview	CbD	1
Defines the roles of the various bodies involved in medical education and other sectors	CbD	1
Differentiates between appraisal and assessment and performance review and is aware of the need for both	CbD	1
Outlines the role of workplace-based assessments, the assessment tools in use, their relationship to course learning outcomes, the factors that influence their selection and the need for monitoring evaluation	CbD	1
Outlines the appropriate local course of action to assist a trainee experiencing difficulty in making progress within their training programme	CbD	1
<b>Skills</b>		
Is able to critically evaluate relevant educational literature	CbD	1
Varies teaching format and stimulus, as appropriate to situation and subject	CbD, TO	1
Provides effective and appropriate feedback after teaching, and promotes learner reflection	CbD, MSF	1
Conducts developmental conversations as appropriate, for example, appraisal, supervision, mentoring	CbD, MSF	1
Demonstrates effective lecture, presentation, small group and bedside teaching sessions	CbD, MSF, TO	1, 3
Provides appropriate career support, or refers trainee to an alternative effective source of career information	CbD, MSF	1, 3
Participates in strategies aimed at improving patient education e.g. talking at support group meetings	CbD, MSF, TO	1
Is able to lead departmental teaching programmes, including journal clubs	CbD, TO	1
Recognises the trainee in difficulty and takes appropriate action, including where relevant referral to other services	CbD	1
Is able to identify and plan learning activities in the workplace	CbD, TO	
<b>Behaviour</b>		
In discharging educational duties acts to maintain the dignity and safety of patients at all times	CbD, MSF, TO	1, 4
Recognises the importance of the role of the physician as an educator within the multi-professional healthcare team and uses	CbD, MSF	1

medical education to enhance the care of patients		
Balances the needs of service delivery with education	CbD, MSF	1
Demonstrates willingness to teach trainees and other health and social workers in a variety of settings to maximise effective communication and practical skills and to improve patient care	CbD, MSF, TO	1
Encourages discussions with colleagues in clinical settings to share knowledge and understanding	CbD, MSF, TO	1, 3
Maintains honesty and objectivity during appraisal and assessment	CbD, MSF	1
Shows willingness to participate in workplace-based assessments and demonstrates a clear understanding of their purpose	CbD, MSF	1
Shows willingness to take up formal training as a trainer and responds to feedback obtained after teaching sessions	CbD, MSF, TO	1, 3
Demonstrates a willingness to become involved in the wider medical education activities and fosters an enthusiasm for medical education activity in others	CbD, MSF, TO	1
Recognises the importance of personal development as a role model to guide trainees in aspects of good professional behaviour	CbD, MSF	1
Demonstrates a willingness to advance own educational capability through continuous learning	CbD, MSF	1

### 3. TECHNOLOGY

<b>To understand and utilise the technology which underpins practice of Clinical Neurophysiology</b>		
<b>Knowledge</b>	<b>Assessment Methods</b>	<b>GMP</b>
Measurement techniques, electrodes and transducers	*	1,2
Analogue-to-digital and digital-to-analogue conversion, effects of time and voltage resolution, aliasing	*	1,2
Amplifiers and their characteristics	*	1
Stimulators	*	1,2
Signal processing including: averaging; trigger and delay techniques; Fourier and spectral analysis; brain mapping	*	1
Component parts of recording systems	*	1
Computer technology	*	1
Information technology including Data Protection Act, general and specialised software used in departments, analysis and research tools	*	1,2
Simple testing and repair of equipment	*	1,2
Safety and legal issues surrounding equipment	*	1,2
<b>Skills</b>		
Makes rational purchasing decisions of recording and administrative systems	*	1,3
Designs, implements and monitors safety standards	*	1,2,4
Recognises artefacts	DOPS, *	1
Assesses and utilises new technologies	DOPS, *	1
Participates in supervision and training of non medical and medical staff in basic technology	*	1,3
Observes legal and professional requirements for safe use of technology	*	1,2,4
<b>Behaviours</b>		
Keeps knowledge current by continuous medical education	MSF	1
Knows limits of own knowledge and when to seek assistance	MSF	1

## 4. HEALTH AND SAFETY

<b>To enable the trainee to be conversant with and implement measures that ensures the safe working of a Department of Clinical Neurophysiology for staff and patients</b>		
<b>Knowledge</b>	<b>Assessment Methods</b>	<b>GMP</b>
Hazards relating to the use of medical equipment (electrical and magnetic)	DOPS, *	1,2
Hygiene and sterilisation procedures, procedures for prevention of cross infection including MRSA, Hepatitis B, HIV, prion diseases including CJD	*	1,2
Control of substances hazardous to health (COSHH regulations)	*	1,2
Procedures relating to specific clinical situations: pacemakers, anti-coagulant therapy, theatre work, withdrawal of anti-epileptic medication	*, DOPS	1,2
Manual handling	*	1,2
Needle stick injury - prevention and action on occurrence	*, DOPS	1,2
<b>Skills</b>		
Demonstrates safe practice of clinical procedures and when using equipment in a range of clinical settings	DOPS	1,2,3
<b>Behaviours</b>		
Makes patient and staff safety the top priority	MSF	1,2,3,4
Assures quality by clinical governance and significant event reporting	MSF	1,2,3,4
Follows local and national health and safety guidelines	MSF	1,2,3,4



## 5. BASIC NEUROSCIENCE

<b>To acquire and reinforce knowledge of basic neuroanatomy, neurophysiology, neuropharmacology and neuropathology</b>		
<b>Knowledge</b>	<b>Assessment Methods</b>	<b>GMP</b>
<b>Neuroanatomy</b>	*	1
Knowledge of the major subdivisions of the central and peripheral nervous systems		
Fibre tracts and nuclei	*	1
Cortical subdivision and function	*	1
Visual, sensory, auditory and motor pathways	*	1
Basal ganglia	*	1
Cerebellum	*	1
Autonomic nervous system	*	1
Vascular supply to the brain	*	1
Maturation of the nervous system	*	1
<b>Neurophysiology</b>	*	1
Basic knowledge of nerve conduction from ion channel function to the massed responses of nerve trunks, fibre tracts and nuclei.		
Synaptic function (inhibitory and excitatory) and the neuromuscular junction.	*	1
Different motor unit types.	*	1
Motor control and the cerebellum.	*	1
Visual, auditory and somatosensory physiology from receptor to cortex.	*	1
Biophysics of nerve stimulation (electrical and magnetic) and recording	*	1
<b>Neuropharmacology</b>	*	1
Central nervous system neurotransmitters and drugs which modulate them.		
Mode of action of drugs affecting the central and peripheral nervous systems	*	1
<b>Neuropathology</b>	*	1
Reactions of peripheral and central nervous systems to disease: tumours, infections, inflammation, infarction and immune mediated mechanisms.		
Demyelination and degeneration in the central nervous system; ephaptic transmission	*	1
Pathophysiology of epilepsy; mechanisms of excessive or hypersynchronous neural activity and of the generalised cortico-reticular epilepsies.	*	1
Demyelination, degeneration and regeneration in the peripheral nervous system.	*	1

How nerve conduction can be affected by pathology, particularly axonal degeneration and demyelination; how these two basic types of neuropathic abnormalities may be differentiated, and how they may overlap and inter-relate.	*, DOPS	1
Changes in nerve conduction and needle EMG in neuropathic and myopathic conditions	*, DOPS	1
Temporal evolution of EMG and nerve conduction findings after complete and partial nerve injury.	*, DOPS	1
Different patterns of neuropathies and the ways in which peripheral neuropathies may present (diffuse sensori-motor predominantly sensory, predominantly motor (with conduction block), multifocal.	*, DOPS	1
Patterns and distribution of myopathic disorders.	*, DOPS	1
Pre- and post-synaptic defects of neuromuscular transmission	*, DOPS	1
<b>Skills</b>		
interprets the findings of Clinical Neurophysiology investigations at their most basic level i.e. localisation in the nervous system and the mechanisms of pathogenesis	*, DOPS	1
<b>Behaviours</b>		
Maintains knowledge by continuing medical education	MSF	1, 2,4
Participates in basic neuroscience teaching sessions, at national, regional and local levels	KSF, *	1,2,4

## 6. NEUROLOGY

### CORE NEUROLOGICAL COMPETENCIES

#### History Taking

To enable the trainee to a clinical history focussing on the patient's complaint		
Knowledge	Assessment Methods	GMP
Scope of the neurological history.	mini-CEX, CbD	1,2,3,4
Understanding of the differences between open and closed questioning	mini-CEX, CbD	1,2,3,4
Recognises the importance of social and cultural issues and practices that may have an impact on health	mini-CEX, CbD	1,2,3,4
Skills		
Takes an appropriate, focussed and comprehensive history, including where appropriate information from others, and communicates this verbally or in writing and in summary form.	mini-CEX, CbD	1,2,3,4
Communicates effectively with patients from diverse backgrounds and those with special communication needs, such as the need for interpreters	mini-CEX, CbD	1,3,4
Where values and perceptions of health and health promotion conflict, facilitates balanced and mutually respectful decision making	mini-CEX, CbD	1,3,4
Behaviour		
Listens to and deals with complex patients (e.g. angry or distressed patient).	mini-CEX, CbD, MSF	1,2,3,4
Uses of an interpreter appropriately for patients & families when English is not their first language.	mini-CEX, MSF	1,2,3,4

