



CHARLES CLARKE

NEUROLOGY

A CLINICAL
HANDBOOK

WILEY

Table of Contents

[Cover](#)

[Title Page](#)

[Copyright Page](#)

[Preface](#)

[Foreword](#)

[1 Neurology Worldwide](#)

[Basic Data](#)

[Practical Neurology](#)

[Burden of Illness](#)

[Improvements](#)

[Acknowledgements](#)

[References](#)

[Further Reading and Information](#)

[2 Movement, Sensation and The Silent Brain](#)

[ABC of Movement: Cortical, Extrapyrmidal and Cerebellar Function](#)

[Cerebellar System](#)

[Sensory Pathways](#)

[The Silent Brain](#)

[Acknowledgements](#)

[Further Reading and Information](#)

[3 Aetiologies and Mechanisms](#)

[Genetics](#)

[Immune Mechanisms: Concepts and Components](#)

[Ion Channels and Inherited Mutations](#)

[Acknowledgements](#)

Further Reading

4 Examination, Diagnosis and the Language of Neurology

Elements of Diagnosis

Neurological Examination: Preliminary Assessment

Diagnostic Tests

The Vocabulary of Neurology

Mononeuropathy, Polyneuropathy

Abnormal Illness Behaviour and Somatic Symptom Disorder

Acknowledgements

References

Further Reading

5 Cognition, Cortical Function and Dementias

Cognitive Functions and Clinical Practice

Attention and Neglect

Memory - Its Subdivisions

Anatomy

Amnesias

Paramnesias

Perception and Its Disorders

Hallucinations - False Perceptions

Voluntary Action Failure: Apraxias

Speech and Language

Reading, Writing and Numeracy

Knowledge and the Cognitive Executive

Dementias

Acknowledgements

Further Reading

[Websites](#)

[Broca's aphasia](#)

[Wernicke's aphasia](#)

[6 Stroke and Cerebrovascular Disease](#)

[Pathophysiology: Ischaemic Stroke](#)

[Risk factors: Age, Hypertension, Tobacco, Lipids, Alcohol](#)

[Stroke and TIA](#)

[Typical Stroke Patterns](#)

[Intracerebral Haemorrhage \(ICH\)](#)

[Stroke & TIA management](#)

[Stroke and TIA Investigations](#)

[Cerebral Venous and Venous Sinus Thrombosis](#)

[Arteriovenous Malformations](#)

[Cavernous Malformations](#)

[Non-atherosclerotic Vascular Disease and Other Causes of Stroke](#)

[Vasculitis and Other Rarities](#)

[Acknowledgements](#)

[Further Reading](#)

[Personal References](#)

[Websites](#)

[7 Movement Disorders](#)

[Parkinsonian Syndromes and Parkinsonism](#)

[Parkinson's Disease](#)

[Parkinson's, Dementia and Lewy Body Pathology](#)

[Multiple System Atrophy \(MSA\)](#)

[Progressive Supranuclear Palsy \(PSP\)](#)

[Corticobasal Degeneration](#)

[Tremor](#)

[Dystonia](#)

[Chorea](#)

[Tics](#)

[Myoclonus and Startle Syndromes](#)

[Functional Movement Disorders](#)

[Movement Disorders and Dopamine Receptor Blockade](#)

[Restless Legs Syndrome and Painful Legs and Moving Toes](#)

[Stiff Person and Stiff Limb Syndromes Fatal Encephalomyelitis with Rigidity](#)

[Acknowledgements](#)

[Further Reading](#)

[Websites](#)

[8 Epilepsy and Related Disorders](#)

[International League Against Epilepsy Classification](#)

[Classification and Causes of Epilepsy](#)

[Differential Diagnosis](#)

[Investigation](#)

[Management: Newly Diagnosed Cases](#)

[Management: Established Epilepsy](#)

[Emergencies: Prolonged Convulsions, Serial Seizures, Status Epilepticus](#)

[Epilepsy Surgery](#)

[Driving Regulations: UK](#)

[Acknowledgements](#)

[Further Reading](#)

Websites

9 Infections

Acute Bacterial Meningitis

Brain Abscess

Subdural Empyema

Intracranial Epidural Abscess

Spinal Epidural, Subdural and Intramedullary Abscess

Infective Endocarditis: Neurology

Tuberculosis

Tuberculoma, TB Brain Abscess and Spinal TB

Leprosy (Hansen's Disease)

