

Contents

List of Contributors page ix

Preface xv

Development of the Concept of Dystonia as a Disease, a Syndrome and a Movement

Disease, a Synonym
Phenomenology 1

Stanley Fahm

Section I Basics

- 2 Classification of Dystonia** 9
Alberto Albanese and Stefania Lalli

3 Primary or Idiopathic Dystonias ('Isolated Dystonia') 15
Bettina Balint, Roberto Erro and Kailash P. Bhatia

4 Non-Primary Dystonias 20
Peter Kaňovský and Dirk Dressler

5 Epidemiology of Dystonia 27
Bulent Elibol and Gul Yalcin Cakmakli

6 The Motor Network Model for Dystonia 32
Hyder A. Jinnah and Ellen J. Hess

7 Functional Imaging in Dystonia 36
Scott A. Norris and Joel S. Perlmutter

8 The Pathophysiology of Dystonia 40
Jung E. Park, Sophie Cho and Mark Hallett

9 Animal Models of Dystonia 49
Marta Maltese, Paola Imbriani and Antonio Pisani

10 Genetics of the Dystonias: Overview 53
Aloysius Domingo and Christine Klein

11 Dystonia: from Genomics to Proteomics and Beyond 59
Thomas T. Warner and Daniela Hansen

12 Dystonia and Tremor 63
Ellen B. Penney and Elan D. Louis

13 Posttraumatic Dystonia 66
Karen Frei and Daniel Truong

14 Non-Motor Symptoms in Dystonia 68
Maryam Jahanshahi

15 Scales for Assessment of Dystonia 75
Cynthia L. Comella and Glenn T. Stebbins

- 16 **Theories Behind Dystonia Scale Development** 79
Sophie Cleanthous and Stefan J. Cano

17 **Linking Allied Health Professionals and Physicians: The IAB Model** 82
Fereshte Adib Saberi and Dirk Dressler

18 **The Role and Responsibility of the Dystonia Specialist Nurse** 85
Marianne King

19 **History of Dystonia Treatments** 87
Frank Erbguth

20 **Dystonia in Arts and Artists** 92
Hansjörg Bätzner and Christian Riederer

Section II Botulinum Toxin Therapy

- 21 **The Global Market for Botulinum Toxin** 99
Andy Pickett

22 **Molecular Mechanisms of Botulinum Toxin** 102
Ornella Rossetto and Cesare Montecucco

23 **Indirect Central Nervous System Effects of Botulinum Toxin** 106
Melanie Leigh D. Supnet and Raymond L. Rosales

24 **Direct Central Nervous System Effects of Botulinum Neurotoxin** 111
Matteo Caleo and Riccardo Mazzocchio

25 **Analgesic Effects of Botulinum Toxins** 115
Zdravko Lacković and Maja Relja

26 **Manufacture of Commercial Botulinum Neurotoxins for Human Treatment** 120
Eric A. Johnson

27 **Pharmacology of Botulinum Toxins** 128
Dirk Dressler and Keith Foster

28 **Immunology of Botulinum Toxin Therapy** 133
Dirk Dressler and Hans Bigalke

29 **Use of Non-A/Non-B Botulinum Toxins** 137
Roberto Eleopra

- 30 **Clinical Muscular Anatomy for the Botulinum Toxin Injector** 139
Mandar Jog and Robert Chen
- 31 **Ultrasound Guidance for Botulinum Toxin Application** 149
Uwe Walter and Dirk Dressler
- 32 **Treatment Algorithms and Injection Schemes for Botulinum Toxin Therapy of Dystonia** 154
Dirk Dressler
- 33 **Botulinum Toxin Therapy for Cervical Dystonia** 160
Mary Ann Thenganatt and Joseph Jankovic
- 34 **Botulinum Toxin Therapy for Cranial Dystonia** 167
Karoline Wenzel and Carlo Colosimo
- 35 **Botulinum Toxin Therapy for Spasmodic Dysphonia** 172
Christopher Tang and Andrew Blitzer
- 36 **Botulinum Toxin Therapy for Writer's Cramp and Other Focal Hand Dystonias** 178
Barbara Illoowsky Karp
- 37 **Botulinum Toxin Therapy for Bruxism** 182
Olga Orlova
- 38 **Treatment of Blepharospasm With Eyelid-Opening Apraxia** 185
Rainer Laskawi and Dirk Dressler
- 39 **Organisation of a Botulinum Toxin Clinic** 189
Austen Peter Moore

Section III Musician's Dystonia

- 40 **Phenomenology of Musician's Dystonia** 195
Steven J. Frucht
- 41 **Aetiological Concepts of Musician's Dystonia** 202
Eckart Altenmüller and Christos I. Ioannou
- 42 **Treatment of Musician's Dystonia With Botulinum Toxin** 206
Miriam Sklerov and Seth L. Pullman
- 43 **Experimental Occupational and Brain Stimulation Therapies for Musician's Dystonia** 210
Eckart Altenmüller and Shinichi Furuya

Section IV Psychogenic Dystonia

- 44 **The Clinical Spectrum of Functional/Psychogenic Dystonia** 217
Thomas D. L. Steeves and Anthony E. Lang
- 45 **Diagnosis of Psychogenic Dystonias** 224
Carine W. Maurer and Mark Hallett

Section V Treatment of Paediatric Dystonia

- 46 **Intrathecal Baclofen for Dyskinetic Cerebral Palsy** 229
R. Jeroen Vermeulen, Laura A. Bonouvie, Annemieke I. Buizer, Willem J. R. van Ouwerkerk, Jasper van Aalst, Onno Teernstra, Dan Soudant and Jules G. Becher
- 47 **Deep Brain Stimulation for the Treatment of Paediatric Dystonia** 233
Laura Cif and Philippe Coubes
- 48 **Deep Brain Stimulation for Small Children With Dystonia** 238
Keyoumars Ashkan and Jean-Pierre Lin

