



Neuromuscular Rehabilitation in Manual and Physical Therapies

Dedicated to Tsafi, Guy, Mattan and Pinooki



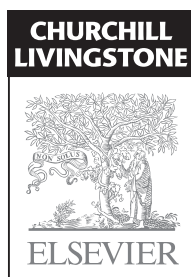
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Neuromuscular Rehabilitation in Manual and Physical Therapies

Principles to Practice

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This book is for individuals who would like to help other individuals to recover their control of movement.

Neuromuscular rehabilitation is straightforward and uncomplicated: we all do it naturally all of the time. Throughout our lives we learn new movement patterns or recover our control after an injury. The means by which we achieve these changes are no different to neuromuscular rehabilitation. They all rely on the same neurophysiological, psychological and behavioural processes.

Neuromuscular rehabilitation integrates several branches of knowledge. They include medical, neurophysiological, psychological-behavioural and motor-control sciences as well as manual and physical therapy fields. The enormity of available information from these diverse sources can be overwhelming, in particular when trying to translate this information into a practical clinical approach. The main aim in writing this book was to collate and integrate all this information and present it in a practical, user-friendly format.

Over the years of working in clinics I have observed that neuromuscular rehabilitation of a person after joint surgery or musculoskeletal injury bears close resemblance to the clinical management of a stroke patient. It was clear to me that there is a unifying model for neuromuscular rehabilitation. However, it took a good decade and a half to put it together into a coherent and cohesive model, and one which is still being tinkered with. This unified model for neuromuscular rehabilitation is described throughout the book.

The information in the book is derived from several sources. It is a combination of my own research in the neurophysiology of manual therapy, the vast research in all the fields discussed above, my clinical experience of 23 years and my experience of teaching neuromuscular rehabilitation for the last 15 years. These experiences have made me aware of the academic and practical needs of the practitioners in this area. This is reflected in the contents of this book: it aims to bridge the gap between science and the practice of neuromuscular rehabilitation.

The contents and organization of the book

The book starts by identifying the main unifying model/principles for motor rehabilitation (Ch. 1), including the importance of a functional approach, skill- and ability-level rehabilitation and the code for neuromuscular adaptation. The following chapters discuss several areas that are relevant to neuromuscular rehabilitation. They include how movement is organized (motor control, Ch. 2) and how it is constructed from underlying control components called motor abilities (Ch. 3). These abilities are affected in various neuromuscular and musculoskeletal conditions and may, therefore, become the target of rehabilitation. Also, proprioception plays an important role in movement control and is often affected by musculoskeletal and central nervous system damage (Ch. 4).

The next important issue in rehabilitation is how to sustain the motor recovery in the long term. Chapter 5 discusses motor learning and adaptation principles and how to integrate them into the clinical management. The consequences of learning, neurophysiological/neuromuscular plasticity and adaptation are discussed in Chapter 6.

In musculoskeletal injuries the motor system reorganizes movement to prevent further damage (Ch. 7). The motor manifestation of this reorganization will be discussed as well as the indications for introducing neuromuscular rehabilitation after injury identified.

Once an individual acquires an injury, their beliefs, attitudes and behaviour may have important implications for recovery. Furthermore, the way a person uses their body or schedules their activities during the day may put them at risk for injury. These cognitive and behavioural factors are discussed in Chapter 8. This theme is continued in Chapter 9, examining non-traumatic pain conditions such as trapezius and jaw myalgia, and chronic neck pain. In this group of conditions the individual develops localized and debilitating pain without a history of tissue trauma.

Chapter 10 explores the principles of functional movement, motor control and learning/adaptation, and their use in rehabilitating patients with central nervous system damage.

Chapter 11 describes how to develop a rehabilitation programme using the key principles identified in the book. Chapter 12 describes some of the assessments and challenges of motor abilities and similarly for proprioception in Chapter 13. A summary of the book can be found in Chapter 14.

The book is supplemented by a DVD demonstrating some of the assessments and challenges of the motor abilities and their use in clinic. The

movement challenges described in the book and DVD are derived from several sources. Some are research-based, others I have developed and used in clinic. Over many years of teaching I have observed professionals from different disciplines and their approach in rehabilitating movement control. Their wealth of experience and knowledge is part of this library of movement rehabilitation. It is a source book that aims to provide ideas and not recipes or treatment protocols for rehabilitation.

I hope you will find it useful.

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Prof Eyal Lederman