## Neurological Examination

To enable the trainee to elicit the neurological signs relevant to the patient's complaint		
	Assessment Methods	GMP
<b>Knowledge</b>		
The scope of neurological signs, particularly relating to the conditions regularly encountered by clinical neurophysiologists (diseases of the peripheral nervous system, disorders of consciousness and multiple sclerosis)	mini-CEX, CbD	1,2,3,4
<b>Skills</b>		
Undertakes an appropriate, focussed and comprehensive examination of mental and physical state and communicates this verbally or in writing and in summary form.	mini-CEX, CbD	1, 2,3,4
Comprehends constraints (including those that are cultural or social) to performing physical examination and strategies that may be used to overcome them	mini-CEX, CbD	1,,3,4
<b>Behaviour</b>		
Uses a chaperone where appropriate	mini-CEX, CbD, MSF, PS	1,2,3,4
Respects patient's personal dignity	mini-CEX, CbD, MSF, PS	1,2,3,4

## Communication Skills

To enable the trainee to communicate the clinical aspects of a patient's condition to the patient and other health care workers		
Knowledge	Assessment Methods	GMP
Communication in the English language, verbally and in writing.	mini-CEX, CbD	1,2,3,4
Skills		
Produces legible case notes.	mini-CEX, CbD, MSF	1,2,3,4
Negotiates with patients, relatives and fellow healthcare professionals	mini-CEX, CbD, MSF	1,2,3,4
Dictates reports and other clinical correspondence	mini-CEX, CbD, MSF	1,2,3,4
Shows consideration and time to those with visual, auditory and other impairments.	mini-CEX, CbD, MSF	1,2,3,4
Respond to people in an ethical, honest and non-judgmental manner	mini-CEX, CbD, MSF	1,2,3,4
Adopt assessments and interventions that are inclusive, respectful of diversity and patient-centred	mini-CEX, CbD, MSF	1,2,3,4
Listen actively and question sensitively to guide the patient and to clarify information in particular with regard to matters that they may find it difficult to discuss, e.g. domestic violence or other abuse	mini-CEX, CbD, MSF	1, 3, 4
Identify opportunities to promote changes in lifestyle and other actions which will positively improve health, e.g. to encourage smoking cessation and/or weight reduction	mini-CEX, CbD, MSF	1,2,3,4
Work collaboratively with other agencies, e.g. occupational health service, to improve the health of individual patients and communities, and help patients to remain at or return to work whenever appropriate	mini-CEX, CbD, MSF	1, 3
Encourage patients to remain at or return to work whenever appropriate	mini-CEX, CbD, MSF	1, 3
Behaviour		
Communicates effectively with patients, their family and carers and other staff with appropriate regard for confidentiality.	MSF	1,2,3,4
Considers cultural, religious & educational background of individuals	MSF	1,2,3,4
Gives a prognosis, explains the patient's condition, breaks bad news, obtains full and informed consent for investigations and treatment in a way that can be understood by the patient.	MSF	1,2,3,4
Summarises the clinical case in a coherent manner to clinical colleagues.	MSF	1,2,3,4

## Differential Diagnosis, Investigation and Initial Management

To enable the trainee to appreciate clinical management decision making with particular relevance to the role of Clinical Neurophysiology

Knowledge	Assessment Methods	GMP
The different presentations of common and less common neurological diseases.	mini-CEX, CbD	1,2,3,4
The roles and usefulness of investigations including neuro-imaging	mini-CEX, CbD	1,2,3,4
Skills		
Formulates an appropriately ordered differential diagnosis based on an appreciation of the patient, the past history and current problems and their likely causes.	mini-CEX, CbD	1,2,3,4
Gives consideration for different racial, social & ethnic groups.	mini-CEX, CbD	1,2,3,4
Formulates a focussed and relevant series of investigations.	mini-CEX, CbD	1,2,3,4
Behaviours		
Plans and requests appropriate observations, liaises with members of the MDT, determines and prescribes immediate treatment, seeks appropriate opinions and interventions and with others, develops an overall plan for the individual patient.	MSF, PS	1,2,3,4
Demonstrates leadership skills including mentorship of junior medical colleagues.	MSF, PS	1,2,3,4

## 7. BASIC ELECTROENCEPHALOGRAPHY

**To provide the trainee with the knowledge and skills to be able to record and report on EEGs across all age groups and medical conditions**

Knowledge	Assessment Methods	GMP
Use and limitations of EEG in a range of medical disorders	*	1,2
EEG technology	*	1,2
Physiological basis of EEG signals	*	1,2
Requirements of specific recording environments e.g. intensive care unit	*, DOPS	1,2
Skills		
Recognizes normal components of the EEG and evolution of maturational changes	DOPS, *	1
Recognizes normal variants and abnormalities	DOPS, *	1
Writes a factual report	DOPS	1,3
Interprets EEG in clinical setting	DOPS	1
Comments on EEG findings to referring clinician	DOPS, MSF	1,3
Cares for patient during recording, with particular reference to disorders of consciousness including epilepsy	DOPS	1,3
Behaviours		
Applies and demonstrates clinical behaviours as in core neurological competence	MSF, mini-CEX, DOPS	1,2,3,4

## 8. BASIC NERVE CONDUCTION AND ELECTROMYOGRAPHY

<b>To enable the trainee to understand the indications for nerve conduction studies and electromyography (EMG); to perform these investigations; and to report on the findings</b>		
<b>Knowledge</b>	<b>Assessment Methods</b>	<b>GMP</b>
Physiology of nerve conduction, neuromuscular transmission and excitation -contraction mechanisms in muscle	*	1
Clinical presentation and pathophysiology of diseases of the peripheral nerves, neuromuscular junction and muscles	*, DOPS	1
Anatomy of peripheral nerves and muscles with regard to electrode placement and needle insertion	*, DOPS	1
Techniques for study of peripheral nerves including sensory, motor, and F wave studies, H reflex, repetitive nerve stimulation and blink reflex.	*, DOPS	1
Adaptations necessary in particular patient groups or difficult recording situations	*, DOPS	1,2,3,4
Techniques of electromyography including recognition of neurogenic and myopathic disorders, and adaptations necessary in particular patient groups or difficult recording situations	*, DOPS	1,2,3,4
Normal values, including anatomical variants; effects of age, temperature, height and co-morbid conditions. Use of internal controls e.g. the opposite limb in contralateral conditions	*, DOPS	1,2
<b>Skills</b>		
Liaises with referring colleagues and advise on appropriate investigations	DOPS, MSF	1,3
Takes a history from and examines the patient to formulate the problem for investigation. Selects and performs the appropriate tests, with modification as required during neurophysiological examination	DOPS, mini-CEX	1,2,3
Cares for the patient throughout the consultation by explaining the procedure, obtaining co-operation, and minimising discomfort. Provides appropriate information to the patient after the examination	DOPS	1,2,3,4
Describe and interpret findings of the investigation in the report	DOPS	1,3
Participates in the training and practice of Clinical Physiologists in performance of basic nerve conduction studies and reports on their findings	DOPS	1,2,3
<b>Behaviours</b>		
Applies and demonstrates clinical behaviours as in core neurological competence	MSF, mini-CEX	1,2,3,4



## 9. BASIC EVOKED POTENTIALS

**To understand the technical basis and methods of recording visual evoked potentials, appreciate when these tests may be used, and the expected changes from normal in a variety of pathological conditions**

Knowledge	Assessment Methods	GMP
Technical aspects of pattern reversal and flash visual stimulation	*	1,2
Technical aspects of recording, including averaging methods	*	1
Technical difficulties of recording from children and adults in a variety of circumstances, including the intensive care unit	*, DOPS	1,2,3,4
Anatomical generators of evoked potentials, and the basis for determining these generators	*, DOPS	1
Measurement of latency, amplitude and polarity in normal subjects, and the effect of altering stimulus parameters	*, DOPS	1
Physiological basis for alteration in evoked potential response amplitude and latency in demyelinating and degenerative pathological processes affecting the central and peripheral nervous system	*, DOPS	1
Sensitivity and specificity of evoked potential abnormalities for the diagnosis of multiple sclerosis, and changes expected in other demyelinating, degenerative, traumatic or vascular nervous system diseases	*, DOPS	1,2,3
Skills		
Sets up stimulus and recording apparatus to elicit reproducible visual evoked potentials	DOPS	1,2
Performs the test on adults and children	DOPS	1,2,3,4
Analyses main evoked potential components	DOPS	1,2
Recognizes of limits of normality and interpretation of alterations due to nervous system disease	DOPS	1,2,3
Behaviours		
Applies and demonstrates clinical behaviours as in core neurological competencies	MSF, mini-CEX	1,2,3,4

