

# Neuromuscular Disease: A Case-Based Approach

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# Neuromuscular Disease

## A Case-Based Approach

Second Edition

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## Foreword

During the past three decades, interest in neuromuscular medicine has increased exponentially.

This neurology section turned from a descriptive diagnostic setting into a molecular diagnostic and currently gene therapeutic subject.

However, the base of all this development remains the deep phenotyping or, more holistically, the Gestalt approach to neuromuscular disorders.

In this book, four ‘icons’ of the neuromuscular world, Marianne de Visser, Jessica Hoogendijk, Erik Niks, and Pieter van Doorn, jointly describe emblematic clinical case reports of the whole spectrum of these acquired and inherited more than 800 distinct disorders.

In this book, all sections of the nervous system, from motor neurons via the spinal cord and peripheral nerve through the neuromuscular endplate into the skeletal muscle, are reflected in case presentation to raise awareness, interest, knowledge, and clues for

beginners, professionals, and to esteemed experts of the field.

A state-of-the-art summary supports these case reports for evaluating people with neuromuscular disorders using neuromuscular-specific ancillary investigations such as electrophysiology, imaging, and genetic testing by Stephan Goedee and Wouter van Rheenen.

This book, written in the beautiful Dutch tradition of clinical perception of medicine, will help set the framework for teaching and learning about patients living with neuromuscular disorders.

Taking up this ongoing novel ‘therapy area’ of neuromuscular disorders, this book is in high demand, as treating rare diseases is re-learning rare diseases.

Benedikt Schoser

## Preface to 2nd Edition

Neuromuscular diseases (NMD) are classified as rare diseases affecting less than 5 individuals in 10,000, but collectively NMD are quite common. Diagnosis of NMD can be difficult, but due to advancements in particular in genetic testing, some adult patients may receive a better-defined or alternative diagnosis to the one established during childhood.

This book contains 66 neuromuscular cases across the spectrum of NMD that aim to familiarize the reader with the wide spectrum of clinical features in NMD, the diagnostic strategies, and therapeutic possibilities. Asking about symptoms and problems in daily life, the family history, and careful neurological examination often largely help to make an appropriate clinical and differential diagnosis. In the second edition of this book, 23 tables of differential diagnoses are included that assist in the diagnostic process. Additional laboratory investigations are often helpful and include at least assessment of serum creatine kinase (CK) activity in patients suspected to have a myopathy, anti-acetylcholine receptor, and other antibodies in patients with fluctuating weakness, and a range of laboratory tests to identify risk factors for polyneuropathy in patients with a neuropathy. The basics of electromyography (EMG) and nerve ultrasound (NUS) are described and illustrated. EMG examination is important in the diagnosis of motor neuron disease, helpful to diagnose polyneuropathy, and essential to dissect polyneuropathy into axonal and demyelinating subgroups. If a hereditary disease is suspected, up-to-date DNA analysis is often the diagnostic approach of choice. The basics of genetic diagnostic tests, including suggestions when and how to use them, are described. In inflammatory diseases of muscle, myositis blots to detect myositis-specific antibodies can be used to search for specific comorbidities. Advanced imaging techniques, especially MRI and muscle ultrasound, can be helpful to make the diagnosis or to guide the location of a muscle biopsy. An appropriate sequence of

examinations usually allows for making an accurate diagnosis. However, despite advanced and targeted investigations, offering a precise diagnosis may remain a challenge.

Once a diagnosis has been made, other medical disciplines sometimes have to be consulted, for example a medical geneticist in case of a hereditary disease. Some patients with a hereditary myopathy, but also those with, for example, amyloidosis, require consultation of a cardiologist. Targeted treatment for hereditary neuromuscular disorders is currently limited to only a few diseases, but it is hoped that gene therapy will become more widely applicable in the near future. Most patients with immune-mediated diseases, especially those with immune-mediated polyneuropathy, and patients with myasthenia gravis or myositis can nowadays be treated successfully, but there is still a need for more effective drugs with fewer side effects, and new drugs are currently under investigation.

Management of patients with an NMD often also involves rehabilitation care in all its aspects, and there are current standards of care for anaesthesia, pregnancy, the transition of paediatric care to adulthood care, and palliation. Therefore, this book is relevant for a wide range of medical professionals, care givers, students, and others interested in patients with an NMD.

We are indebted to the late Professor John Wokke for his eminent contribution to the first version of this book, which was published in 2013. This second edition is fully revised and updated, now containing also paediatric cases and many new cases, new figures, and videos. To assist in the diagnostic process, we added 23 tables of differential diagnoses of a wide range of clinical problems (e.g., axial weakness, bulbar weakness, or pure motor distal weakness). However, we did not aim at completeness and this book is not intended to be a comprehensive textbook.

We thank Drs Stephan Goedee (Chapters 4 and 5), Wouter van Rheenen (Chapter 7), and Renske Wadman (Case 7) for their contributions, Professor



**Preface to 2nd Edition**

Eleonora Aronica and Dr Wim van Hecke for their help with the muscle pathology, Professor Peter Barth and Dr Anneke van der Kooi for providing Cases 58 and 64 Dr Janneke Hoeijmakers and Professor Jan Verschuuren for providing Figures 14.3 and 32.1, Professor Karin Faber and Dr Henk-Jan Westeneng for providing Videos 39.2-3 and 62.1, and Dr Merel van Maerle for her recommendations regarding genetic counseling in Chapter 8.

We foremost thank our patients, who form the basis of this book. They agreed to have their

disease, or their child's disease, pictured in a photograph or video, trusting this will help in educating medical professionals and thus contribute to the treatment and care for patients with a neuromuscular disease.

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