

Research in Physical Medicine and Rehabilitation

X. Information Resources

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Researchers in physical medicine and rehabilitation require access to information regarding possible interventions and programs, available services and technology, research (published, unpublished and in progress), statistics on incidence, prevalence and expected recovery, and funding sources. This paper provides an overview to the most readily available sources of information, including 16 abstracts and indexes, 6 sources of review articles, 9 population statistical databases and 84 journals specifically devoted to rehabilitation. Of these journals, 29 may be accessed through Medline and 32 through other sources. An additional 58 journals indexed in Medline publish more than 16 rehabilitation articles per year. The journals within Medline that publish the most rehabilitation articles are listed by topic area: geriatric rehabilitation, cardiac rehabilitation, pediatric rehabilitation, rehabilitation research, self-help devices, sports medicine and rheumatologic rehabilitation. Specific search strategies that may be used for any computer assisted search of Medline are given to locate articles in these topic areas and also the following areas: amputee rehabilitation, spinal cord injury rehabilitation, traumatic brain injury rehabilitation, cerebral palsy rehabilitation, stroke rehabilitation, decubitus care, electrodiagnosis, rehabilitation engineering, pain rehabilitation, pulmonary rehabilitation, sexual rehabilitation and urologic rehabilitation. The user friendly Grateful Med software is introduced for simplified online Medline searching. Exercises are provided for starting a journal club with the retrieved articles.

The goal of this paper is to assist you in your quest to sharpen your mind in preparation for research and clinical practice. Knowledge of the latest diagnostics, treatments and therapeutics is expected from all of us. Even if you are not starting a research project at the present time, you will have more choices in your clinical decisions and have more answers for the questions raised by consumer-oriented patients you see daily.

Research and clinical practice require understanding the current issues within physiatry. Journals include the latest information to assist you both in formulating the question¹ and beginning a conceptual review of the literature.² If you followed the steps to complete a conceptual review of the literature in the second article of this series by using a computer search of the Medline you must already realize the vast universe of medical literature with articles relevant to physiatry. How does one approach the task of keeping up with current literature in the field of physiatry?

INFORMATION RESOURCES

To conduct research in physical medicine and rehabilitation' you need ready access to many types of information. The breadth of the field makes it more difficult to define a small body of information to master. This is compounded by the clinical demands, which give the researcher less time to do the research, let alone master the requisite information. The kinds of information needed by the researcher are so broad that the task of organizing this is daunting. These areas include:

- Interventions available/program models/best practice/cost benefit
- Nature of disabling conditions and interventions, recovery expected
- National, state and local services available
- Technologies available
- Published research articles
- Reports from recent research projects
- Bibliography of current grants and grant programs (government/foundation)
- Statistics/incidence/prevalence
- Other information, expert or referral sources

The National Library of Medicine compiles directories of organizations that provide information and services directly to *requesters*.³ This includes a publication of organizations with toll free 800 numbers (*Health Hotline*) and an online database (Dirline) of more than 15,000 organizations. A more specific annotated guide to information sources in rehabilitation is contained in a recent publication by the Rehabilitation Engineering Society of North America.⁴ The plethora of sources, and difficulty in identifying them, is further indicated by the incomplete overlap between these two lists and the fact that neither one refers to the other! There is no centralized source for all the types of information the researcher might need. This paper will provide a guide to the most readily available sources of scientific reports, with a focus on medical journals indexed in Medline.

Accessing the Medical Literature

Abstracts and indexes are the major source of bibliographic references from which researchers obtain the needed information. A comprehensive list of 56 databases of references and 11 vendors is available in the Assistive Technology Sourcebook.⁴ Some of the major information vendors that allow you to access these via modem are BRS (800-3454BRS), CompuServe (800-848-8199) and Dialog (800-3-DIALOG). You may pay a monthly fee, an hourly use charge or a certain amount per reference retrieved or all of these. Many of these databases are also available on compact disc, in which case you must buy a disc reader and the discs (a 1-yr license to use the database on CD-ROM costs about \$1000-2000), but then there are no further charges. The databases most relevant to rehabilitation are as follows.

