

Saint Petersburg State Establishment of Health Care City Hospital No 40

**HIGH TECHNOLOGY METHODS
OF TREATMENT AND REHABILITATION**

THEORY AND PRACTICE

YEARBOOK 2011

Editor-in-Chief

Doctor of Medical Sciences

Professor S. G. Scherbak

Sestroretsk • Saint Petersburg • 2012

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High technology methods of treatment and rehabilitation. Theory and practice : Yearbook 2011 / SPb State Establishment of Health Care City Hospital No 40 ; Editor-in-Chief S. G. Scherbak.—Sestroretsk; St. Petersburg : Renome, 2012.—159 p. ISBN 978-5-91918-151-4

The current edition is a collection of works on theory and practice performed by physicians of the City Hospital No 40, Saint Petersburg, Russia, in 2011. This is already the second yearbook. The first one came out last year. The book consists of a preface and 8 chapters. The first three chapters comprise a packet of information documents which provide the conduction of a clinical trial with employment of the method of transcranial magnetic stimulation (TCMS). The first chapter of the triptych analyzes the current views on the mechanism of action of the method. It has been shown that despite already a quartercentury history of development and employment of TCMS, an integral view which reveals the mechanism of action of the method has not yet existed. The second chapter has been focused on the analysis of the results of employment of TCMS in rehabilitation of stroke patients in the years of 2009–2011 including the ongoing clinical trials. The third chapter considers the options of integration of TCMS into an already prepared in our hospital plan of clinical trial of comparative effectiveness of rehabilitation patients after stroke employing assisting robot *Lokomat*. Chapters 4 and 5

devote to the problem of placebo in the clinical trials of non-pharmacological profile, including acupuncture. It has been shown that neither the domestic nor international documents which regulate the design and procedure of such trials provide testing of the experimental group against placebo. Chapter 6 is allocated to the review of the modern state of the problem of the usage of transcranial infrared laser therapy in stroke. Chapter 7 is a review which covers a thematic issue of the *Journal of Rehabilitation Medicine*, 2011, No 2, entirely dedicated to implementation of the *International Classification of Functioning (ICF)* in rehabilitation and physiotherapy. And finally, chapter 8 includes an annotated index of internet-publications dedicated to the employment of the assisting robot *Lokomat* over the eleven-year period of 2001–2011. The chapter abstracts in Russian and English are situated before the corresponding chapters, bibliography is at the end of each chapter.

UDC (616-08+616-089.227)(050.8:08)“2011”

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CHAPTER 1.

The current views on the mechanism of action of transcranial magnetic stimulation. Review of the foreign scientific medical Internet publications

Scherbak S.G., Golota A.S., Krassii A.B., Lisovets D.G., Mosenko S.V., Spirin A.B.

The current review represents the first part of a packet of information documents which provide the conduction of a clinical trial with employment of the method of transcranial magnetic stimulation. In the review the publications of 2009–2011 years have been adduced. The earlier works has been used mostly for dealing with questions concerning the history of the problem or some important particular details. The basic text precedes by a brief excursus over the history of magnetotherapy. Despite already a quarter-century history of development and employment of transcranial magnetic stimulation, an integral view which reveals the mechanism of action of the method has not yet existed. That is why in this review the presentation of the material, to a certain extent by tradition, is going along the conventional scientific sections, namely, biophysics, electrophysiology, molecular biology and biochemistry, and safety.

Key words: biochemistry, biophysics, electromagnetic induction, electrophysiology, magnetic field therapy, magnetic stimulation therapy, molecular biology, neurophysiology, physiology, transcranial magnetic stimulation.

MESH terms: Biochemistry, Biophysics, Electrophysiology, Magnetic Field Therapy, Magnetic Stimulation Therapy, Molecular Biology, Neurophysiology, Physiology, Transcranial Magnetic Stimulation.

UDC: (612.81+615.4+615.8)616-08

Bibliography: 44 items.