Syphilis and Neurosyphilis (*Treponema pallidum pallidum*)

Lyme Disease and Neuroborreliosis

Leptospirosis (Weil's Disease)

Brucellosis (Malta Fever, Undulant Fever)

Psitticosis and Cat Scratch Disease

Anthrax

Diphtheria

Botulism

Tetanus

Whipple's Disease

Tick-Borne Diseases

Other Infections

Viral Infections

Viral Encephalitis

Fungal Infections

Parasitic Worms

[Schistosomiasis \(Bilharzia\) and Other Parasitic Worms](#)

[African Trypanosomiasis \(Sleeping Sickness\)](#)

[HIV](#)

[Acknowledgements](#)

[Further Reading](#)

[10 Nerve, Anterior Horn Cell and Muscle Disease](#)

[Peripheral Nerve Anatomy](#)

[Inherited Neuropathies](#)

[Inflammatory and Acquired Neuropathies](#)

[Focal and Compressive Neuropathies](#)

[Plexopathies](#)

[Anterior Horn Cell Diseases](#)

[Neuromuscular Junction Disorders](#)

[Muscle Diseases](#)

[Muscular Dystrophies](#)

[Mitochondrial Respiratory Chain Diseases](#)

[Inflammatory Myopathies, Rarities, Drugs and Rhabdomyolysis](#)

[Acknowledgements](#)

[Further Reading and Websites](#)

[11 Multiple Sclerosis, Neuromyelitis Optica \(Devic's\) and Other Demyelinating Diseases](#)

[Multiple Sclerosis](#)

[Neuromyelitis Optica, Devic's Disease](#)

[Acute Parainfectious Inflammatory Encephalopathies](#)

[Acknowledgements](#)

[Further Reading, References and Websites](#)

12 Headache

Classification and Anatomical Concepts

Primary Headaches

Management

Secondary Headaches

Acknowledgements

Further Reading, References and Websites

13 Cranial Nerve Disorders

I. Olfactory Nerve

V. Trigeminal Nerve

VII. Facial Nerve

Lower Four Cranial Nerves: IX, X, XI and XII

X. Vagus Nerve

XI. Accessory Nerve

XI Nerve Damage

XII. Hypoglossal Nerve

Bulbar and Pseudobulbar Palsy

Multiple Cranial Neuropathies

Acknowledgements

Further Reading and Information

14 Neuro-Ophthalmology

Visual Pathways

Examination

Visual Loss: Uni- and Bilateral Visual Failure

Swollen Disc(s) – Papilloedema

Uveo-Meningitic Syndromes

Phakomatoses

Diplopia and Eye Movement Abnormalities

[Ocular Myopathies](#)

[Palsies of III, IV and VI Nerves](#)

[Gaze and Central Eye Movements](#)

[Chiasmal and Retrochiasmal Visual Pathways](#)

[Pupil Abnormalities](#)

[Acknowledgements](#)

[Further Reading and Information](#)

[15 Neuro-Otology](#)

[Essential Anatomy](#)

[Dizziness and Vertigo Assessment](#)

[Nystagmus Varieties](#)

[Vestibular Investigations](#)

[Vestibular Disorders](#)

[Management: Drugs and Physical Manoeuvres](#)

[Hearing Disorders](#)

[Acknowledgements](#)

[Further Reading and Information](#)

[16 Spinal Cord and Spinal Column Disorders](#)

[Emergencies](#)

[Cervical Spine Degeneration and Pathology](#)

[Lumbar and Sacrococcygeal Spine](#)

[Paraparesis/Paraplegia, Myelitis, Transverse Myelitis and Myelopathy](#)

[Cord Vascular Disease](#)

[Spinal Infection](#)

[Spine and Spinal Cord Major Trauma](#)

[Craniocervical Junction - Basilar Invagination and Atlantoaxial Disease](#)

[Rheumatological and Bone Disorders](#)

[Spinal Dysraphism, Scoliosis and Kyphosis](#)
[Acknowledgements](#)

[Further Reading and Information](#)

[17 Ataxias, Cerebellar Disorders and Related Conditions](#)

[Acquired Ataxia Syndromes](#)