## 10. ADVANCED ELECTROENCEPHALOGRAPHY

### Long-term EEG Monitoring

<b>To acquire competence to supervise and report on video EEG telemetry and Ambulatory EEG recordings</b>		
<b>Knowledge</b>	<b>Assessment Methods</b>	<b>GMP</b>
Semiology and classification of epileptic seizures and epilepsies	*	1
EEG correlates of different seizure types	*, DOPS	1
Indications for long-term EEG monitoring and the limitations of these techniques	*	1
Technology of video EEG telemetry and ambulatory monitoring, including the setting up and operation of equipment and fault finding	*, DOPS	1
Differential diagnosis of epileptic and non-epileptic seizures	*, DOPS	1
Common antiepileptic drugs, their uses, dosage and side effects	*	1,2
Management of status epilepticus	*	1
Role of EEG in presurgical assessment of epilepsy	*, DOPS	1
Role of EEG monitoring in the management of status epilepticus	*, DOPS	1
<b>Skills</b>		
Assesses seizure histories and proposing differential diagnosis	*, DOPS	1
Evaluates video recordings of seizures of epileptic and non-epileptic origins	*, DOPS	1
Reads ictal and interictal EEGs in persons with epileptic and non-epileptic attacks	*, DOPS	1
Sets up video EEG telemetry and ambulatory monitoring, selection of montages, polygraphy etc; changing archiving media; identification of common faults	*, DOPS	1,2
Manages initial stages of status epilepticus	*, DOPS, mini-CEX	1
Manages seizures and acute psychotic episodes in telemetry unit	*, DOPS, mini-CEX	1
Explains procedures to patients and carers and obtaining their co-operation	*, DOPS, PS	1
Participates in the multidisciplinary telemetry team	DOPS, MSF	1,3
<b>Behaviours</b>		
Applies and demonstrates clinical behaviours as in core neurological competence	MSF	1,2,3,4
Provides leadership for the multidisciplinary telemetry team	MSF	1,2,3,4

## Clinical Neurophysiology support for Epilepsy Surgery

To acquire competence in one or more of the following:

- supervision and reporting on sub-acute electrophysiological recordings with intracranial electrodes
- supervision and reporting on acute electrocorticograms
- participation in functional brain mapping
- participation in carotid amygdala tests

Knowledge	Assessment Methods	GMP
Role of scalp and intracranial EEG techniques in pre-surgical assessment of epilepsy	*	1
Strategies of epilepsy surgery and multidisciplinary presurgical assessment	*	1,3
Intracranial EEG correlates of different seizure types	*, DOPS	1
The uses, interpretation and limitations of acute/intra-operative electrocorticography	*, DOPS	1
Use of functional brain mapping in presurgical assessment	*, DOPS	1
Procedure, uses and interpretation of carotid amygdala test and simultaneous EEG recording	*, DOPS	1,3
Risks and benefits of epilepsy surgery and its associated procedures	*	1,2
Skills		
Sets up intracranial recordings, selection of montages, identification and correction of common faults	* DOPS	1,2
Interprets intracranial recordings	*, DOPS	1
Assists surgeon and supervises technician in setting up and performing intra-operative electrocorticographic recordings and in identification correction of common artefacts and faults	*, DOPS	1,3
Assists at carotid amygdala tests	*, DOPS	1,3
Assists at functional brain mapping	*, DOPS	1,3
Explains these procedures accurately and comprehensibly to patients and carers	DOPS, PS	1,3
Behaviours		
Applies and demonstrates clinical behaviours as in core neurological competence	MSF, mini-CEX	1,2,3,4

## Polysomnography and Multiple Sleep Latency Tests

<b>To acquire competence to supervise and report on polysomnography and/or Multiple Sleep Latency Tests</b>		
<b>Knowledge</b>	<b>Assessment Methods</b>	<b>GMP</b>
Classification and semiology of sleep disorders	*	1
Normal EEG and polygraphic findings in sleep	*, DOPS	1
Indications for polysomnography and MSLT and the limitations of these techniques	*, DOPS	1
Rechtschaffen & Kales' sleep staging criteria; manual and automated methods of staging	*, DOPS	1
Technology and procedures for polysomnography and Multiple Sleep Latency Tests	*, DOPS	1
<b>Skills</b>		
Elicits and assesses histories of possible sleep disorders and proposes differential diagnosis	DOPS	1
Stages sleep and recognizes polygraphic features of common sleep disorders	DOPS	1
Sets up polygraphy both in the laboratory and using ambulatory recordings, selects of montages, transducers etc; changing media; identifies of common faults	*, DOPS	1
Explains procedures to patients and carers and obtaining their co-operation	DOPS, PS	1,3
Participates in the multidisciplinary sleep studies team	DOPS, MSF	1,3
<b>Behaviours</b>		
Applies and demonstrates clinical behaviours as in core neurological competence	MSF	1,2,3,4

# 11. ADVANCED NERVE CONDUCTION AND ELECTROMYOGRAPHY

## Quantitative Electromyography (EMG)

**To acquire knowledge of and technical competence in quantitative motor unit potential analysis(macro EMG, EMG frequency analysis, turns/amplitude analysis) or single fibre EMG**

Knowledge	Assessment Methods	GMP
Basic principles of EMG quantification, including frequency analysis	*	1
Indications for quantitative methods	*, DOPS	1
Technical aspects: needles, EMG filtering, statistical analysis on data generated	*, DOPS	1
Single fibre EMG using voluntary activation and axonal stimulation	*, DOPS	1
Principles of jitter, blocking and fibre density measurement	*, DOPS	1
Principles of quantification of recruitment patterns; turns/amplitude analysis; frequency analysis	*, DOPS	1
Principles of quantification of motor unit potentials; amplitude, duration and phase measurement	*, DOPS	1
Skills		
Liaises with referring colleagues and advise on appropriate investigations	DOPS	1,3
Takes a history from and examines the patient to formulate the problem for investigation. Selects and performs the appropriate tests, with modification as required during neurophysiological examination	DOPS, mini-CEX	1,3
Cares for the patient throughout the consultation by explaining the procedure, obtaining co-operation, and minimising discomfort. Provides appropriate information to the patient after the examination	DOPS, PS	1,3,4
Describes and interprets findings of the investigation in the report	DOPS	1,3
Behaviours		
Applies and demonstrates clinical behaviours as in core neurological competence	MSF, mini-CEX	1,2,3,4

## Quantitative sensory testing

<b>To acquire understanding of the pathophysiological concepts of sensory perception relating to the peripheral and central sensory nervous systems, and to obtain technical competence in different methods of quantitative sensory testing</b>		
<b>Knowledge</b>	<b>Assessment Methods</b>	<b>GMP</b>
Anatomy, physiology and pathology of sensory receptors, and of peripheral and central sensory neural pathways	*	1
Principles of different available methods and paradigms of quantitative sensory testing for warm and cold thresholds; heat pain and cold pain thresholds. Limitations of psychophysical techniques	*	1
Principles of methods of quantitative sensory testing for touch thresholds	*, DOPS	1
Principles of other indirect methods of quantitative testing such as measurement of reflex vasodilatation using laser Doppler, and nicotine and acetylcholine induced sweating quantified by an evaporimeter	*, DOPS	1
Interaction between the autonomic nervous and sensory systems. Related diagnostic techniques in assessment of patients with neuropathic disorders	*, DOPS	1
<b>Skills</b>		
Liaises with referring colleagues and advise on appropriate investigations	DOPS	1,3
Takes a history from and examines the patient to formulate the problem for investigation.	DOPS, mini-CEX	1
Selects and performs the appropriate tests, with modification as required during neurophysiological examination	DOPS	1
Cares for the patient throughout the consultation by explaining the procedure, obtaining co-operation, and minimising discomfort.	DOPS	1,3,4
Provides appropriate information to the patient after the examination	DOPS, PS	1,3,4
Describes and interprets findings of the investigation in the report	DOPS	1,3
<b>Behaviours</b>		
Applies and demonstrates clinical behaviours as in core neurological competence	MSF, mini-CEX	1,2,3,4

## Uroneurophysiology

**To enable the trainee to understand the indications for uroneurophysiological investigations, to perform some or all of these procedures, and to report on the findings**