CHAPTER 2.

The current state of the problem of employment of transcranial magnetic stimulation in rehabilitation of patients after stroke. Review of the foreign scientific medical Internet publications

Scherbak S.G., Golota A.S., Krassii A.B., Mosenko S.V., Spirin A.B.

The current review represents the second part of the packet of information documents which provide the conduction of a clinical trial with employment of the method of transcranial magnetic stimulation. The review is dedicated to the analysis of the newest data on the employment of method in rehabilitation of the posts-stroke patients. The review consists of two sections. The first section presents the consolidated data on the usage of transcranial magnetic stimulation after stroke according to the 2009–2011 publications. The earlier works have been adduced mostly for dealing with the history of the problem or some important special details. The second section comprises the analysis of the ongoing clinical trials of transcranial magnetic stimulation in stroke rehabilitation which have been logged in at the international registry *ClinicalTrial.gov*.

Key words: clinical trials, stroke, transcranial magnetic stimulation.

MeSH terms: Clinical Trials as Topic, Stroke, Transcranial Magnetic Stimulation.

UDC: (615.4+615.8+616-08)616.8

Bibliography: 22 items.

CHAPTER 3.

The project of integration of transcranial magnetic stimulation into the clinical trial with employment of assisting robot *Lokomat* in rehabilitation of patients after stroke

Berezhkova N.I., Volodina S.T., Golota A.S., Krassii A.B., Makarenko C.V., Merzliakov K.V., Mosenko S.V., Razorenova T.S., Spirin A.B., Urazov S.P.

The current project represents the third part of the packet of information documents which provide the conduction of a clinical trial with employment of the method of transcranial magnetic stimulation. The document is dedicated to integration of the method into already prepared in our hospital plan of clinical trial "Comparative effectiveness of rehabilitation after stroke employing assisting robot *Lokomat* in the modes of comfort and submaximal loading" ROBOMAX STROKE SPB40. The logical center of the project comprises two flow charts of the integration: the parallel and successive.

Key words: clinical trials, Lokomat, rehabilitation, robotics, stroke, transcranial magnetic stimulation.

MeSH terms: Clinical Trials as Topic, Rehabilitation, Stroke, Robotics, Transcranial Magnetic Stimulation.

UDC: (615.4+615.8+616-08+616-089.227)616.8

Bibliography: 28 items.

CHAPTER 4.

Placebo in the clinical trials of non-pharmacological profile. The current state of the problem

Scherbak S.G., Golota A.S., Dolchonova T.V., Krassii A.B., Larin K.E., Lebedeva S.V., Lisovets D.G., Razorenova T.S.

The current article is dedicated to the modern state of the problem of usage of placebo in nonpharmacological clinical trials. On examples of apparatus and non-apparatus interventions it has been shown that the algorithm of the non-pharmacological placebo is much more complex than the pharmacological one. It is underlined that neither the domestic state standard nor international documents which regulate the design and procedure of the clinical trials of the non-pharmacological profile provide testing of the experimental group against placebo. On the basis of the recent foreign scientific medical publications it is demonstrated how scientists have been trying to overcome not only a moral but a legal collision ensued from the necessity of the actual patient deception while using placebo.

Key words: clinical trials, placebo.

MeSH terms: Clinical Trials as Topic, Placebo Effect.

UDC: 025.4(614.2+615.6+616-089.227)

Bibliography: 31 items.

CHAPTER 5.

Acupuncture in stroke treatment. Review of the foreign scientific medical Internet publications

Scherbak S.G., Golota A.S., Krassii A.B., Reukov A.S.

The current review is dedicated to the modern state of usage of acupuncture in treatment of stroke. The special attention has been paid to search for information on employment of acupuncture within the first hours and days after stroke onset. The results of that information retrieval and related bibliometrics are analyzed. The cardinal landmarks of the history of acupuncture application and research in stroke are traced. The central parts of the review are the sections which cover already completed and ongoing clinical trials. Then the issues of technique, mechanism of action, and acupuncture safety are consecutively covered. A small portion of the text deals with the analysis of questioning the stroke patients attitude to acupuncture.