Section VI Rehabilitation of Dystonia

- 49 **Treatment Strategies for the Rehabilitation of Dystonia** 247
Teresa Jacobson Kimberley, Heidrun Pickenbrock and Lena Zetterberg
- 50 **Rehabilitation of Cervical Dystonia** 252
Jean-Pierre Bleton
- 51 **Rehabilitation and Plasticity of Task-Specific Focal Hand Dystonia** 256
Jaume Rosset-Llobet and Sílvia Fàbregas-Molas

Section VII Pharmacotherapy for Dystonia

- 52 **Pharmacotherapy of Dystonia: an Overview** 263
Vladimir S. Kostić and Zvezdan Pirtošek
- 53 **Anticholinergics in the Treatment of Dystonia** 268
Michel Sáenz-Farret and Federico Micheli
- 54 **Tetrabenazine for the Treatment of Dystonia** 272
Christoph Schrader and Saeed A. Bohlega
- 55 **Treatment of Dopa-Responsive Dystonia** 279
Ryul Kim and Beomseok Jeon
- 56 **Treatment of Paroxysmal Dystonia** 292
Roberto Erro, Bettina Balint and Kailash P. Bhatia

Section VIII Surgical Treatment of Dystonia

- 57 **History of Surgical Treatments for Dystonia** 299
Joachim K. Krauss
- 58 **Selective Neurotomy for the Treatment of Dystonia** 306
Takaomi Taira, Shiro Horisawa, Nobuhiko Takeda and Tomoko Hanada
- 59 **Selective Peripheral Denervation for the Treatment of Cervical Dystonia** 310
James Palmer

- 60 Stereotactic Lesioning for the Treatment of Dystonia** 315
Robert E. Gross and Matthew A. Stern
- 61 Direct Cortical Stimulation for the Treatment of Dystonia** 335
Giuseppe Messina, Giovanni Broggi, Roberto Cordella and Angelo Franzini
- Section IX Deep Brain Stimulation for Dystonia**
- 62 Functional Mechanisms of Deep Brain Stimulation in Dystonia** 345
Andrea A. Kühn and Angelo Quartarone
- 63 Deep Brain Stimulation for Isolated Generalised Dystonia** 352
Binit B. Shah and Elena Moro
- 64 Deep Brain Stimulation for Isolated Focal and Segmental Dystonia** 356
René Reese and Jens Volkmann
- 65 Deep Brain Stimulation for Meige Syndrome** 360
Joachim K. Krauss
- 66 Contemporary Thalamotomy for Dystonia** 363
Takaomi Taira, Shiro Horisawa, Nobuhiko Takeda and Tomoko Hanada
- 67 Deep Brain Stimulation for Myoclonus-Dystonia** 368
Ausaf A. Bari and Andres M. Lozano
- 68 Deep Brain Stimulation for Tardive Dystonia** 372
Doreen Gruber and Andreas Kupsch
- 69 Deep Brain Stimulation for Choroathetosis in Cerebral Palsy** 378
Marie Vidailhet and Christian Amlang
- 70 Deep Brain Stimulation for Other Secondary Dystonias** 382
Lars Timmermann and Anne Koy
- 71 The Subthalamic Nucleus as a Deep Brain Stimulation Target for Dystonia** 385
Jill L. Ostrem and Kelly A. Mills
- 72 The Thalamus as a Target for Deep Brain Stimulation in Dystonia** 389
Akshitkumar M. Mistry and Joseph S. Neimat
- 73 Dystonia Patients Non-Responsive to Deep Brain Stimulation** 392
Amande Pauls
- 74 Akinesia Induced by Deep Brain Stimulation** 397
Christian Blahak
- 75 Programing Deep Brain Stimulation for Treatment of Dystonia** 400
Christos Sidiropoulos, Paul Krack and Elena Moro

- 76 Complications of Deep Brain Stimulation for Dystonia** 404
Marwan Hariz and Gun-Marie Hariz
- Section X Emerging Therapies for Dystonia**
- 77 Experimental Occupational Therapies for Writer's Cramp** 409
Arne Knutzen and Kirsten E. Zeuner
- 78 Transcranial Electric and Magnetic Stimulation for Dystonia** 414
Ulf Ziemann
- 79 Cannabinoids in Dystonias** 420
Eckart Altenmüller and André Lee

- Section XI Future Trends in Dystonia Therapy**
- 80 Future Trends in Dystonia Research** 427
Dirk Dressler, Eckart Altenmüller, Thomas Gasser, Mark Hallett and Joachim K. Krauss

- Appendix I Dystonia Medical Research Foundation: 40 Years of Patient Advocacy and Stimulating Research* 435
Janet Hieshitter and Jessica Feeley
- Appendix II Dystonia Europe: Developing Partnerships in the Dystonia Community* 437
Alistair Newton
- Appendix III The Dystonia Coalition* 440
Ami R. Rosen and Hyder A. Jinnah
- Appendix IV DystonieNet: A Dutch Approach for Optimising the Treatment of Cervical Dystonia* 444
Maria A. J. de Koning-Tijssen and Joost van den Dool
- Appendix V Musicians With Dystonia* 446
Glen Estrin
- Appendix VI Funding for Dystonia Research: Trends and Challenges* 448
Jan K. Teller

- Index* 451

Robert Chen
Division of Neurology, Department of Medicine, Toronto Western Hospital, University of Toronto, Toronto, Ontario, Canada

Sophie Cho
Human Motor Control Section, National Institute of Neurological Disorders and Stroke, National Institutes of Health, Bethesda, MD, USA