<b>Knowledge</b>	<b>Assessment Methods</b>	<b>GMP</b>
Anatomy and normal function and control of the urological system.	*	1
Neural innervation and control of urethral and anal sphincters.	*	1
Normal characteristics of motor neurons in Onuf's nucleus	*	1
Consequences for urological and sexual function in neurological and general medical disorders, including endocrine disease such as polycystic ovary syndrome.	*	1
Clinical presentation and underlying pathology of these conditions	*	1
Technique of needle EMG examination of sphincters; normal and abnormal findings	*, DOPS	1
Use of EMG recording as part of urodynamic assessment	*, DOPS	1
Adaptations of technique necessary in particular patient groups or difficult recording situations	*, DOPS	1
Use and limitations of other techniques to assess bladder and sexual function, such as pudendal nerve conduction studies, sacral reflexes and cortical sensory/motor evoked responses	*, DOPS	1
<b>Skills</b>		
Liases with referring colleagues and advises on appropriate investigations	DOPS, MSF	1,3
Takes a history from and examines the patient to formulate the problem for investigation.	DOPS, mini-CEX	1
Selects and performs the appropriate tests, with modification as required during neurophysiological examination	DOPS	1,3
Cares for the patient throughout the consultation by explaining the procedure, obtaining co-operation, and minimising discomfort or anxiety.	DOPS	1,3,4
Provides appropriate information to the patient after the examination	DOPS, PS	1,3,4
Describes and interprets findings of the investigation in the report	DOPS	1,3
<b>Behaviours</b>		
Applies and demonstrates clinical behaviours as in core neurological competence	MSF, mini-CEX	1,2,3,4

## EMG guided botulinum toxin therapy

To enable the trainee to understand the indications for botulinum toxin therapy, methods of administration and effects of therapy

Knowledge	Assessment Methods	GMP
Pharmacology of Botulinum toxin, including dosage and dilution schedules related to different strains of toxin and different manufacturers	*	1,2
Clinical conditions where its use is indicated	*	1
Role of EMG guided Botulinum toxin therapy	*, DOPS	1
Method of delivery using EMG guidance	*, DOPS	1
Anatomy of muscles with regard to site of needle insertion	*, DOPS	1
Complications of therapy	*, DOPS	1,2
Skills		
Liases with doctor or team referring patient for treatment	DOPS	1,3
Takes a history and examines the patient with a view to setting out a treatment plan	DOPS, mini-CEX	1,3
Explains the procedure to the patient in a manner which is understandable and gain patient's consent.	DOPS, PS	1,3
Establishes patient co-operation to minimise discomfort during the procedure	DOPS	1,3,4
Performs EMG guided toxin therapy in a range of disorders, including focal limb and orofacial dystonias, diffuse dystonic disorders, spasmodic torticollis, spasticity.	DOPS	1,3
Behaviours		
Applies and demonstrates clinical behaviours as in core neurological competence	MSF, mini-CEX	1,2,3,4



## 12. ADVANCED EVOKED POTENTIALS

### Multi-modal evoked potentials

To understand the technical basis, methods of recording and clinical application of one or more of the specialised evoked potentials, acquire proficiency in performance of these studies, and expertise in the interpretation of clinical significance of findings

Knowledge	Assessment Methods	GMP
Somatosensory evoked potentials using electrical stimulation of peripheral nerves	*, DOPS	1,2
Brain stem auditory evoked potentials and evoked potential audiometry	*, DOPS	1
Visual physiology, including electroretinography, electronystagmography, electrooculography: evaluation of function of rods and cones, retinal pigment, epithelium and ganglion cells	*, DOPS	1
Skills		
Proficiency in performance and clinical interpretation of designated technique for each selected category	DOPS	1,3
Behaviours		
Applies and demonstrates clinical behaviours as in core neurological competence	MSF, mini-CEX	1,2,3,4

## Operative spinal monitoring

To enable the trainee to participate in a multi-disciplinary team monitoring spinal cord &/or nerve root function during surgery

Knowledge	Assessment Methods	GMP
Surgical procedures undertaken in spinal deformity correction and other spinal surgery requiring neurophysiological monitoring	*	1,2
Risks & mechanisms of neurological injury associated with surgical procedures	*	1,2,3,4
Somatosensory evoked potential techniques	*, DOPS	1
Motor Evoked potential recording techniques	*, DOPS	1
Nerve root monitoring techniques	*, DOPS	1
Effects of anaesthetic agents and physiological variables on neurophysiological recordings	*, DOPS	1
Guidelines for performance of intra-operative neurophysiological monitoring techniques	*, DOPS	1,2
Guidelines on individual responsibilities of members of the monitoring team and advised action relating to adverse events	*, DOPS	1,2
Skills		
Assess pre-operative clinical and neurological status, decides the form of monitoring required, and consents the patients.	DOPS	1,3
Monitors somatosensory evoked responses and identifies adverse events perioperatively.	DOPS	1,2,3
Monitors Motor evoked responses and identifies adverse events perioperatively.	DOPS	1,2,3
Monitors nerve root EMG recordings and identifies adverse events perioperatively.	DOPS	1,2,3
Identifies effects of anaesthetic agents, physiological variables and surgical manoeuvres on recordings	DOPS	1,2,3
Works effectively within the monitoring team, and demonstrates leadership	DOPS, MSF	1,3
Behaviours		
Applies and demonstrates clinical behaviours as in core neurological competence	DOPS mini-CEX	1,2,3,4

## Transcranial Magnetic Stimulation

To enable the trainee to perform transcranial magnetic stimulation		
Knowledge	Assessment Methods	GMP
Physical property of magnetic fields and the mechanism of neural excitation, including effect of coil design.	*	1,2
Contra indications to the use of magnetic fields and other safety measures	*, DOPS	1,2
Differences between cortical and peripheral nerve stimulation	*, DOPS	1
Parameters of stimulation and recording and defined protocols of investigation.	*, DOPS	1
Physiological variables affecting measurements	*, DOPS	1
Normal values and changes expected due to disease process	*, DOPS	1
Skills		
Evaluates referral and decides the most appropriate test protocol.	DOPS	1
Explains technique to patient	DOPS, mini-CEX	1,3
Assess patient for possible contraindications.	DOPS	1,2,3
Measures parameters of motor evoked potential, including threshold, latency, central conduction time, amplitude, amplitude ratio and silent period	DOPS	1
Reports results and interprets the findings in relation to disease processes.	DOPS	1,3
Behaviours		
Applies and demonstrates clinical behaviours as in core neurological competence	MSF, mini-CEX	1,2,3,4

## 4 Learning and Teaching

### 4.1 The training programme

The organisation and delivery of postgraduate training is the statutory responsibility of the General Medical Council (GMC) which devolves responsibility for the local organisation and delivery of training to the deaneries. Each deanery oversees a "School of Medicine" which is comprised of the regional Specialty Training Committees (STCs) in each medical specialty. Responsibility for the organisation and delivery of specialty training in Clinical Neurophysiology in each deanery is, therefore, the remit of the regional Clinical Neurophysiology STC. Each STC has a Training Programme Director who coordinates the training programme in the specialty.

The Specialist Training Programme comprises 4 years:

- 12 months training in Neurology. This may be completed as a single attachment of 12 months, or in blocks to a total of 12 months through the 4 year training programme, depending on local opportunities or preference. This is achieved in the setting of ward attachments and outpatient clinics supervised by Neurology Trainers, but trainees must obtain the neurological competencies by placement in posts capable of delivering this aspect of the curriculum.
- 24 months training in Clinical Neurophysiology (all age groups)
- 12 months for necessary additional specialised training or time credit for clinical work undertaken during research.  
Trainees wishing to spend a longer period in research will be encouraged to do so, but the time credit will be limited to 12 months. Credit for clinical work undertaken during research will be granted at the discretion of the SAC.

Though programmes may vary in the sequence in which the above training is obtained, determined by postgraduate deans according to local opportunity, in general:

- Neurological Training is often started and may be completed in ST3
- The Basic Techniques in electroencephalography, nerve conduction and electromyography, and evoked potentials should be completed after 2 years of clinical neurophysiology training in ST4 or ST5, and certainly by the Penultimate Year Assessment.
- Advanced Techniques and any Research are generally undertaken in ST5 and ST6.

#### Basic Techniques

Trainees must attain competence in basic electroencephalography, basic nerve conduction studies and electromyography and basic evoked potentials. In brief, these investigations are:

- **Basic Electroencephalography (EEG)** - in adults, children and neonates; in waking and sleeping states; with application of activation procedures (hyperventilation, photic stimulation).
- **Basic Nerve conduction studies (NCS) and electromyography (EMG)** - in adults and children (recognising that paediatric NCS and EMG accounts for a small proportion of Clinical Neurophysiology practice outside specialised units); assessment of peripheral nerves; evaluation of the neuromuscular junction; EMG investigation of neurogenic and myopathic conditions.
- **Basic Evoked potential studies** – visual modality.