Key words: acupuncture, stroke.

MeSH terms: Acupuncture, Stroke.

UDC: (616.8+615.8) 615.814

Bibliography: 62 items.

CHAPTER 6.

The current state of the problem of employment of transcranial infrared laser therapy in stroke. Review of the foreign scientific medical Internet publications

Scherbak S.G., Golota A.S., Krassii A.B., Lisovets D.G., Reukov A.S.

The current review is dedicated to the problem of employment of laser therapy in the infrared range for the acute stroke treatment. Because the unified scientific and technical nomenclature of infrared radiation and its subbands does not exist, the first section covers that topic. Then the relevant bibliometric data which allow to evaluate the intensity of scientific research in the field are adduced. The development of the light therapy in general and, in more detail, the infrared laser therapy of stroke are briefly presented. The following part concerns the analysis of the basic sources from the point of view of the authors and scientific research establishments in which those works have been performed. The main sections of the review is the analysis of the key publications and annotations to the clinical trials on the theme. Then the sections dealt with mechanism of therapeutic action and safety of the infrared laser treatment of acute stroke follow.

Key words: infrared radiation, laser, stroke.

MeSH terms: Infrared Rays, Lasers, Stroke.

UDC: (616.8+621.373.826+621+384)615.8

Bibliography: 49 items.

CHAPTER 7.

The International Classification of Functioning in rehabilitation and physiotherapy. Review

Scherbak S.G., Golota A.S., Dokish Yu.M., Krassii A.B., Lisovets D.G., Popov A.E., Razorenova T.S., Sarana A.M., Sotnikov I.L.

This review covers a thematic issue of the *Journal of Rehabilitation Medicine*, 2011, No 2, entirely dedicated to implementation of the *International Classification of Functioning (ICF)* in rehabilitation and physiotherapy. The principal questions raising in articles are the following: verification of the ICF versions specialized in relation to nosology and age; development of focused mini-versions of the ICF, in particular, for drawing up rehabilitation and physical therapy plans of care; employment of ICF for assessment of the effectiveness of ongoing treatment and its end point. 13 articles, 95 pages, extensive bibliography after each article, language – English.

Key words: Physical Therapy Modalities, rehabilitation.

MeSH terms: Physical Therapy Modalities,
Rehabilitation.

UDC: 025.4(614.2+615.6+616-089.227)

Bibliography: 20 items.

CHAPTER 8.

The assisting robot Lokomat. Annotated index of the foreign scientific medical Internet publications, 2001–2011

Yudina L.P., Berezhkova N.I., Volodina S. T., Golota A.S., Krassii A.B., Makarenko C.V., Merzliakov K.V., Spirin A.B., Urazov S.P.

The current catalogue LOKOMAT 2001–2011 is an annotated index of bibliographical descriptions of publications dedicated to all aspects of employment of the assisting robot *Lokomat*, the company of *Hocoma*, Switzerland. The index comprises the bibliographical descriptions of documents on the theme which have been published over the period of 11 years, 2001–2011. The index is alphabetically arranged by titles or first author last names followed by respective annotations. The bibliographical descriptions are grouped by years, from 2011 to 2001 (the year of the first publication on the theme). The appendix contains an educational supplement «The method of bibliographical description of scientific publications in the behind text list of references of scientific articles and dissertations» which familiarizes the readers with the basics of bibliographical terminology and rules of formatting of reference lists of scientific articles and dissertations according the requirements of the State of Russia Standard (ГОСТ Р 7.05-2008) became effective on the 1st of January 2009.

Key words: Lokomat, rehabilitation, stroke.

MESH terms: Rehabilitation, Robotics, Stroke.

UDC: (616-089.227+615.4+681:5)019.9(048)“2001-2011”