[Inherited Ataxia Syndromes](#)

[Acknowledgement](#)

[Further Reading and Information](#)

[18 Restorative Neurology, Rehabilitation and Brain Injury](#)

[Key Aspects](#)

[Restorative and Compensatory Approaches, Skill Learning and Task-Related Training](#)

[Specific Problems](#)

[Single Incident Brain Injury](#)

[Service Delivery](#)

[Acknowledgements](#)

[Further Reading, References and Websites](#)

[19 Toxins, Physical Insults, Nutritional and Metabolic Disorders, Unregulated Drugs](#)

[Heavy Metals, Chemicals and Natural Toxins](#)

[Radiation](#)

[Lightning and Electrical Shocks](#)

[Heat, Cold, Diving and High Altitude](#)

[Space Travel](#)

[Vitamin Deficiencies and Copper Deficiency](#)

[Unregulated/Illegal Drugs and Drug Abuse](#)

[Acknowledgements, Further Reading and Personal References](#)

[20 Consciousness, Coma, Intensive Care and Sleep](#)

[Definitions of Consciousness and Coma](#)

[States of Impaired Consciousness](#)

[Stupor and Coma: A Practical Approach](#)

[Detailed Assessment](#)

[Neurological Intensive Care](#)

[Severe Traumatic Brain Injury \(TBI\): General Principles](#)

[Sleep and Its Disorders](#)

[Sleep Disorders](#)

[Acknowledgements, Further Reading and Personal References](#)

[21 Neuro-Oncology](#)

[Clinical Features](#)

[Imaging](#)

[Tumours: The Multidisciplinary Approach](#)

[Complications of Radiotherapy and Chemotherapy](#)

[Neurological Complications of Cancer \(NCCs\)](#)

[Acknowledgements, Further Reading and Websites](#)

[22 Neuropsychiatry](#)

[Mental State](#)

[Mental Health and Capacity Acts](#)

[Definitions and Diagnoses in Psychiatry](#)

[Functional Neurological Disorders](#)

[Neurology and Psychiatry](#)

[Acknowledgement and Further Reading](#)

[Further Reading](#)

23 Pain

Definitions

Pain in CNS Diseases

Peripheral Pain

Pain Management

Diminished Sensitivity to Pain

Acknowledgement and Further Reading

24 Autonomic Aspects of Neurology

Anatomy and Neurotransmission

Localised Autonomic Disorders

Primary and Secondary Autonomic Disorders

Regional Autonomic Dysfunction

Parkinson's Disease, Multiple System Atrophy (MSA) and Pure Autonomic Failure (PAF)

Rare Autonomic Disorders

Acknowledgements and Further Reading

25 Uro-Neurology and Sexual Dysfunction

Lower Urinary Tract: Neurological Control

Bladder Dysfunction and Neurological Disease

Urinary Retention

Management

Sexual Function

Acknowledgements, References and Further Reading

26 Systemic Conditions and Neurology

Cardiac and Aortic Disease

Endocrine Disease

Electrolyte Disturbances

Blood Disorders

[Neurology and Transplantation](#)
[Systemic Vasculitides and Related Disorders](#)
[Other Cerebral Arteriopathies](#)
[Sarcoidosis](#)
[Behçet's Syndrome](#)
[IgG4-Related Disease and CLIPPERS](#)
[Neurocutaneous Syndromes](#)
[Neurological Aspects of Pregnancy](#)
[Acknowledgements, References and Further Reading](#)
[Index](#)
[End User License Agreement](#)

List of Tables

Chapter 1

[Table 1.1 Population size and doubling times.](#)

[Table 1.2 Incidence and point prevalence.](#)

[Table 1.3 DALYs \(Disability-Adjusted Life Year\) for neurological and psychi...](#)

Chapter 4

[Table 4.1 Detailed examination.](#)

[Table 4.2 Lower \(LMN\) & upper motor neurone \(UMN\) lesions.](#)

[Table 4.3 Normal CSF.](#)

[Table 4.4 Movement, root value, muscle & nerve.](#)

Chapter 8

[Table 8.1 Epilepsy: by aetiology.](#)

Chapter 9

[Table 9.1 CSF in meningitis.](#)

[Table 9.2 Main causes of viral meningitis.](#)

Chapter 10

[Table 10.1 Some upper limb focal neuropathies.](#)

