Contents

SECTION 1: Stroke Rehabilitation

1. Blood Supply of Brain and its Disorders **3**
Syed Ali Asad

• Supply of Cerebrum *3* • Vascular Supply of Midbrain *6* • Effects of Lesion *7* • Summary of the Principal Cortical Areas of Cerebrum and their Lesions *12*

2. Clinical Presentation of Stroke Syndromes **14**
Souvik Sen

• Clinical Diagnosis of Acute Ischemic and Hemorrhagic Stroke *16* • Clinical Syndromes and Arterial Distribution of Stroke *17* • Clinical Stroke Scales *25*

3. Evaluation of Stroke **28**
Ranen Kumar Ghatak, Mouli Madhab Ghatak

• Stroke *28* • History *29* • Clinical Examination of Stroke Patient *31* • Investigation *34* • Activity of Daily Living *35* • Scales Used for Outcome Assessment *35*

4. Acute Stroke Management **40**
Souvik Sen

• Mechanisms of Ischemic Stroke *43* • Mortality/Morbidity *44* • Clinical History and Symptomatology *45* • Physical Examination *45* • Common Stroke Mimics (Differential Diagnosis) *47* • Blood Tests in Acute Stroke *47* • Neuroimaging Studies in Acute Stroke *48* • Other Tests that Might Assist in Acute Stroke Management *51* • Stroke Medical Care *51* • Surgical Care *53* • Consultations *54* • Diet *54* • Physical Activity *55* • Further Inpatient Care *55* • Outpatient Care/Rehabilitation *55* • In/Outpatient Measures in Secondary Prevention *56* • Transfer to a Stroke Capable Hospital *56* • Complications *57* • Patient and Health Personnel Education *57* • Palliative Care *58*

5. Concepts in Stroke Rehabilitation **60**
Mouli Madhab Ghatak

• Neural Plasticity: The Light in Rehabilitation *60*
• The Learning: Plasticity Duet *61* • Basic Factors in Stroke Rehabilitation *62* • Goal of Stroke Rehabilitation Programs *62* • Stroke Recovery Predictors (SRP) *62* • When Rehabilitation? *63*
• Where and Whom to Rehabilitate? *63*
• Phases of Poststroke Rehabilitation *64*
• Long-term Rehabilitation *72*

6. Management of Complications and Deconditioning Hazards of Stroke and Spinal Cord Injury Patients **78**
Partha Pratim Pan, Mouli Madhab Ghatak

• Musculoskeletal Changes *79* • Cardiovascular Hazards *89* • Deep Vein Thrombosis and Pulmonary Embolism *89* • Pulmonary Complications *91*
• Integumentary System *92*

7. Therapeutic Exercise Program for Stroke Patients **97**
S Srinivas Rau

• Goals of Exercises during the Early Stage *97*
• Positioning the Patient *97* • Choice of Positioning *98*
• Reflex Inhibiting Movement Patterns *100* • Selective Movements of the Upper Extremity *102* • The Lower Extremity *102* • Trunk Mobilization in Hemiplegia *104*
• The Pelvis in Hemiplegia *106* • Gait and Gait Training *106* • Some Useful Methods to Facilitate Walking *107*

8. Speech and Language Dysfunction in Stroke: Diagnosis and Management **109**
K Venugopal, Indu Marium Jacob

• General Characteristics of Aphasia *110*
• Types of Aphasia *111* • Differential Diagnosis *111*
• Evaluation of Aphasia *114* • Assessment Instruments *115*
• Independent Test of Specific Skills *116* • Treatment of Aphasia *117* • Variables that affect Treatment Outcome *117*
• Principles of Treatment of Aphasic Patients *118*
• Therapy Approaches *119* • New Therapeutic Approaches for Teaching Aphasia *122* • Alternative Augmentative Communication in Aphasia *122*

9. Pressure Sore and Skin Care in Stroke and Spinal Cord Injuries **128**
Rupnarayan Bhattacharya
• Etiology of Pressure Sore *128* • Pathology *129* • Pressure Sore Grading *130* • Distribution of Pressure Sore *131* • Management of Pressure Sore *132*