Medline

Medline contains almost 6 million references since 1966 in 3400 journals, of which 21 are specifically rehabilitation and 80 contain more than 15 articles a year relating to rehabilitation. Online access is via BRS, BRS/Colleague, Dialog and others, and it is also available in CD-ROM from numerous sources. Grateful Med⁵ is a software program for your computer produced by the National Library of Medicine that allows you to automate your access to Medline and other sources through one of the above vendors, and thus reduce your connect time and charges.

Excerpta Medica

Excerpta Medica (Section 19, Rehabilitation and Physical Medicine; Amsterdam: Excerpta Medica Foundation) is one of 45 Excerpta. Medica titles that cover over 3.2 million citations since 1974 in 4500 journals in biomedical science. 40% of the citations are available only in the online version, not in the printed copy of the index. Online access is via BRS, BRS/Colleague, Dialog and CD-ROM from Silver Platter.

Science Citation Index (Scisearch)

Scisearch indexes 7 million references from 1979 in 1400 journals. Rather than the content of article itself, it indexes the references at the end of the article. Thus, *if you* know a key article, it is easier to retrieve other relevant articles published subsequently. This is very useful for updating your article collection, as you can see who has recently cited *these references with* (probably) more recent research on the same topic. Online access is through Dialog. One million references in the social sciences are included in Social Scisearch.

Abledata

Abledata contains over 15,000 descriptions of assistive devices and is accessible online through BRS and BRS/Colleague. HyperAbledata is produced by the Trace Center and available as diskette or CDROM for use with the Macintosh Hypercard system (IBM version expected in 1991).⁶

Psychological Abstracts

Psychological Abstracts has over 650,000 citations and abstracts since 1967; online version contains more references than the printed one.

Conference Papers Index

Conference Papers Index records over 1 million titles of papers presented at major scientific and technical meetings and conferences since 1973. Available both in print and online from Dialog.

Crisp

Crisp references more than 46,000 active grants from NIH and US Public Health Service. The most recent 2 yr are online through Dialog, and grants since 1972 are on tape. Title, investigator and abstract are catalogued by topic area, including general physical rehabilitation, physical therapy, occupational therapy and cancer rehabilitation.⁷

Eric

Eric contains 600,000 education materials, including special education and disabling conditions. It is accessed online through BRS and Dialog, and 650 locations around the country contain the text of the materials on microfilm.

Rehabdata

Rehabdata lists the 20,000 documents since 1950 in the collection of the National Rehabilitation Information Center, including research reports of projects funded through the Department of Education (NIDRR and RSA). Online access is through BRS.

Sport Database

Sport Database, accessed online through BRS, has 200,000 sports references since 1979.

Engineering Index

Engineering Index (online Compendex through BRS and Dialog) accesses 1.3 million engineering references from 1969.

VA Rehabilitation R&D Database

The VA Rehabilitation R&D database indexes the two most recent years of the research project summaries published yearly in the supplement to the *Journal of Rehabilitation Research and Development*, which includes both VA and non-VA sponsored projects.⁸ It also includes Abledata and abstracts from the *Journal of Rehabilitation Research and Development*, and it is accessed through Compuserve.

Ageline

Ageline (online through BRS) covers 25,000 references in social gerontology since 1978, with limited coverage to 1966.

Combined Health Information Database

Combined Health Information Database (BRS online) combines 30,000 references since 1973 from information clearinghouses in arthritis, diabetes, health education, hypertension and digestive diseases.

Linguistics and Language Behavior Abstracts

This service (online with BRS and Dialog) indexes 400,000 references since 1973.

OT Source

OT Source catalogs materials in occupational therapy (books and articles), including six journals specifically in occupational therapy. 11,000 references are included in material dating from 1922, and it can be accessed online directly through the American OT Association.⁹

STUDY GUIDES AND LITERATURE REVIEWS

The information sources listed above can be overwhelming, and several sources of compiled references placed in a theoretical framework are available. These include the *Yearbook of Rehabilitation* (Chicago: Year Book Medical Publishers), which extracts relevant information from journals (covered 114 in 1989). Study guides to physical medicine and rehabilitation, with references, are published each spring in the *Archives of Physical Medicine and Rehabilitation*. The *Annual Review of Rehabilitation*, *State-of-the-Art Reviews*, *Critical Reviews in Rehabilitation Medicine* and *Rehab Briefs* also review specific topics. The bibliographic databases listed above also specifically identify some scientific articles as review articles.