[Table 10.2 Common lower limb focal neuropathies.](#)

[Table 10.3 Anterior horn cell diseases and related conditions.](#)

[Table 10.4 Skeletal muscle channelopathies.](#)

[Table 10.5 Principal mitochondrial respiratory chain diseases.](#)

Chapter 11

[Table 11.1 Symptomatic treatments and rehabilitation in MS.](#)

Chapter 12

[Table 12.1 Acute migraine treatments.](#)

Chapter 14

[Table 14.1 Visual failure.](#)

[Table 14.2 Optic neuritis/optic neuropathy.](#)

[Table 14.3 III nerve palsy: causes.](#)

[Table 14.4 Abducens \(VI\) nerve palsy.](#)

[Table 14.5 Causes of unilateral Horner's.](#)

Chapter 15

[Table 15.1 Vestibular migraine criteria \(International Headache & Bárány So...](#)

Chapter 16

[Table 16.1 Some causes of myelopathy.](#)

Chapter 17

[Table 17.1 AR cerebellar ataxias.](#)

[Table 17.2 Congenital inherited ataxic disorders](#)

Chapter 19

[Table 19.1 Some potential neurobiological weapons.](#)

[Table 19.2 Vitamin deficiencies and neurology.](#)

[Table 19.3 Metabolic disorders - some relevant examples.](#)

[Table 19.4 Unregulated drugs and the nervous system.](#)

Chapter 20

[Table 20.1 The vocabulary of altered consciousness.](#)

[Table 20.2 Coma + meningism +/- lateralising signs: examples.](#)

[Table 20.3 Coma without meningism and without lateralising signs.](#)

[Table 20.4 Glasgow Coma Scale score.](#)

[Table 20.5 NICU: Examples of conditions supported.](#)

[Table 20.6 Common sleep disorders.](#)

Chapter 21

[Table 21.1 Nervous System Tumours - from WHO Classification](#)

[Table 21.2 Sellar region lesions.](#)

Chapter 23

[Table 23.1 Complex regional pain syndrome.](#)

Chapter 24

[Table 24.1 Autonomic investigations.](#)

[Table 24.2 Classification of autonomic disorders.](#)

Chapter 25

[Table 25.1 Cord lesions and the bladder.](#)

Chapter 26

[Table 26.1 Causes of cardiac embolism.](#)

List of Illustrations

Chapter 1

[Figure 1.1 Standardized prevalence and incidence rates of treated epilepsy i...](#)

[Figure 1.2 Age structure in developed \(Sweden\) and developing \(Costa Rica\) c...](#)

[Figure 1.3 Comparison of age-specific fertility rates in women with treated ...](#)

Chapter 2

[Figure 2.1 Brain: overall anatomy \(a\) Lateral view \(b\) Midsagittal section \(...\)](#)

[Figure 2.2 Descending corticospinal pathways.](#)

[Figure 2.3 Oblique coronal section: *putamen*, *caudate*, *globus pallidus*, *subth...*](#)

[Figure 2.4 A striatal motor loop. SMA - supplementary motor area, VLN - vent...](#)

[Figure 2.5 Zones of the cerebellum.](#)

[Figure 2.6 Cerebellar peduncles & nuclei: posterior view.](#)

[Figure 2.7 Cerebellum: cortical micro-anatomy.](#)

[Figure 2.8 Sensory pathways to the cortex. \(a\) Posterior columns, \(b\) Spinot...](#)

[Figure 2.9 Cord cross-section: dorsal horn laminae, ascending & descending t...](#)

[Figure 2.10 Brainstem: lateral view - cranial nerve nuclei.](#)

[Figure 2.11 Reticular formation: \(a\) Nuclei \(b\) Principal neurotransmitter c...](#)

[Figure 2.12 Limbic system: brain midline sagittal section.](#)

[Figure 2.13 Thalamus \(from above\): \(a\) nuclei \(b\) connections of relay nucle...](#)

[Figure 2.14 \(a\) Hypothalamic & pituitary region: sagittal - from right \(b\) P...](#)

Chapter 3

[Figure 3.1 Genetic control of spinal development - putative mechanisms.](#)

Chapter 4

[Figure 4.1 Axial brain CT: brain windows.](#)

