

deficiency is the scant treatment of hydrocephalus encompassing a mere 11 pages, 5 of which deal with complications of ventricular shunts. One wonders why. The chapter of trauma is brief to the extreme, but notwithstanding, valuable. Notwithstanding these constructive criticisms – which do diminish the usefulness of this textbook somewhat – the overall impression and value is good. Each bite size piece of information is useful.

In summary, the book is most readable and useful as a reference book if one knows what the diagnosis is, but often lacking in direction to the reader of how to get there in the beginning. It is certainly comprehensive and in that regard it has merit. Regardless of the above critical comments, which hopefully will be used to improve the second edition, this book is recommended for any unit performing pediatric neuroradiology and for residents and fellows in the neurosciences; it is good for a random overview and for each entity, concisely described, if not necessarily completely illustrated. It is refreshing to see a blend of plain films, computed tomography and magnetic resonance imaging. It does provide a balance between the imaging techniques often lacking in many books. For all these reasons, it is a worthwhile investment.

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BRAIN PLASTICITY AND BEHAVIOUR. 1995. By Bryan Kolb. Published by Lawrence Erlbaum Assoc. Publishers. 194 pages. \$C59.00

If the 1900s was designated the Decade of the Brain, the next ten years should be the decade of Brain Recovery. Developments in the neurobiology of regeneration and neural plasticity and in cognitive neuroscience are opening exciting new possibilities for neurological and cognitive rehabilitation. This monograph introduces the reader to a broad range of empirical findings on brain recovery at the behavioural level in humans and animals. After a basic discussion in chapter 1 on synaptic plasticity as it is played out in the cerebral cortex, the author reviews features of cortical organization and the correlates of cortical plasticity, including axonal growth, dendritic growth and glial changes in chapter 2. A major constraint on neural recovery is the requirement for appropriate afferent and efferent connectivity. Intrinsic cortical circuits, which are responsible for the majority of cortical connections, are the most likely site for cortical plasticity. Citing his own experimental researches, the author shows that the effects of synaptic plasticity can be seen in general training as well as specific learning paradigms and in the process of normal aging. Neural plasticity is depicted as a continuous, dynamic process going on throughout the life-span. The continual change occurring in neurons provides the substrate for rapid adaptation to the environment. Experience changes not only synaptic organization but also dendritic morphology in a manner which in turn enables more rapid plastic changes to occur.

Chapters 3 and 4 review the evidence for recovery in adult humans with reference to stroke, closed and penetrating head

injury and surgical excision. Although partial recovery occurs after many forms of injury, there is marked individual variability in the extent of recovery of different functions; for example, language appears to recover more readily than other cognitive abilities. Mechanisms promoting recovery may no longer be able to compensate as the subject ages, and the earlier symptoms of the brain injury may be unmasked. The study of recovery from brain damage in adult laboratory animals, including recovery of motor and sensory function, spatial navigation and the effects of serial damage, has revealed several factors which contribute to differential patterns of recovery. Recovery is task-dependent and may be evident in one behavioural measure and not another. The time for recovery varies for different types of behaviour and lesion size plays an important role as does young age and the aging process. The "Kennard Principle", that damage at a younger age gives more potential for recovery, ignores critical periods and stages of development. In fact, brain injuries have different sequelae depending on the stage of development at which they occur. Sometimes damage early in life may be worse than later on, since some aspects of cognitive development are critically dependent on the integrity of certain structures at particular times. From these human and animal studies the author draws several conclusions. Injury during the mitotic or neural migration phase of brain development (birth to six days in rats; third trimester to part way through first year in humans) yields a very poor behavioural outcome. Injury during the period of maximal dendritic differentiation and synaptic formation has the greatest potential for functional recovery. In rats this begins at seven to ten days and continues into adolescence. In humans this may start in the second year of life but the end point depends on the region injured. There is often a price to pay for recovery and aging may reverse some of the gain. The extent of damage clearly influences recovery and bilateral damage is more devastating than unilateral injury. Generally, cognitive behaviours show better recovery than species-typical behaviours.

The final chapters of the book highlight evidence for plasticity after cortical damage to specific regions such as the hippocampus and different neocortical areas. Remodelling of cortical circuitry is postulated to be the correlate of functional recovery. The essential hypothesis is that dendritic atrophy correlates with non-recovery and dendritic growth correlates with recovery. Dendritic growth is influenced by neocortical activity and this has important implications for rehabilitation. Surprisingly, in this context, the author makes no reference to the emerging literature on the activity-linked use of amphetamines in rehabilitation of motor deficits after stroke; specifically the recovery-promoting effects of amphetamine may only be seen when the drug is given in temporal relationship to the physiotherapy. These observations have yet to be fully exploited in standard rehabilitation programs. There is also no mention of Robertson's work on the use of motor activation to speed recovery from hemispatial neglect. In the final section, experimental evidence from animal lesion models is used to illuminate and interpret recovery patterns seen in acquired brain injury in humans. The important modulating effects of hormones and neurotrophic factors is also addressed.