### **Advanced Techniques**

Trainees are expected to spend about 20% of training becoming proficient in at least 3 advanced techniques. Trainees should select at least one technique from each of the 3 major categories of advanced electroencephalography, advanced nerve conduction studies and electromyography, and advanced evoked potentials, though they may select several procedures specific to their expected sub-specialisation. The syllabus gives details these techniques, but in summary they include:

- **Advanced EEG** - from the following: video EEG; telemetry; ambulatory monitoring; pre-operative assessment for epilepsy surgery including invasive EEG studies; electrocorticography; cortical stimulation; cerebral function monitoring; polygraphy, sleep studies and multiple sleep latency tests.
- **Advanced NCS and EMG** - from the following: quantitative EMG (single fibre EMG; turns/amplitude analysis; motor unit potential analysis; EMG frequency analysis, macro EMG); quantitative sensory testing; autonomic nervous system assessment; uroneurophysiology; application of botulinum toxin therapy.
- **Advanced evoked potential studies** –from the following: intra-operative monitoring; magnetic stimulation studies; detailed investigation of visual system including electroretinography; auditory evoked potentials; somatosensory evoked potentials; event related potentials

The Clinical Neurophysiology curriculum has been designed in order that it can be delivered in all deaneries. It is recognised that some advanced techniques are not universally available, and that trainees with a particular interest in one area may have to pursue their training aspirations by way of Out Of Programme Experience.

### **Acting up as a consultant (AUC)**

“Acting up” provides doctors in training coming towards the end of their training with the experience of navigating the transition from junior doctor to consultant while maintaining an element of supervision.

Although acting up often fulfills a genuine service requirement, it is not the same as being a locum consultant. Doctors in training acting up will be carrying out a consultant’s tasks but with the understanding that they will have a named supervisor at the hosting hospital and that the designated supervisor will always be available for support, including out of hours or during on-call work. Doctors in training will need to follow the rules laid down by the Deanery / LETB within which they work and also follow the JRCPTB rules which can be found at [www.jrcptb.org.uk/trainingandcert/Pages/Out-of-Programme](http://www.jrcptb.org.uk/trainingandcert/Pages/Out-of-Programme).

## 4.2 Teaching and learning methods

The curriculum will be delivered through a variety of learning experiences. Trainees will learn from practice, clinical skills appropriate to their level of training and to their attachment within the department.

Trainees will achieve the competencies described in the curriculum through a variety of learning methods. There will be a balance of different modes of learning from formal teaching programmes to experiential learning 'on the job'. The proportion of time allocated to different learning methods may vary depending on the nature of the attachment within a rotation.

This section identifies the types of situations in which a trainee will learn.

**Learning with Peers** - There are many opportunities for trainees to learn with their peers. Local postgraduate teaching opportunities allow trainees of varied levels of experience to come together for small group sessions. Examination preparation encourages the formation of self-help groups and learning sets.

**Work-based Experiential Learning** - The content of work-based experiential learning is decided by the local faculty for education but includes active participation in:

- Specialty-specific outpatient and inpatient work within Clinical Neurophysiology. This forms the basis for work-based experiential learning in the specialty. Trainees will be closely supervised by consultants who will be readily available to demonstrate techniques, explain investigation strategy, teach analysis and report preparation. Senior clinician scientists and clinical physiologists may contribute to teaching of specific techniques. The trainee with experience takes on a larger case-mix and is less closely supervised, but the consultant is always available to assist.
- Neurology specialty clinics. After initial induction, trainees will review patients in outpatient clinics, under direct supervision. The degree of responsibility taken by the trainee will increase as competency increases. As experience and clinical competence increase trainees will assess 'new' and 'review' patients and present their findings to their clinical supervisor.
- Post-take consultant ward-rounds (Neurology)
- Personal ward rounds and provision of ongoing clinical care on specialist medical ward attachments. Every patient seen, on the ward or in out-patients, provides a learning opportunity, which will be enhanced by following the patient through the course of their illness: the experience of the evolution of patients' problems over time is a critical part both of the diagnostic process as well as management (Neurology). Patients seen should provide the basis for critical reading and reflection of clinical problems.
- Consultant-led ward rounds (Neurology). Every time a trainee observes another doctor, consultant or fellow trainee, seeing a patient or their relatives there is an opportunity for learning. Ward rounds, including those post-take, should be led by a consultant and include feedback on clinical and decision-making skills.
- Multi-disciplinary team meetings. There are many situations where clinical problems are discussed with clinicians in other disciplines. These provide excellent opportunities for observation of clinical reasoning.

Trainees have supervised responsibility for the care of in-patients. This includes day-to-day review of clinical conditions, note keeping, and the initial management of the acutely ill patient with referral to and liaison with clinical colleagues as necessary. The degree of responsibility taken by the trainee will increase as competency

increases. There should be appropriate levels of clinical supervision throughout training with increasing clinical independence and responsibility as learning outcomes are achieved (see Section 5: Feedback and Supervision).

**Formal Postgraduate Teaching** – The content of these sessions are determined by the local faculty of medical education and will be based on the curriculum. There are many opportunities throughout the year for formal teaching in the local postgraduate teaching sessions and at regional, national and international meetings. Many of these are organised by the Royal Colleges of Physicians.

Suggested activities include:

- A programme of formal bleep-free regular teaching sessions to cohorts of trainees (e.g. a weekly core training hour of teaching within a Trust)
- Case presentations
- Journal clubs
- Research and audit projects
- Lectures and small group teaching
- Grand Rounds
- Clinical skills demonstrations and teaching
- Critical appraisal and evidence based medicine and journal clubs
- Joint specialty meetings
- Attendance at training programmes organised on a deanery or regional basis, which are designed to cover aspects of the training programme outlined in this curriculum.

The frequency, format and range of formal postgraduate teaching opportunities will vary between different training programmes and different clinical placements.

**Independent Self-Directed Learning** -Trainees will use this time in a variety of ways depending upon their stage of learning. Suggested activities include:

- Reading, including web-based material
- Maintenance of personal portfolio (self-assessment, reflective learning, personal development plan)
- Audit and research projects
- Reviewing archived Clinical Neurophysiology recordings and reports held in training databases
- Reading journals
- Achieving personal learning goals beyond the essential, core curriculum

**Formal Study Courses** – The British Society of Clinical Neurophysiology organizes a triennial teaching course in all aspects of current clinical neurophysiology practice, and offers bursaries to Clinical Neurophysiology trainees eligible to attend. This is supplemented by national training days held 2-3 times a year in conjunction with the Association of Trainees in Clinical Neurophysiology that provides lectures in advanced areas of the specialty. It is expected that trainees will attend these courses as a component of training.

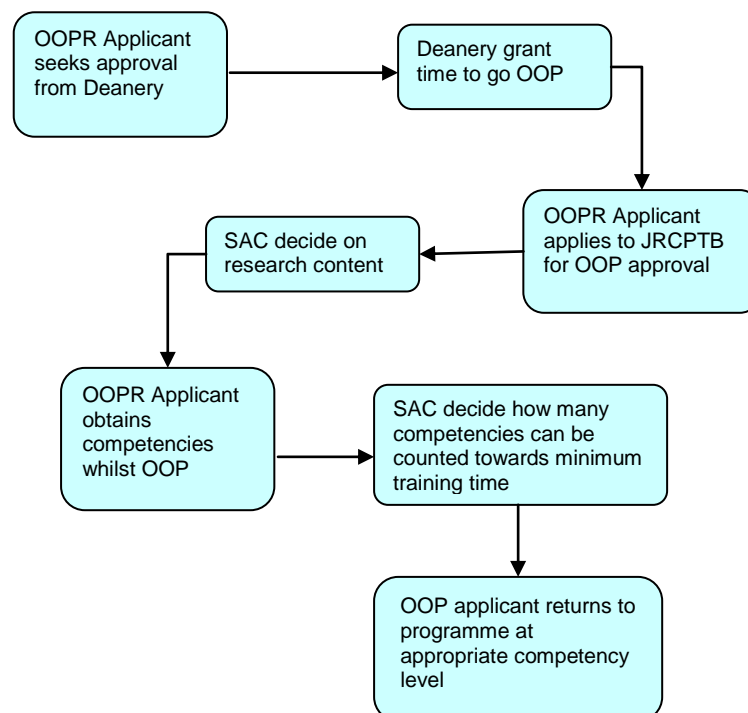
Time to be made available for other formal courses is encouraged, subject to local conditions of service. Attendance at relevant specialty specific training courses is encouraged (eg Moorfield's Hospital electrophysiology of vision course, Great Ormond Street paediatric EMG course, national and international scientific meetings). Examples of generic skills include management and communication courses.

### 4.3 Research

Trainees who wish to acquire research competencies, in addition to those specified in their specialty curriculum, may undertake a research project as an ideal way of obtaining those competencies. For those in specialty training, one option to be considered is that of taking time out of programme to complete a specified project or research degree. Applications to research bodies, the deanery (via an OOPR form) and the JRCPTB (via a Research Application Form) are necessary steps, which are the responsibility of the trainee. The JRCPTB Research Application Form can be accessed via the JRCPTB website. It requires an estimate of the competencies that will be achieved and, once completed, it should be returned to JRCPTB together with a job description and an up to date CV. The JRCPTB will submit applications to the relevant SACs for review of the research content including an indicative assessment of the amount of clinical credit (competence acquisition) which might be achieved. This is likely to be influenced by the nature of the research (eg entirely laboratory-based or strong clinical commitment), as well as duration (eg 12 month Masters, 2-year MD, 3-Year PhD). On approval by the SAC, the JRCPTB will advise the trainee and the deanery of the decision. The deanery will make an application to the GMC for approval of the out of programme research. All applications for out of programme research must be prospectively approved.