[Figure 4.2 Axial brain CT: bone windows. White arrow: ossicles. Black arrow:...](#)

[Figure 4.3 CT Myelogram. \(a\): Sagittal. \(b\): Axial. Intrathecal contrast cre...](#)

[Figure 4.4 Axial MR \(a\) T1w - CSF black. \(b\) T2w - CSF white, grey matter hy...](#)

[Figure 4.5 MR Angiography: contrast MRA of neck vessels.](#)

[Figure 4.6 DSA: \(a\) arterial and \(b\) venous phase. Left internal carotid art...](#)

[Figure 4.7 Normal EEG followed by frontal spike-and-wave. E: eye movement ar...](#)

[Figure 4.8 Ulnar nerve conduction: nerve compression at elbow.](#)

[Figure 4.9 Brainstem: lateral schematic view.](#)

[Figure 4.10 Principal patterns of sensory loss.](#)

[Figure 4.11 Spinal and V nerve dermatomes.](#)

Chapter 5

[Figure 5.1 Alzheimer's disease autopsy: abundant amyloid plaques in neocorte...](#)

[Figure 5.2 MR T1W: Alzheimer's disease - widespread cerebral atrophy.](#)

[Figure 5.3 MR T1W: frontotemporal dementia - asymmetry is typical.](#)

[Figure 5.4 CADASIL. Typical vascular changes \(MR T1W\).](#)

Chapter 6

[Figure 6.1 MRA: Origins of common carotid and vertebral arteries.](#)

[Figure 6.2 Principal cerebral arteries.](#)

[Figure 6.3 Venous sinuses: MR venogram. SSS: superior sagittal sinus, ISS: i...](#)

[Figure 6.4 MR DWI: single lacunar infarct.](#)

[Figure 6.5 MR T2W: multiple white matter lesions.](#)

[Figure 6.6 Cerebral edema following right MCA occlusion \(CT\).](#)

[Figure 6.7 MR T2W: deep MCA \(striato-capsular\) infarction.](#)

[Figure 6.8 Unenhanced CT: acute PCA occlusion.](#)

[Figure 6.9 MR T1W: PICA infarction.](#)

[Figure 6.10 CT: intracerebral haematoma in putamen.](#)

[Figure 6.11 CT: cerebellar haemorrhage.](#)

[Figure 6.12 DSA: giant basilar artery aneurysm.](#)

[Figure 6.13 Catheter angiogram: bi-lobed PCOM artery aneurysm.](#)

[Figure 6.14 CT: SAH - blood around brainstem.](#)

[Figure 6.15 Frontal AVM \(a\) MR T2W \(b\) DSA. Nidus - white arrows; draining v...](#)

[Figure 6.16 Right frontal cavernoma \(a\) MR T2 \(b\) MR SWI.](#)

Chapter 8

[Figure 8.1 Spike-wave discharge with typical absence epilepsy.](#)

[Figure 8.2 Interictal EEG: left mesial TLE. Focal spikes: F7, T3 and LSp.](#)

[Figure 8.3 Widespread bilateral spike-wave discharge with a frontal complex ...](#)

[Figure 8.4 Left hippocampal sclerosis. Coronal T2-W: atrophy in left hippoca...](#)

Chapter 9

[Figure 9.1 Left temporal abscess MRI: \(a\) T2-W. \(b\) T1-W post-contrast.](#)

[Figure 9.2 Extensive posterior spinal epidural abscess: T2-W sagittal MRI.](#)

[Figure 9.3 Neurocysticercosis MR: \(a\) T2-W \(b\) T1-W post-contrast - lesions ...](#)

Chapter 10

[Figure 10.1 Nerve trunk, transverse section diagram. \(a\) Light microscopy. \(...](#)

[Figure 10.2 *Pes cavus*, clawed toes in CMT1A.](#)

[Figure 10.3 CMT1A: onion bulb pathology transverse sections: \(a\) Concentric ...](#)

[Figure 10.4 Neuromuscular junction. \(a\) Motor end plate: acetylcholine \(ACh\)...](#)

[Figure 10.5 Muscle action diagram. \(a\) Thin filaments - actin wrapped in neb...](#)

Chapter 11

[Figure 11.1 \(a, b\) Macroscopic pathology of demyelination. \(a\) Arrow to circ...](#)