10. Swallowing Problems in Stroke and Brain Injury **138**
K Venugopal, Indu Marium Jacob
• Oral Preparatory Phase *139* • Oral Transport Stage *139* • Central Control of Swallowing *141* • Role of the Cerebral Cortex *141* • Characteristics of Swallowing Disorders in the Brain Injury *142* • Impaired Cognition *143* • Assessment of Swallowing *145* • Management of Dysphagia *147* • Alternatives to Rehabilitation of Oral Feeding *149*

11. Psychiatric Rehabilitation in Stroke **152**
Srilekha Biswas
• Psychological Consequences of Stroke and their Management *152*

12. Nature, Impact and Retraining of Cognitive Deficits in Stroke **158**
Shobini L Rao
• Nature of Cognitive Deficits in Stroke *158*
• Prevalence of Cognitive Deficits *159*
• Assessment of Cognitive Deficits *159*
• Impact of Cognitive Deficits on Stroke Outcome *161*

13. Nutritional Management of Stroke **172**
Shrabani Sanyal Bhattacharya
• Nutrition-related Risks and Preventive Diets for Stroke *175*
• Dietary Management *176* • Hypocholesterolemic Agents *178*

SECTION 2: Spinal Cord Injury Rehabilitation

14. Anatomy of Spinal Cord **183**
Syed Ali Asad
• Laminar Concept of Spinal Gray Matter *184*
• White Matter of Spinal Cord *185* • Pain Control Mechanism *193* • Blood Supply of Spinal Cord *194*

15. Pathophysiology of Spinal Injury **202**
Milind Deogaonkar

• *Spinal Column Injury:* Traumatic Forces *202*
• *Spinal Column Injury:* Mechanism of Injury *203*
• *Spinal Cord Injury:* Pathophysiology *205*

16. Evaluation of Spinal Cord Injury **207**
HS Chhabra

• History *208* • Impairment, Disability and Handicap *208*
• Neurological Assessment *209* • Asia Scoring *210*
• Steps in Assigning an Asia Level *212* • Functional Outcome Scales *214* • Assessment/Evaluation for Complications *218* • Psychological Assessment *218*
• Evaluation for Requirement of Equipment, Aids and Appliances *220* • Evaluation of Home, Workplace and Environment *220*

17. Role of Electrodiagnostics in Spinal Cord Injury and Stroke Rehabilitation **222**
Arun B Taly, KPS Nair

• Evoked Potentials *223* • Electromyography *224*
• Nerve Conduction Studies *226* • Evaluation of Autonomic Function *226* • Muscle Strength Testing *227*
• Evaluation of Fatigue *228* • Posturography *228*
• Gait Analysis *228* • Quantification of Spasticity *229*
• Pudendal Nerve Latency *235* • Assessment of Residual Function *235*

18. Acute Care and Surgical Aspects of Spinal Injuries **239**
Milind Deogaonkar

• Historical Aspects *239* • Epidemiology *240*
• Prehospital Management *242* • Acute in-hospital Care *242* • Surgery for Spinal Cord Injury *245*

19. Concepts in Spinal Cord Injury Rehabilitation **248**
Mouli Madhab Ghatak

• A Comprehensive SCI Rehabilitation *249*
• The Predischarge Preparation *251*
• Long-term Care for Quadriplegics *252*
• Modern Technologies in Spinal Cord Injury Rehabilitation *254* • Management of Chronic Pain in SCI Patients *254* • Assistive Technology for People with Spinal Cord Injuries *258*

• Rehabilitation of Spinal Cord Injury Patients *264*
• Reintegration of a Spinal Cord Injury: Person *264*

20. Therapeutic Rehabilitation and Medical Management of Spasticity 268
Rupam Sinha, S Ziauddin, Mouli Madhab Ghatak

• Pathophysiology *268* • Factors Related to Movement Dysfunction after Stroke *269* • Positive and Negative Roles of Spasticity *269* • Movement Problems Associated with Spasticity *270* • Spasticity Treatment Planning *272*
• Therapeutic Approaches in the Treatment of Spasticity *272*
• Medical Management of Spasticity *276* • Intrathecal Baclofen Pump for Treatment of Spasticity *277*