Upon completion of the research period the competencies achieved will be agreed by the OOP Supervisor, Educational Supervisor and communicated to the SAC, accessing the facilities available on the JRCPTB ePortfolio. The competencies achieved will determine the trainee's position on return to programme; for example if an ST3 trainee obtains all ST4 competencies then 12 months will be recognised towards the minimum training time and the trainee will return to the programme at ST5. This would be corroborated by the subsequent ARCP.

This process is shown in the diagram below:



Funding will need to be identified for the duration of the research period. Trainees need not count research experience or its clinical component towards a CCT



programme but must decide whether or not they wish it to be counted on application to the deanery and the JRCPTB.

A maximum period of 3 years out of programme is allowed and the SACs will recognise up to 12 months towards the minimum training times.

#### **4.4 Academic Training**

Academic Clinical Fellowships are available in Clinical Neurophysiology. These are located at centres with experience of pursuing research in the specialty.

For those contemplating an academic career path, there are now well-defined posts at all levels in the Integrated Academic Training Pathway (IATP) involving the National Institute for Health Research (NIHR) and the Academy of Medical Sciences (AMS). For full details see <http://www.nccrcd.nhs.uk/intetacatrain> and <http://www.academicmedicine.ac.uk/uploads/A-pocket-guide.pdf>. Academic trainees may wish to focus on education or research and are united by the target of a consultant-level post in a university and/or teaching hospital, typically starting as a senior lecturer and aiming to progress to readership and professor. A postgraduate degree will usually be essential (see “out of programme experience”) and academic mentorship is advised (see section 6.1). Academic competencies have been defined by the JRCPTB in association with AMS and the Colleges and modes of assessment have been incorporated in the latest edition of the Gold Guide (section 7, see <http://www.jrcptb.org.uk/forms/Documents/GoldGuide2009.pdf>).

Academic integrated pathways to CCT are a) considered fulltime CCTs as the default position and b) are run through in nature. The academic programmes are CCT programmes and the time set for the CCT is the time set for academic trainees. If a trainee fails to achieve all the required competencies within the notional time period for the programme, this would be considered at the ARCP, and recommendations to allow completion of clinical training would be made (assuming other progress to be satisfactory) see the guidelines for monitoring training and progress <http://www.academicmedicine.ac.uk/careersacademicmedicine.aspx>. Extension of a CCT date will be in proportion depending upon the nature of the research and will ensure full capture of the specialty outcomes set down by the Royal College and approved by GMC.

## **5 Assessment**

### **5.1 The assessment system**

The purpose of the assessment system is to:

- enhance learning by providing formative assessment, enabling trainees to receive immediate feedback, measure their own performance and identify areas for development;
- drive learning and enhance the training process by making it clear what is required of trainees and motivating them to ensure they receive suitable training and experience;
- provide robust, summative evidence that trainees are meeting the curriculum standards during the training programme;
- ensure trainees are acquiring competencies within the domains of Good Medical Practice;
- assess trainees’ actual performance in the workplace;

- ensure that trainees possess the essential underlying knowledge required for their specialty;
- inform the Annual Review of Competence Progression (ARCP), identifying any requirements for targeted or additional training where necessary and facilitating decisions regarding progression through the training programme;
- identify trainees who should be advised to consider changes of career direction.

The integrated assessment system comprises of workplace-based assessments and knowledge – based assessments. Individual assessment methods are described in more detail below.

Workplace-based assessments will take place throughout the training programme to allow trainees to continually gather evidence of learning and to provide trainees with formative feedback. This is provided by the assessor immediately after the assessment. They are not individually summative but overall outcomes from a number of such assessments provide evidence for summative decision making. The number and range of these will ensure a reliable assessment of the training relevant to their stage of training and achieve coverage of the curriculum.

## 5.2 Assessment Blueprint

In the syllabus (3.3) the “Assessment Methods” shown are those that are appropriate as **possible** methods that could be used to assess each competency. It is not expected that all competencies will be assessed and that where they are assessed not every method will be used.

## 5.3 Assessment methods

The following assessment methods are used in the integrated assessment system:

### Examinations and certificates

- Advanced Life Support Certificate (ALS)

The small size of the specialty means that it is not feasible to run a full specialty certificate examination to assess knowledge. The specialty is currently planning to pilot a formative knowledge-based assessment method and, if successful, it is intended that this method will be used in the future.

Where there is a \* in the syllabus this competency will be assessed, in the future, by a knowledge-based assessment method

### Workplace-based assessments (WPBAs)

- Multi-Source Feedback (MSF)
- mini-Clinical Evaluation Exercise (mini-CEX)
- Direct Observation of Procedural Skills (DOPS)
- Case-Based Discussion (CbD)
- Patient Survey (PS)
- Audit Assessment (AA)
- Teaching Observation (TO)

These methods are described briefly below. More information about these methods including guidance for trainees and assessors is available in the ePortfolio and on the JRCPTB website [www.jrcptb.org.uk](http://www.jrcptb.org.uk). Workplace-based assessments should be recorded in the trainee’s ePortfolio. The workplace-based assessment methods

include feedback opportunities as an integral part of the assessment process, this is explained in the guidance notes provided for the techniques.

### **Multisource feedback (MSF)**

This tool is a method of assessing generic skills such as communication, leadership, team working, reliability etc, across the domains of Good Medical Practice. This provides objective systematic collection and feedback of performance data on a trainee, derived from a number of colleagues. 'Raters' are individuals with whom the trainee works, and includes doctors, administration staff, and other allied professionals. The trainee will not see the individual responses by raters, feedback is given to the trainee by the Educational Supervisor.

### **mini-Clinical Evaluation Exercise (mini-CEX)**

This tool evaluates a clinical encounter with a patient to provide an indication of competence in skills essential for good clinical care such as history taking, examination and clinical reasoning. The trainee receives immediate feedback to aid learning. The mini-CEX can be used at any time and in any setting when there is a trainee and patient interaction and an assessor is available.

### **Direct Observation of Procedural Skills (DOPS)**

A DOPS is an assessment tool designed to assess the performance of a trainee in undertaking a practical procedure, against a structured checklist. The trainee receives immediate feedback to identify strengths and areas for development. Clinical Neurophysiology is a practical, procedure-based specialty and DOPS is an important WBA tool. The domains of the DOPS assessment have been particularly developed to make them specialty specific, and the majority of work-based assessments of techniques is by use of this tool.

### **Case based Discussion (CbD)**

The CbD assesses the performance of a trainee in their management of a patient to provide an indication of competence in areas such as clinical reasoning, decision-making and application of medical knowledge in relation to patient care. It also serves as a method to document conversations about, and presentations of, cases by trainees. The CbD should include discussion about a written record (such as written case notes, out-patient letter, discharge summary). A typical encounter might be when presenting newly referred patients in the out-patient department. For Clinical Neurophysiology this assessment method is most suited to the neurology component of the syllabus.

### **Patient Survey (PS)**

Patient Survey addresses issues, including behaviour of the doctor and effectiveness of the consultation, which are important to patients. It is intended to assess the trainee's performance in areas such as interpersonal skills, communication skills and professionalism by concentrating solely on their performance during one consultation.

This assessment has been piloted by some Clinical Neurophysiology trainees and supervisors in conjunction with the JRCPTB. It is not currently used as an assessment but its use and inclusion will be reviewed on a regular (at least annual) basis. It is expected that this assessment will form part of required assessments in the future.

### **Audit Assessment Tool (AA)**

The Audit Assessment Tool is designed to assess a trainee's competence in completing an audit. The Audit Assessment can be based on review of audit

documentation OR on a presentation of the audit at a meeting. If possible the trainee should be assessed on the same audit by more than one assessor. Clinical Neurophysiology trainees should complete 2 audits over the course of the 4 year training programme.

### **Teaching Observation (TO)**

The Teaching Observation form is designed to provide structured, formative feedback to trainees on their competence at teaching. The Teaching Observation can be based on any instance of formalised teaching by the trainee that has been observed by the assessor. The process should be trainee-led (identifying appropriate teaching sessions and assessors). Trainees in Clinical Neurophysiology are expected to satisfactorily complete this assessment twice during the training programme, with the first assessment completed before the end of ST4 and the second before the end of ST6.