[Figure 11.2 MR-T2W. \(a\) Multiple periventricular MS lesions. \(b\) Extensive a...](#)

[Figure 11.3 MR-T2W typical cervical cord MS lesions.](#)

[Figure 11.4 MR T2W: extensive cord lesion in NMO.](#)

[Figure 11.5 MR FLAIR: acute disseminated encephalomyelitis.](#)

Chapter 12

[Figure 12.1 Trigeminovascular system and migraine. Thalamic trigemino-vascul...](#)

Chapter 13

[Figure 13.1 Cells of the olfactory system.](#)

[Figure 13.2 Olfactory tract region, from below.](#)

[Figure 13.3 Cutaneous distribution of V₁, V₂ and V₃.](#)

[Figure 13.4 Spinal V nucleus: distribution.](#)

[Figure 13.5 Trigeminal pathways within the brainstem.](#)

[Figure 13.6 Facial nucleus, facial and abducens \(VI\) nerves \(pons cross-sect...\)](#)

[Figure 13.7 Principal branches of VII.](#)

[Figure 13.8 *Nervus intermedius*, greater petrosal nerve and *chorda tympani*.](#)

[Figure 13.9 Nerves IX, X, XI and XII: distribution. ICA, internal carotid ar...](#)

[Figure 13.10 Nerves IX, X and XI: skull base and brainstem.](#)

[Figure 13.11 Nerve XI, jugular foramen, *nucleus ambiguus* \(AP view, upper cor...](#)

[Figure 13.12 XII: Nerve peripheral distribution.](#)

Chapter 14

[Figure 14.1 Visual pathway: essential anatomy.](#)

[Figure 14.2 Typical visual field defects.](#)

[Figure 14.3 The eight retinal layers.8. Nerve fibre layer7. Ganglion cel...](#)

[Figure 14.4 Circuit diagram of retina. A, amacrine cell; C, cone; CB, cone b...](#)

[Figure 14.5 \(a\) Fovea and optic nerve. \(b, c\) Fovea and foveola: section and...](#)

[Figure 14.6 'What' visual pathway - right hemisphere medial surface. \(a\) Ast...](#)

[Figure 14.7 'Where' visual pathway - right hemisphere, lateral surface. Aste...](#)

[Figure 14.8 Cortical eye fields.](#)

[Figure 14.9 Voluntary conjugate eye movement \(midbrain, posterior view\).](#)

[Figure 14.10 Pupillary constriction to light \(midbrain, level of superior co...](#)

[Figure 14.11 Origins of III, IV and VI: transverse sections through brainste...](#)

[Figure 14.12 III, IV, VI and V within cavernous sinus. \(a\) Middle cranial fo...](#)

[Figure 14.13 *Dilator* and *sphincter pupillae*, lens and ciliary muscle.](#)

[Figure 14.14 Central retinal artery occlusion; cherry-red spot \(white arrow\)...](#)

[Figure 14.15 Cholesterol emboli \(black arrows\).](#)

[Figure 14.16 Central retinal vein occlusion: scattered deep haemorrhages.](#)

[Figure 14.17 Giant cell arteritis histology: granulomatous inflammation, fra...](#)

[Figure 14.18 Right-sided optic atrophy.](#)

[Figure 14.19 Chronic bilateral papilloedema and dilated veins with raised in...](#)

[Figure 14.20 Early papilloedema.](#)

[Figure 15.1 Vestibular apparatus: \(a\) Five vestibular sense organs. \(b\) Cell...](#)

[Figure 15.2 Semicircular canals and brainstem: head rotation and conjugate l...](#)

[Figure 15.3 Canalolithiasis. Diagram of a clump of otoconial debris in the p...](#)

[Figure 15.4 \(a\) Cochlea \(in section\). \(b\) Cochlear nerve, ventral cochlear n...](#)

Chapter 16

[Figure 16.1 Axial T2W MR: right lateral disc protrusion at C3-C4.](#)

[Figure 16.2 Sagittal T2W MR: central disc protrusion at C5-C6.](#)

[Figure 16.3 Sagittal T2W MR: central disc protrusion at L5-S1.](#)

[Figure 16.4 Sagittal T2W MR: multiple lumbar disc protrusions in a narrow ca...](#)

[Figure 16.5 Sagittal T2W MR: thoracic cord infarction.](#)

