
It takes an average of 17 years for an innovative finding to emerge from scientific depths into the daily practice of clinical medicine (Balas & Boren, 2000). Indeed, translating evidence-based findings into clinical practice is a long and sometimes treacherous process with many a novel finding lost in the cavernous gap that separates the laboratory from the clinic. Neuroplasticity and Rehabilitation serves as a bridge over that gap; achieving in a mere 350 pages, the integration of several years of laboratory research with animal models into real-world applications of rehabilitation strategies for humans.

The field of brain rehabilitation is based on the premise that functional abilities can be rehabilitated or restored after an injury. Nonetheless, evidence-based research to back up the promise of functional restoration has historically been lacking or, at the very least, not-well communicated; leading many health professionals to be skeptical of the field’s potential. This volume on brain plasticity is a loud and clear message to those skeptics that neurorehabilitation for brain-injured individuals provides not only compensation for lost abilities, but also offers an avenue for the potential restoration of those abilities.

The aim of this book is to provide a description of the evidence and successful application of brain-based approaches to rehabilitation. The volume is presented in two parts. Part I dedicated to the foundational bench work on brain plasticity underlying approaches to neurorehabilitation. Part II extends these concepts to the development and improvement of behavioral and cognitive rehabilitation interventions for both adults and children with a variety of impairments.

Dr. Raskin and colleagues have achieved the formidable feat of providing an all-encompassing collection of chapters on brain plasticity, spanning the neuronal to the cognitive-behavioral. In the introductory chapter, Dr. Raskin provides a detailed summary of the ideas and concepts to come that although accurate in description, somehow does not convey the rush of excitement and insight that one will experience when reading the chapters themselves. Perhaps due to the broad scope of material being reviewed, this section is of necessity more didactic, but we urge the reader to carry on given all of what lies ahead.

Part I, entitled Reorganization in the Central Nervous System contains five chapters and delves into the basic neurosciences. For clinicians who do not regularly read basic neuroscience literature, this may represent unfamiliar but still very worthwhile reading. Neuroscientists have become increasingly adept at presenting their findings to the general public, and as a result have propelled, on behalf of both patient and clinician, a demand for greater knowledge about the inner workings of the brain. These five informative chapters on experientially induced re-organization of the brain represent this trend and set the stage for the next section on clinical rehabilitation.

When discussing plasticity in the injured brain, Dr. Brian Kolb presents the problem of the three-legged cat to address the well-argued point that what is observed behaviorally after brain injury is not recovery but rather compensation. After being struck by a vehicle, the common treatment for a cat with an injured leg is to remove the leg. Initially, the cat is severely limited in movement. After a period of recovery, however, the cat becomes nearly as agile as it was prior to the injury. The restoration of function can be so impressive as to mimic recovery; however, the fact remains that the cat has not regrown an amputated leg, but rather compensated for only having three legs. In the same way, the author argues that after brain injury, one has not recovered lost brain function, but similar to the three-legged cat, has developed a sophisticated means of compensating for the loss. Kolb warns that most recovery is likely to be compensation and not restoration per se, yet still provides convincing evidence for the potential of behavioral, pharmacological, and neuronal replacement therapies that promote the stimulation of growth factors and stem cells in animals to alter not just behavioral outcomes, but brain plasticity resulting in actual tissue regeneration.

Dr. Jones follows up with a fascinating chapter, which describes how behavioral factors, such as exercise and environmental stimulation, can be both neuroprotective and neurodegenerative, depending on dosing and timing gradations. In a similar fashion, neuroplasticity in the somatosensory and motor cortices can be adaptive or maladaptive, as in the fascinating case of focal dystonias discussed in Dr. Nudo’s chapter. While promising, these findings point to the clear need for further research of behavioral manipulations to maximize rehabilitation interventions and outcomes. Dr. Raskin and colleagues discuss the reality of tailoring rehabilitation strategies on an individual basis to determine optimal treatment parameters for different brain dysfunctions. Finally, Dr. Stern introduces the concept of promoting cognitive reserve as a protective factor to counteract
the negative effects of brain injury. Indeed, future work in the field will be defined by these and many other issues of interest addressed throughout the book.

Part II, entitled *Interventions for Motor and Cognitive Deficits*, constitutes two thirds of the book in terms of total pages and extends upon the solid findings presented in Part I. This section explores the complex landscape of recovery and rehabilitation by covering treatment-focused topics on a wide variety of motor and cognitive problems. Rehabilitation interventions—from those designed to improve sensory and motor deficits to higher order cognitive abilities—are examined in populations including those with acquired brain injury, neurodevelopmental (such as ADHD, Schizophrenia), and neurodegenerative disorders. Every chapter delivers unique perspectives on the future of brain rehabilitation, but with a shared theme of achieving optimal and efficient rehabilitation outcomes by looking to underlying neural, behavioral, and cognitive mechanisms to inform the design and delivery of treatment interventions. For this very purpose, a practical checklist is provided in Chapter 13 to guide clinicians in how to integrate these concepts directly into their own practice.

The authors also discuss obstacles that interfere with evidence-based practice to date. Restorative interventions have unfortunately been found to have limited generalizability to real-world settings. They conclude that sound research with solid methodology has been lacking in the field and overview the contradictory findings in the limited research currently available. Clinical trials, currently testing hypotheses from the 1980s, lag behind basic neuroscience research, but nevertheless there is hope that the bench-to-beside gap is shrinking from both ends. If anything, translational research is bi-directional and the advances made in research-based practice will eventually lead to more practice-based research.

Although a significant portion of this book highlights the neural mechanisms underlying neuroplasticity, the final chapters focus on the future challenges in the area of investigating potential adjunctive or synergistic effects that medical, psycho-social and neurocognitive treatments have in combination. The final chapter by Dr. Freeland reviews the role of pharmacological interventions in rehabilitation and provides a discussion of the next big advance in pharmacological development—novel drugs that target neurotrophins. His words: “the future of rehabilitation appears linked to the burgeoning field of neuroplasticity,” may be in fact be an understatement and clearly the take-home message of this volume.

Reference


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The short review of this new book is that it is a necessary resource for your clinical practice and should be up on the reference shelf with your general assessment and neuroanatomy books. Forensic neuropsychology is changing rapidly and this new edition will allow you to catch up on the new issues and clinical practices. The chapters in the book are a great resource, especially when you get one of those unusual forensic referrals.

In the first chapter, Larrabee refers to a scientific and empirical approach to clinical assessment and reasoning that is similar to the actuarial approach originally presented by Meehl (1956). Over the years, cognitive psychologists have contributed a number of new ideas in the study of human reasoning heuristics that apply to clinical reasoning (Wedding & Faust, 1989).