## **5.4 Decisions on progress (ARCP)**

The Annual Review of Competence Progression (ARCP) is the formal method by which a trainee's progression through her/his training programme is monitored and recorded. ARCP is not an assessment – it is the review of evidence of training and assessment. The ARCP process is described in A Reference Guide for Postgraduate Specialty Training in the UK (the “Gold Guide” – available from [www.mmc.nhs.uk](http://www.mmc.nhs.uk)). Deaneries are responsible for organising and conducting ARCPs. The evidence to be reviewed by ARCP panels should be collected in the trainee's ePortfolio.

The ARCP Decision Aid is included in section 5.5, giving details of the evidence required of trainees for submission to the ARCP panels.

The following is an indication of when assessments are used and how they demonstrate progression of competence by trainees:

- Trainees are required to have 3 satisfactory DOPS in each of the curricular areas of basic electroencephalography, basic nerve conduction and electromyography and basic evoked potentials by the end of ST6, and usually by the end of ST5.

A satisfactory DOPS is one that meets expectation for the stage of training or above in all domains. The clinical case used for DOPS should be different for the 3 assessments, with increasing complexity to demonstrate progression of skills

Trainees are expected to become competent in at least one advanced Clinical Neurophysiology technique; advanced electroencephalography, advanced electromyography and advanced evoked potentials (options are outlined in the syllabus). Trainees are required to have 3 satisfactory DOPS in each of their chosen techniques. As these competencies are gained towards the end of training, these assessments should be obtained before the end of ST6.

- Six satisfactory mini-CEX assessments in neurology are required by the end of ST6. A satisfactory assessment is one that meets expectation for the stage of training or above in all domains.

At the end of ST3 evidence of 6 satisfactory DOPS or mini-CEX assessments is required. The combination will depend on the proportion of Clinical Neurophysiology and Neurology that the trainee has undertaken in the year. If

this number of assessments is not achieved the ARCP panel will require further training, depending on the panel's assessment of the ability of the trainee to complete successfully the assessments required over the next year of training.

To demonstrate progression at the end of ST4 a further 6 satisfactory assessments, either DOPS or mini-CEX are required. Similarly, at the end of ST5 a further 6 satisfactory assessments is required, and by the end of ST6 a total of 18 satisfactory DOPS and 6 mini-CEX is required.

- Trainees are expected to undertake 2 MSF assessments during their training, one in ST3 and the second before the end of ST5. A satisfactory assessment is a mean score of 4 or above in all domains. Failure to provide a satisfactory MSF at the end of ST3 and again at the end of ST5 leads to a requirement for further training, depending on the panel's assessment of the ability of the trainee to redress the identified deficiency over the next year of training.
- Trainees are expected to complete one satisfactory patient survey before the penultimate year assessment at the end of ST5
- Trainees should undertake at least 2 audit projects during their training programme, with evidence of satisfactory assessment at the end of ST4 and ST5.
- Trainees should have satisfactorily completed 2 Teaching Observations, one by the end of ST4 and the other by the end of ST6.

Cumulative evidence of assessment at the Penultimate Year Assessment (PYA) requires 2 satisfactory MSFs, 18 satisfactory mini-CEX or DOPS, which must include 9 DOPS covering curricular areas of basic electroencephalography, basic nerve conduction studies and electromyography, and basic evoked potentials.

The 3 DOPS in any one area of the curriculum should avoid reduplication of subject matter and should preferably be performed by at least 2 different trainers.

For the DOPS on basic electroencephalography, trainees choose a combination from the following lists, with minimal overlap between assessments: list 1- adult, child, sleep, wake, inpatient, outpatient, ITU or off-site; list 2 – epilepsy, acute encephalopathy, neurodegenerative disorder, normal.

For the DOPS on basic nerve conduction studies and electromyography, trainees choose a combination from the following lists, with minimal overlap between assessments: list 1 - adult, child, outpatient, ITU or off-site; list 2 – focal nerve entrapment, generalized peripheral neuropathy, radiculopathy, motor neurone disease, myopathy.

For the DOPS on basic evoked potentials, trainees choose a combination from the following lists, with minimal overlap between assessments: list 1 - adult, child; list 2 – multiple sclerosis, other central nervous system disorders, normal.

**Indicative procedure numbers.** The specialty recognizes that expertise in procedures is gained by experience and exposure to different clinical presentations of conditions. The revision review working party has considered the numbers of procedures that it considers appropriate for a trainee to have

performed in each area of the curriculum. Trainees are expected to record their experience by case-mix in the Training Log Book. These data greatly assist ARCP panels in assessing whether the breadth of experience in the previous year is appropriate for the trainee's timetable, and that this is progressing. The recommended minimum number of procedures to be performed in each syllabus area over the course of the training programme is shown in the appendix. The right hand column gives the indicative minimum number of procedures that should be undertaken over the full training programme.

The educational supervisor's report should be considered by the ARCP panel as supportive evidence.

## 5.5 ARCP Decision Aid

	ST3	ST4	ST5 (Penultimate Year Assessment)	ST6
<b>Workplace-based assessments</b>				
Direct Observation of Procedural Skills (DOPS) and mini-Clinical Evaluation Exercise (mini-CEX)	6 satisfactory DOPS or mini-CEX	6 further satisfactory DOPS or mini-CEX (12 in total)	6 further satisfactory DOPS or mini-CEX (18 in total)	6 further satisfactory DOPS or mini-CEX (24 in total: 18 DOPS and 6 mini-CEX)
Multi-Source Feedback (MSF)	First Satisfactory MSF		Second Satisfactory MSF	
Patient Survey (PS)			Satisfactory satisfactory PS	
Audit Assessment (AA)		First satisfactory AA	Second satisfactory AA	
Teaching Observation (TO)		First satisfactory TO		Second satisfactory TO
<b>Supporting Evidence</b>				
	Satisfactory educational supervisor's report	Satisfactory educational supervisor's report	Satisfactory educational supervisor's report	Satisfactory educational supervisor's report
	Appropriate indicative procedure numbers	Appropriate indicative procedure numbers	Appropriate indicative procedure numbers	Appropriate indicative procedure numbers

## 5.6 Penultimate Year Assessment (PYA)

The penultimate ARCP prior to the anticipated CCT date will include an external assessor from outside the training programme. JRCPTB and the deanery will coordinate the appointment of this assessor. This is known as "PYA". Whilst the ARCP will be a review of evidence, the PYA will include a face to face component.

## 5.7 Complaints and Appeals

All workplace-based assessment methods incorporate direct feedback from the assessor to the trainee and the opportunity to discuss the outcome. If a trainee has a complaint about the outcome from a specific assessment this is their first opportunity to raise it.

Appeals against decisions concerning in-year assessments will be handled at deanery level and deaneries are responsible for setting up and reviewing suitable processes. If a formal complaint about assessment is to be pursued this should be referred in the first instance to the chair of the Specialty Training Committee who is accountable to the regional deanery. Continuing concerns should be referred to the Associate Dean.

# 6 Supervision and feedback

## 6.1 Supervision

All elements of work in training posts must be supervised with the level of supervision varying depending on the experience of the trainee and the clinical exposure and case mix undertaken. Outpatient and referral supervision must routinely include the opportunity to personally discuss all cases if required. As training progresses the trainee should have the opportunity for increasing autonomy, consistent with safe and effective care for the patient.

Trainees will at all times have a named Educational Supervisor and Clinical Supervisor, responsible for overseeing their education. Depending on local arrangements these roles may be combined into a single role of Educational Supervisor. In Clinical Neurophysiology the 2 supervisory roles are often the responsibility of the same individual.

Each trainee will be assigned an educational and clinical supervisor in each placement. Trainees may have more than one educational supervisor dependent upon the geography of a local training programme. All educational supervisors will have undergone appropriate training and a record of this will be collected by the STC Chair/TPD in each deanery and forwarded to the SAC in Clinical Neurophysiology Chair. This training may be deanery, Royal College of Physicians or hospital trust-led.

The responsibilities of supervisors have been defined by GMC in the document "Operational Guide for the PMETB Quality Framework". These definitions have been agreed with the National Association of Clinical Tutors, the Academy of Medical Royal Colleges and the Gold Guide team at MMC, and are reproduced below:

### ***Educational supervisor***

*A trainer who is selected and appropriately trained to be responsible for the overall supervision and management of a specified trainee's educational progress during a*



*training placement or series of placements. The Educational Supervisor is responsible for the trainee's Educational Agreement.*

### **Clinical supervisor**

*A trainer who is selected and appropriately trained to be responsible for overseeing a specified trainee's clinical work and providing constructive feedback during a training placement. Some training schemes appoint an Educational Supervisor for each placement. The roles of Clinical and Educational Supervisor may then be merged.*

The training of STC Chairs/TPDs will be expected to be more comprehensive than educational supervisors and include sessions on trainees in difficulty and managing the ARCP process (e.g. study days from the Physicians as Educators Course run by the Royal College of Physicians of London, or via local deanery training).