[Figure 16.6 Sagittal T2W MR: spinal AVM - multiple tortuous vessels with sig...](#)

[Figure 16.7 Sagittal T2W MR: syringomyelia - large fluid-filled cavity in th...](#)

Chapter 17

[Figure 17.1 *Ataxia telangiectasia*: typical conjunctival telangiectases.](#)

Chapter 19

[Figure 19.1 Abrupt papilloedema, retinal oedema and venous congestion on Mou...](#)

[Figure 19.2 Splenium in high-altitude cerebral oedema.](#)

[Figure 19.3 Fatal cerebral oedema. \(a\) Haemorrhagic brainstem infarction. \(b...](#)

[Figure 19.4 Symptomless retinal haemorrhage on Mount Everest.](#)

Chapter 20

[Figure 20.1 CT - acute extradural haematoma.](#)

[Figure 20.2 CT - large chronic subdural haematoma with an intraventricular d...](#)

Chapter 21

[Figure 21.1 Imaging and macroscopic features of gliomas Grades I-IV.](#)

[Figure 21.2 Frontal meningioma. MR T1-enhanced image.](#)

[Figure 21.3 Primary CNS lymphoma.](#)

[Figure 21.4 Histological features of Grade I-IV astrocytomas.](#)

[Figure 21.5 Intramedullary cervical cord glioma. MR T2W.](#)

Chapter 24

[Figure 24.1 Craniosacral parasympathetic and thoracolumbar sympathetic outfl...](#)

[Figure 24.2 Major neurotransmitters at autonomic ganglia.](#)

Chapter 25

[Figure 25.1 Central neuroanatomy of micturition control.](#)

[Figure 25.2 Innervation of lower urinary tract. IMP, inferior mesenteric ple...](#)

[Figure 25.3 Algorithm for incontinence. CISC, clean intermittent self-cathet...](#)

Chapter 26

[Figure 26.1 Arteries arising from the aorta.](#)

[Figure 26.2 Arterial supply: spinal cord.](#)

Neurology: A Clinical Handbook

Charles Clarke

Honorary Consultant Neurologist, National Hospital for Neurology & Neurosurgery, University College London Hospitals NHS Foundation Trust, Queen Square, London, UK



This Handbook is based on the Second Edition of *Neurology: A Queen Square Textbook*, which was co-edited by Dr Clarke.

WILEY

This edition first published 2022
© 2022 John Wiley & Sons Ltd

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, except as permitted by law. Advice on how to obtain permission to reuse material from this title is available at <http://www.wiley.com/go/permissions>.

The right of Charles Clarke to be identified as the author of this work has been asserted in accordance with law.

Registered Offices

John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, USA
John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

Editorial Office

9600 Garsington Road, Oxford, OX4 2DQ, UK

For details of our global editorial offices, customer services, and more information about Wiley products visit us at www.wiley.com.

Wiley also publishes its books in a variety of electronic formats and by print-on-demand. Some content that appears in standard print versions of this book may not be available in other formats.

Limit of Liability/Disclaimer of Warranty

The contents of this work are intended to further general scientific research, understanding, and discussion only and are not intended and should not be relied upon as recommending or promoting scientific method, diagnosis, or treatment by physicians for any particular patient. In view of ongoing research, equipment modifications, changes in governmental regulations, and the constant flow of information relating to the use of medicines, equipment, and devices, the reader is urged to review and evaluate the information provided in the package insert or instructions for each medicine, equipment, or device for, among other things, any changes in the instructions or indication of usage and for added warnings and precautions. While the publisher and authors have used their best efforts in preparing this work, they make no representations or warranties with respect to the accuracy or completeness of the contents of this work and specifically disclaim all warranties, including without limitation any implied warranties of merchantability or fitness for a particular purpose. No warranty may be created or extended by sales representatives, written sales materials or promotional statements for this work. The fact that an organisation, website, or product is referred to in this work as a citation and/or potential source of further information does not mean that the publisher and authors endorse the information or services the organisation, website, or product may provide or recommendations it may make. This work is sold with the understanding that the publisher is not engaged in rendering professional services. The advice and strategies contained herein may not be suitable for your situation. You should consult with a specialist where appropriate. Further,

readers should be aware that websites listed in this work may have changed or disappeared between when this work was written and when it is read. Neither the publisher nor authors shall be liable for any loss of profit or any other commercial damages, including but not limited to special, incidental, consequential, or other damages.

