

Significance of Slow Wave Sleep: Considerations from a Clinical Viewpoint

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Summary: Previous experimental observations, almost exclusively carried out with young healthy subjects, have been interpreted as showing a particular restorative role for human slow wave sleep (SWS). This article considers whether findings from polygraphic sleep studies in patients and elderly subjects lead to similar inferences about the meaning or "function" of SWS. The question was approached in three different ways: (a) by presenting results from a long-term study in elderly subjects whose SWS data were correlated with baseline medical and psychometric findings and with 5-year follow-up results; (b) by correlating nonmanipulated wake-time during days with parameters of SWS on subsequent nights in a group of 30 demented inpatients undergoing 72-h continuous sleep-wake recording; (c) by reviewing and comparing published polygraphic sleep studies for a number of psychiatric conditions. None of these three approaches provided unequivocal evidence for a clinically significant role for SWS. Reasons for the different outcome of SWS studies in young experimental subjects and clinical populations are discussed. **Key Words:** Slow wave sleep—Sleep stages—Sleep and old age—Dementia.

The significance or meaning of polygraphically defined sleep stages in humans has been discussed ever since their description in terms of electroencephalographic patterns (1) and following the discovery of REM sleep (2). Whereas REM sleep was related to dreaming and connections to psychological and psychopathological parameters were soon established, interest in slow wave sleep (SWS) emerged somewhat later. Experiments in young volunteers (3) supported earlier observations (4) that SWS denoted particularly "deep" sleep, as measured by the stimulus intensity needed to awaken a sleeping subject. Other findings, such as the occurrence of SWS in the first few hours of sleep and its increase as a function of previous time awake, e.g., after sleep deprivation, led to the assumption that SWS serves for physical restoration or, put more cautiously, that SWS marks a time in which restorative processes of the organism are taking place.

The discovery that the anabolic growth hormone is excreted mainly during SWS (5) supported the restoration hypothesis of SWS. This was further expanded by Oswald (6) and Adam (7), who adduced biological data to show that the purpose of sleep, and particularly SWS, was for tissue repair and growth. On the other hand, not all studies involving

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Slow Wave Sleep Its Measurement And Functional Significance

William H. Moorcroft



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Slow Wave Sleep, 1990 **Slow Wave Sleep** Michael H. Chase, Tom Roth, University of California, Los Angeles. Brain Information Service, 1990 **Understanding Sleep and Dreaming** William H. Moorcroft, 2006-09-04 Designed primarily as a text this volume is an up to date and integrated overview of physiological sleep mechanisms brain function psychological ramifications of sleep dimensions of dreaming and clinical disorders associated with sleep It is accessibly written with specially boxed material that enhances the text Authored by a researcher clinician professor with more than 25 years of experience in sleep studies Understanding Sleep and Dreaming provides a solid basis for those who are not expert in this area It offers a good foundation for those who will continue sleep studies while at the same time offering enough information for those who will apply this knowledge in other ways such as clinicians in their individual practices or researchers for whom sleep may be part of a specific study It is an excellent text for courses on sleep at the undergraduate and graduate levels

Sleep Science: Integrating Basic Research and Clinical Practice W. J. Schwartz, Julien Bogousslavsky, 1997 This book is published at a time when more and more advances are being made to bridge the gap between basic and clinical neuroscience It is primarily intended for scientists and clinicians intent on linking the neurobiology of sleep with its associated disorders Topics were selected that illustrate how contemporary research is being translated into clinical insights and therapies The contributed chapters were written by scientists actively working at the interface between basic and applied sleep science with subjects ranging from the mechanisms of intracellular signal transduction to the effects of ambient geophysical cycles Essays include the physiologic regulation of sleep and its homeostatic collapse the underlying neural and chemical circuitry and the biological basis for new therapies using melatonin and environmental light *In Vivo Optical Imaging of Brain Function* Ron D. Frostig, 2009-05-06 These are exciting times for the field of optical imaging of brain function Rapid developments in theory and technology continue to considerably advance understanding of brain function Reflecting changes in the field during the past five years the second edition of *In Vivo Optical Imaging of Brain Function* describes state of the art techniques a **Comprehensive Human Physiology** Rainer Greger, Uwe Windhorst, 2013-11-11 Comprehensive Human Physiology is a significantly important publication on physiology presenting state of the art knowledge about both the molecular mechanisms and the integrative regulation of body functions This is the first time that such a broad range of perspectives on physiology have been combined to provide a unified overview of the field This groundbreaking two volume set reveals human physiology to be a highly dynamic science rooted in the ever continuing process of learning more about life Each chapter contains a wealth of original data clear illustrations and extensive references making this a valuable and easy to use reference This is the quintessential reference work in the fields of physiology and pathophysiology essential reading for researchers lecturers and advanced students Sleep, Dreaming & Sleep Disorders William H. Moorcroft, 1993 This is a comprehensive review of sleep dreaming sleep disorders and the

functions of sleep and dreams It is designed as a text for undergraduates in psychology biology nursing and related areas The author discusses sleep under the headings of measurement homeostatic rhythmic physiology and sleep in animals Dreaming is examined in the nature of dreams dream theories and dream interpretation

In Vivo Optical Imaging of Brain Function Ron Frostig, 2002-05-15 The major advantage of in vivo optical techniques is the ability to study many levels of function of the CNS that are inaccessible by other methods This rapidly expanding field is multidisciplinary in nature and findings have thus far been scattered throughout the literature In Vivo Optical Imaging of Brain Function reviews the wide variety of

Current Issues in Developmental Psychology A.F. Kalverboer, M.L. Genta, J.B. Hopkins, 2012-12-06 This volume contains a number of contributions which concern basic issues in the field of brain behavioural development in the human especially with regard to the young child They have been written by distinguished scientists active in this field who have all been participating in an Erasmus teachers exchange program entitled Biopsychology of Development ICP NL 3026 14 This volume is the product of this cooperation The book is intended for scientists in this and related fields as well as for graduate students and advanced undergraduates as a means of updating their knowledge about human brain behaviour development It offers a contemporary review methodologically and theoretically of some basic issues in early human brain behaviour development Attention is paid to normal development and also to deviance as exemplified by discussions on child abuse and on early development of preterms and children of deaf mothers For the title of the book we have chosen for the term Developmental Psychology with as a subtitle biopsychological perspectives in order to express our interest in the basic requirements in the organism for an optimal adaptation during ontogeny as well as in the mechanisms underlying maladaptive behaviour The term may indicate that we are not just focusing on higher brain functions which would be suggested by the term Developmental Neuropsychology Further it is meant to express our interest in the integrated study of normal and deviant development without a particular focus on abnormality which would be suggested by the term Developmental Psychopathology

Sleep, Neuronal Plasticity and Brain Function Peter Meerlo, Ruth M. Benca, Ted Abel, 2015-05-18 This book reviews current knowledge on the importance of sleep for brain function from molecular mechanisms to behavioral output with special emphasis on the question of how sleep and sleep loss ultimately affect cognition and mood It provides an extensive overview of the latest insights in the role of sleep in regulating gene expression synaptic plasticity and neurogenesis and how that in turn is linked to learning and memory processes In addition readers will learn about the potential clinical implications of insufficient sleep and discover how chronically restricted or disrupted sleep may contribute to age related cognitive decline and the development of psychiatric disorders such as schizophrenia and depression The book consists of 19 chapters written by experts in basic sleep research and sleep medicine which together cover a wide range of topics on the importance of sleep and consequences of sleep disruption This book will be of interest to students researchers and clinicians with a general interest in brain function or a specific interest in sleep

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