21. Therapeutic Exercises for Spinal Cord Injuries 285
S Srinivas Rau

• Physiotherapy Assessment during the Acute Phase *286*
• Physiotherapy Treatment during Acute Phase *287*
• Passive or Active Movements *288* • Physiotherapy Treatment in the Subacute Phase *291*

22. Surgical Management of Spasticity 297
Milind Deogaonkar

• Surgical Strategies for Management of Spasticity *297*

23. Functional Restoration of Spinal Cord Injury Patients 303
Amit Pathak

• Basic Principles *303* • Preliminary Training for Functional Activities *304*

24. Management of Neurogenic Bladder, Sexual and Bowel Dysfunction in Spinal Cord Injuries 309
Mahima Agarwal, Mrinal Joshi

• Classification of Neurogenic Bladder *309* • Evaluation of Voiding Dysfunction *311* • Management of Voiding Dysfunctions *311* • Bladder Management Techniques *312* • Pharmacological Management *313*
• Enhancing Bladder Emptying Pharmacologically *314*
• Other Pharmaceutical Treatments for Bladder Emptying *314* • Surgical Treatment Options *314*
• Pathophysiology and Clinical Features *315*
• Aims of Neurogenic Bowel Management *316*
• Neurogenic Bowel Management *316*

25. Respiratory Care in Spinal Cord Injury **319**
Parthasarathi Bhattacharya

• Respiratory Problems in Spinal Cord Injury *320* • Assessment of Pulmonary Function in Spinal Cord Injury *323* • Others Issues: Prevention and Treatment of Complications *328*

26. Nutritional Management in Spinal Cord Injuries **336**
Shrabani Sanyal Bhattacharya

• Metabolic and Endocrine Changes after Spinal Cord Injury *336* • Weight Management *337* • Understanding Calories, Grams and Nutrients *338* • Bowel Management *339* • Strategies for the Prevention of Osteoporosis *340* • Skin Care *341*

27. Wheelchair Selection and Training in Spinal Cord Injury Patients **342**
Amit Pathak

• Evaluation *342* • Wheelchair Types (On the Basis of Mobility) *343* • Ergonomic Consideration in Wheelchair Selection *344* • Wheelchair Maneuvers by Tetraplegic Patient without a Grip *346* • Wheelchair Maneuvers by Paraplegic Patient *347* • Wheelchair Prescription on the Basis of Level of Injury *348*

28. Orthotic Management in Stroke and Spinal Cord Injury **349**
Mouli Madhab Ghatak, Tanmay Sengupta

• Types of Splints *349* • Lower Extremity *352* • Levelwise Orthotic Management of Spinal Cord Injury *353* • Advanced Orthosis *355*

SECTION 3: Brain Injury Rehabilitation

29. Consequences of Traumatic Brain Injury **361**
Indrajit Roy

• Neurophysical Sequelae *362* • Neurobehavioral Sequelae *364* • Case Reports *365*

30. An Outline of Brain Injury Rehabilitation **372**
Bhabani Kumar Chowdhury
• Rehabilitation of Cases with Traumatic Brain Injury *373*
• Assessment Scale *373* • Diaschisis *373*
• Active Rehabilitation *375* • Cognitive Rehabilitation *377*
• Sexuality Rehabilitation *377* • Outcome of Brain Injured *377*

SECTION 4: Integration and Extension

31. Models of Rehabilitation in Spinal Cord Injury and Stroke **381**
Mouli Madhab Ghatak
• Systems of Rehabilitation in Stroke and Spinal Cord Injuries *387*

32. Recreational Therapy in Rehabilitation **392**
West E Ray
• Introduction to Recreational Therapy *392*
• Definition of Recreational Therapy *393*

33. Epilogue: Regeneration Research—A Hope for Future **416**
Milind Deogaonkar
• Nature of Spinal Cord Injury *416* • Spinal Cord Repair Research *417* • Electrostimulus Devices: Paraplegics Walk Again *419*

Appendix **421**
K Venugopal, Indu Marium Jacob
• Clinical Bedside Swallowing Assessment *421*

Index *423*