Library of Congress Cataloging-in-Publication Data

Names: Clarke, Charles (Charles R. A.) author. | National Hospital for Neurology & Neurosurgery, Queen Square.

Title: Neurology: A Clinical Handbook / Charles Clarke.

Other titles: Neurology.

Description: Hoboken, NJ : Wiley, 2022. | Based on: Neurology : A Queen Square Textbook / edited by Charles Clarke, Robin Howard, Martin Rossor, Simon Shorvon. Second edition. Chichester, West Sussex, UK ; Hoboken, NJ : John Wiley & Sons, Inc., 2016. | Includes bibliographical references and index.

Identifiers: LCCN 2021054270 (print) | LCCN 2021054271 (ebook) | ISBN 9781119235729 (paperback) | ISBN 9781119235712 (adobe pdf) | ISBN 9781119235705 (epub)

Subjects: MESH: Nervous System Diseases | Neurology | Handbook

Classification: LCC RC346 (print) | LCC RC346 (ebook) | NLM WL 39 | DDC 616.8-dc23/eng/20211124

LC record available at <https://lccn.loc.gov/2021054270>

LC ebook record available at <https://lccn.loc.gov/2021054271>

Cover Design: Wiley

Cover Image: © Sergey Nivens/Shutterstock

Preface

In my training in the 1970s I was guided by many clinicians and also by books. Those large neurology tomes were useful, but it was the smaller texts that gave me insight into clinical practice. One by Dr Bryan Matthews, later Professor of Clinical Neurology at Oxford, was *Practical Neurology* published in 1963, when Matthews was a general neurologist in Derby. His was a book I could enjoy. Some comments are etched in my memory:

‘There are many admirable textbooks of neurology but it is a matter of common observation that they are of more assistance in the passing of written examinations than in the management of practical problems’. Another, quoting Sir Geoffrey Jefferson, remarked ‘... in life the tracts are not marked in red ...’

And, from Matthews on dizziness: ‘... there can be few physicians so dedicated to their art that they do not experience a slight decline in spirits on learning that their patient complains of giddiness....’

There was thus some logic in taking *Neurology: A Queen Square Textbook*, Second Edition, the major reference work that I initiated and edited with colleagues, and turning it into this shorter, practical book. I hope this *Handbook* will serve two purposes. First, it is to be *read* – each chapter aims to give a brief overview of an area of neurology. Secondly, this book, a synopsis of our subject, provides a pointer to *Neurology: A Queen Square Textbook* in its forthcoming Third Edition, a completely separate project that has been fully updated and enhanced by Robin Howard, Dimitri M. Kullman, David Werring, and Michael Zandi. *Neurology: A Clinical Handbook* is based on the

second edition of *Neurology: A Queen Square Textbook*. The editors and authors of *Neurology: A Queen Square Textbook* have not been involved in the development of this Handbook.

I struggled with several things. First: references. I decided, because one can source most references rapidly on a mobile phone, I would focus only on those references of personal interest. These are largely my own - but with one paper from my late wife Dr Ruth Seifert on *khat* and another from my father Professor Sir Cyril Astley Clarke on fatal methyl bromide poisoning - from the 1940s; both are in [Chapter 19](#). Well, I thought ... this is *my* book.

Secondly, with radiology: the internet is full of excellent neuroradiology (e.g. Radiopaedia *et al.*) that far surpasses printed images. Do please search for such sources - some are mentioned via the additional notes and references on my website:

<https://www.drcharlesclarke.com>.

My main experience for some 40 years, like that of Bryan Matthews, has been as a general neurologist in UK district general hospitals, largely the busy battleground of Whipps Cross, but always attached to a major neurology unit, initially St Bartholomew's and latterly Queen Square. I always found the variety within general neurology more attractive than its emerging specialties. I also broadened my experience by working further afield - during a meningococcal epidemic in Boston, in a leprosy clinic in Mysore, south India and elsewhere in India, Nepal and China, often in remote situations on mountaineering expeditions.

I thank many people. My parents Cyril and Féo Clarke were distinguished medical researchers, but I suspect they often despaired of me - their practical son who seemed focused