The Educational Supervisor, when meeting with the trainee, should discuss issues of clinical governance, risk management and any report of any untoward clinical incidents involving the trainee. The Educational Supervisor should be part of the clinical specialty team. Thus if the clinical directorate (clinical director) have any concerns about the performance of the trainee, or there were issues of doctor or patient safety, these would be discussed with the Educational Supervisor. These processes, which are integral to trainee development, must not detract from the statutory duty of the trust to deliver effective clinical governance through its management systems.

Academic trainees are encouraged to identify an academic mentor, who will not usually be their research supervisor and will often be from outside their geographical area. The Academy of Medical Sciences organises one such scheme (see <http://www.acmedsci.ac.uk/index.php?pid=91>) but there are others and inclusion in an organised scheme is not a pre-requisite. The Medical Research Society organises annual meetings for clinician scientists in training (see [http://www.medres.org.uk/j/index.php?option=com\\_content&task=view&id=54&Itemid=1](http://www.medres.org.uk/j/index.php?option=com_content&task=view&id=54&Itemid=1)) and this type of meeting provides an excellent setting for trainees to meet colleagues and share experiences.

Opportunities for feedback to trainees about their performance will arise through the use of the workplace-based assessments, regular appraisal meetings with supervisors, other meetings and discussions with supervisors and colleagues, and feedback from ARCP.

## **6.2 Appraisal**

A formal process of appraisals and reviews underpins training. This process ensures adequate supervision during training, provides continuity between posts and different supervisors and is one of the main ways of providing feedback to trainees. All appraisals should be recorded in the ePortfolio

### **Induction Appraisal**

The trainee and clinical/educational supervisor should have an appraisal meeting at the beginning of each post to review the trainee's progress so far, agree learning objectives for the post ahead and identify the learning opportunities presented by the post. Reviewing progress through the curriculum will help trainees to compile an effective Personal Development Plan (PDP) of objectives for the upcoming post. This PDP should be agreed during the Induction Appraisal. The trainee and supervisor should also both sign the educational agreement in the e-portfolio at this time, recording their commitment to the training process.

## **Mid-point Review**

This meeting between trainee and educational supervisor is mandatory (except when an attachment is shorter than 6 months), but is encouraged particularly if either the trainee or educational or clinical supervisor has training concerns or the trainee has been set specific targeted training objectives at their ARCP. At this meeting trainees should review their PDP with their supervisor using evidence from the e-portfolio. Workplace-based assessments and progress through the curriculum can be reviewed to ensure trainees are progressing satisfactorily, and attendance at educational events should also be reviewed. The PDP can be amended at this review.

## **End of Attachment Appraisal**

Trainees should review the PDP and curriculum progress with their clinical/educational supervisor using evidence from the e-portfolio. Specific concerns may be highlighted from this appraisal. The end of attachment appraisal form should record the areas where further work is required to overcome any shortcomings. Further evidence of competence in certain areas may be needed, such as planned workplace-based assessments, and this should be recorded. If there are significant concerns following the end of attachment appraisal then the programme director should be informed

# **7 Managing curriculum implementation**

## **7.1 Intended use of curriculum by trainers and trainees**

This curriculum and ePortfolio are web-based documents which are available from the Joint Royal Colleges of Physicians Training Board (JRCPTB) website [www.jrcptb.org.uk](http://www.jrcptb.org.uk).

The educational supervisors and trainers can access the up-to-date curriculum from the JRCPTB website and will be expected to use this as the basis of their discussion with trainees. Both trainers and trainees are expected to have a good knowledge of the curriculum and should use it as a guide for their training programme. On induction to training at ST3 the educational supervisor will ensure that the trainee is aware of the Clinical Neurophysiology curriculum, and the document will be used at all appraisal meeting to inform discussion about progress against curricular requirements.

Each trainee will engage with the curriculum by maintaining a portfolio. The trainee will use the curriculum to develop learning objectives and reflect on learning experiences.

Developments in the curriculum will be fed to STC Chairs/TPDs from the deanery, SAC or JRCPTB and it will be the responsibility of the STC Chairs/TPDs to disseminate this information to all the educational and clinical supervisors. It is suggested that each STC Chair/TPD hold regular review meetings with all the supervisors to review the local training programme.

## **7.2 Recording progress**

On enrolling with JRCPTB trainees will be given access to the ePortfolio for Clinical Neurophysiology. The ePortfolio allows evidence to be built up to inform decisions on a trainee's progress and provides tools to support trainees' education and development.

The trainee's main responsibilities are to ensure the ePortfolio is kept up to date, arrange assessments and ensure they are recorded, prepare drafts of appraisal forms, maintain their personal development plan, record their reflections on learning and record their progress through the curriculum.

The supervisor's main responsibilities are to use ePortfolio evidence such as outcomes of assessments, reflections and personal development plans to inform appraisal meetings. They are also expected to update the trainee's record of progress through the curriculum, write end-of-attachment appraisals and supervisor's reports.

## **8 Curriculum review and updating**

It is proposed that the curriculum is reviewed every 3 years by the curriculum subcommittee of the SAC, including a trainee representative and lay membership, and any changes made are then approved by the JRCPTB and GMC. Changes in clinical practice will be informed both by the SAC and by the British Society for Clinical Neurophysiology. Details of how this process was adopted in 2009 are given in section 2.2.

## **9 Equality and diversity**

The Royal Colleges of Physicians will comply, and ensure compliance, with the requirements of equality and diversity legislation, such as the:

- Race Relations (Amendment) Act 2000
- Disability Discrimination Act 1995
- Human Rights Act 1998
- Employment Equality (Age) Regulation 2006
- Special Educational Needs and Disabilities Act 2001
- Data Protection Acts 1984 and 1998

The Federation of the Royal Colleges of Physicians believes that equality of opportunity is fundamental to the many and varied ways in which individuals become involved with the Colleges, either as members of staff and Officers; as advisers from the medical profession; as members of the Colleges' professional bodies or as doctors in training and examination candidates. Accordingly, it warmly welcomes contributors and applicants from as diverse a population as possible, and actively seeks to recruit people to all its activities regardless of race, religion, ethnic origin, disability, age, gender or sexual orientation.

Deanery quality assurance will ensure that each training programme complies with the equality and diversity standards in postgraduate medical training as set by GMC.

Compliance with anti-discriminatory practice will be assured through:

- monitoring of recruitment processes;
- ensuring all College representatives and Programme Directors have attended appropriate training sessions prior to appointment or within 12 months of taking up post;
- Deaneries must ensure that educational supervisors have had equality and diversity training (at least as an e learning module) every 3 years
- Deaneries must ensure that any specialist participating in trainee interview/appointments committees or processes has had equality and diversity training (at least as an e module) every 3 years.
- ensuring trainees have an appropriate, confidential and supportive route to report examples of inappropriate behaviour of a discriminatory nature.

Deaneries and Programme Directors must ensure that on appointment trainees are made aware of the route in which inappropriate or discriminatory behaviour can be reported and supplied with contact names and numbers. Deaneries must also ensure contingency mechanisms are in place if trainees feel unhappy with the response or uncomfortable with the contact individual.

- monitoring of College Examinations;
- ensuring all assessments discriminate on objective and appropriate criteria and do not unfairly disadvantage trainees because of gender, ethnicity, sexual orientation or disability (other than that which would make it impossible to practise safely as a physician). All efforts shall be made to ensure the participation of people with a disability in training.

## Appendix – Recommended Number of Procedures

Number of procedures recommended to demonstrate experience of Clinical Neurophysiology across the syllabus

Syllabus area	No.
<b>Basic Electroencephalography</b>	
Record EEG Adult	10
Report EEG Adult	1000
Record EEG Paediatric/Neonatal	10
Report EEG Paediatric/Neonatal	1000
<b>Basic Nerve Conduction and EMG</b>	
NCS (Common Nerve Entrapments)	1000
NCS for less common nerve lesions	100
NCS for Generalized Neuropathy	100
EMG for neurogenic disorders	500
EMG in myopathy	20
Repetitive Nerve Stimulation	30
NCS and/or EMG in paediatrics	40
<b>Basic Evoked Potentials</b>	
Record VEPs	10
Interpret VEPs	50
<b>Advanced EEG</b>	
Interpret ambulatory EEG	50
Interpret EEG telemetry	50
Interpret EEG telemetry for surgery	30
Interpret polysomnography	30
Interpret electrocorticography	20
<b>Advanced EMG</b>	
Perform & interpret MUP analysis	50
Perform & interpret Turns/amp analysis	30
Perform & interpret single fibre EMG	50
Perform & interpret macro EMG	30
Perform EMG guided BoTox injection	30
Record & interpret sphincter EMG	30
Record & interpret quant sens tests	30
Record & interpret ANS tests	30
<b>Advanced Evoked Potentials</b>	
Perform & interpret magnetic brain stimulation	50
Interpret SSEPs	50
Interpret Event related potentials	50
Interpret intracortical potentials	20
Interpret electroretinogram	50
Interpret ER audiograms/BSAEPs	50
Monitor spinal, cortical or cranial n function	20