In summary, this is a useful synthesis of current concepts of brain recovery for neuroscientists and clinicians alike from an

active contributor to the field. The important principles of neural plasticity as they relate to behavioural recovery put forward in this monograph provide a rational basis for neurorehabilitation and hopefully will further stimulate readers to turn their scientific and clinical attention to this next great frontier.

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CLINICIAN'S GUIDE TO NEUROPSYCHOLOGICAL ASSESSMENT. 1994. Edited by Rodney D. Vanderploeg. Published by Lawrence Erlbaum Associates Inc., Publishers. 307 pages. \$C36.00

This book is a practical guide to the assessment and interpretation of neuropsychological testing procedures as widely applied in neurological disorders. Although intended primarily for students and practitioners of clinical neuropsychology, it is of interest also to neurologists who wish to better understand and utilize neuropsychological testing. Given the complexity of human behaviour and the tendency of many neurological disorders to take a toll on human cognition, neuropsychological evaluation should be considered part of the neurological investigative armamentarium, not different than an EEG or MRI. In certain disorders, it is the most sensitive tool for detection and sometimes differentiation of neurological disease. The need to understand the information provided by such assessment, including its limitations, should be different than the need to understand the interpretation of an angiogram or a CT scan. This book provides important insights into neuropsychological assessment techniques, interpretation and application of results, with chapters authored by clinical neuropsychologists engaged in clinical practice as well as teaching and research.

Chapter 1 provides an overview of the interview procedure and administration of neuropsychological tests emphasizing the importance of determining the primary referral question, which neurologists should try to formulate as clearly as possible since this may influence the choice of tests and interpretation. An important part of the neuropsychological assessment is the clinical interview which is structured and more comprehensive than usually is possible in a typical neurological consultation. Behavioural observations during the interview and testing can provide important information, with respect to executive functions, mood state and motivation. The main advantage of neuropsychological assessment over mental status assessment is the standardized administration of quantitative tests over a broad range of cognitive functions. This chapter discusses techniques to maximize patient performance including the order of tests, pacing, use of breaks, single versus multiple testing sessions, etc. Procedures to minimize scoring and clerical errors, to look for mismatches and to ensure accuracy in recording of results are also discussed. In Chapter 2 there is a valuable review of methods used to estimate promorbid level of functioning, which clearly affects interpretation, including historical data, socio-economic status, reading tests and demographic variables. Chapter 3 presents principles of interpretation as a multistage process which integrates data from the history, interview, behavioural observations and test scores. The influence of subject-specific variables, state factors, psychological and personality factors and effects from the interaction of different

cognitive functions, including diffuse versus specific deficits, low order and high order deficits, primary and secondary effects are all discussed in a coherent, informative fashion. Indicators that an astute neuropsychologist can use to assess symptom exaggeration or feigned deficits are also briefly described, for example, inconsistencies or poor-than-chance-performance.

Different applications of neuropsychological evaluations, in particular their use in diagnosis, in rehabilitation and in the forensic context are discussed in chapter 4. A series of useful tables describing potential pit-falls in these applications and how to overcome them is provided, as are techniques for providing feedback to both patients and clinicians.

Chapter 5 considers the special application of neuropsychological assessment to children. Three key variables affect the outcome of brain lesions in children, including type of lesion, location and age at the time of damage. The basic domains of assessment are outlined as well as the need for normative reference. The author advocates more longitudinal studies and research into the effectiveness of cognitive remediation in children.

Psychometric issues including reliability, test theory, test referencing, test validity, modelling of data and sampling characteristics are reviewed in chapter 6. Traditional concepts of normal curve distribution often do not apply because of highly skewed distributions in patient populations. It is argued that neuropsychology should not be bound by normed reference tests as traditionally used, but should move towards modelling the tails of sample distribution through operating characteristics.

The last two chapters consider two different approaches to neuropsychological assessment. The cognitive-metric, fixed-battery approach is the more traditional and commonly used in everyday practice. The contents of two new neuropsychological batteries are compared in some detail, including issues such as conversion from raw to scaled scores and age and education correction. An important future direction in the fixed-battery approach will be the increasing application of computerized administration and of computer processing in the interpretation of such batteries. A more flexible, decision-tree-oriented approach to evaluation, usually based on a priori models of brain function, can also be used. The major examples discussed are Luria's approach, the tradition of European Cognitive Neuropsychology, which develops theoretically-motivated tasks to probe specific cognitive deficits in an individual subject, and the Boston process approach, which analyzes how the tasks are carried out as well as the total score. The fixed-battery approach arose within the psychometric tradition, whereas the flexible-battery approach uses neurological and information processing concepts. The two approaches provide alternative, but not mutually exclusive, frameworks for conceptualizing and quantifying data.

In summary, this book guides the reader through the assumptions, procedures, interpretation and different approaches to neuropsychological testing. While it is particularly directed toward neuropsychological trainees and practitioners, it will certainly help interested physicians to interact more knowledgeably with their neuropsychological colleagues. As health care service continue to get relentlessly trimmed, it is important that neuropsychological assessment continue to have a proper place in the repertoire of the neurological