POPULATION DATABASES

Statistical information on persons with disabilities, available from a number of separate databases, is summarized in many publications. The summer 1990 issue of *Disability Studies Quarterly*¹⁰ reviews nine of these databases. Individual books summarizing these databases are reviewed in the *Assistive Technology Sourcebook* (p 453-454). The most commonly used sources are: National Ambulatory Medical Care Survey, National Health and Nutrition Examination Surveys, National Health Interview Survey, National Hospital Discharge Survey, National Medical Expenditure Survey, Post-Census Disability Survey (planned) and United Nations Disability Statistics Database (95 Countries).¹¹

JOURNALS RELATED TO REHABILITATION

There are more than 75 journals devoted to rehabilitation, and many more journals publish some rehabilitation-related articles. Titles of these journals are presented in the tables to guide your reading habits and to assist you with specific searches on rehabilitation topics and in selecting journals in which you may wish to publish. As soon as you expand your reading habits, you quickly become overwhelmed unless you can also develop a means of deciding which articles are important to you and which are not. Therefore, return to article two in this series and read the steps for a conceptual review of the literature.² In addition to these specific topic searches, you can choose to regularly scan whole journals.

Those journals which are indexed in Medline are the most accessible, and therefore we have used the CD-ROM version of Medline to guide you to the major biomedical journals that publish articles in rehabilitation. The information which we present here is obviously restricted to only those journals that are indexed in this source; below is a (partial) list of rehabilitation journals, indicating which are indexed in Medline and which are not and therefore must be consulted directly (Tables 1-3).

TABLE 1

Core rehabilitation journals indexed in Medline

Acta Belgica Medicinali et Physiologi
Advances in Clinical Rehabilitation

American Annals of the Deaf
 American journal of Occupational Therapy^a
 American Journal of Physical Medicine and Rehabilitation^a
 Archives of Physical Medicine and Rehabilitation^a
 Brain Injury
 Decubitis
 Electromyography and Clinical Neurophysiology
 Exceptional Children
 International Disability Studies^a
 International Journal of Rehabilitation Research
 International Rehabilitation Medicine
 Journal of the American Paraplegia Society
 Journal of Burn Care and Rehabilitation^a
 Journal of Communication Disorders
 Journal of Rehabilitation Research and Development
 Journal of Speech and Hearing Disorders
 Journal of Speech and Hearing Research
 Mental Retardation
 Muscle and Nerve
 Pain Paraplegia
 Physical Therapy^a
 Prosthetics and Orthotics International
 Rehabilitation Nursing^a
 Rehabilitation (Stuttgart)
 Research in Developmental Disabilities
 Scandinavian Journal of Rehabilitation Medicine^a
 Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kultury (Problems Hlth Resorts, Physiotherapy, and
 Exercise Therapy-Russian)

^aAlso indexed in Cumulated Index to Nursing and Allied Health.

TABLE 2
Core rehabilitation journals indexed in other sources

OT Source

Occupational Therapy Practice (Aspen)
 Canadian Journal of Occupational Therapy^a
 British journal of Occupational Therapy^a
 Australian Occupational Therapy Journal
 Journal of Hand Therapy
 American Journal of Occupational Therapy^a
 Occupational Therapy Journal of Research^a

Cumulated Index to Nursing and Allied Health

Canadian journal of Rehabilitation
 Clinical Kinesiology^b
 Clinical Management in Physical Therapy
 Cognitive Rehabilitation^b
 Journal of Head Trauma Rehabilitation
 Journal of Orthopedic and Sports Physical Therapy
 Journal of Rehabilitation
 New Zealand Journal of Physiotherapy

Occupational Therapy in Health Care
Occupational Therapy in Mental Health
Physical and Occupational Therapy in Geriatrics
Physical and Occupational Therapy in Pediatrics
Physiotherapy
Physiotherapy Canada
Physiotherapy Practice Psychosocial Rehabilitation Journal
Rehabilitation Psychology^b
Sexuality and Disability
Topics in Acute Care Trauma Rehabilitation

Other Sources

Journal of the Association of Children's Orthotic/Prosthetic Clinics (Excerpta Medica)
Journal of Visual Impairment and Blindness (Excerpta Medica)
Topics in Geriatric Rehabilitation (Excerpta Medica)
American Rehabilitation (Health Index)
Paraplegia News (Health Index)
Rehabilitation Digest (Canadian Periodical Index)
Journal of Rehabilitation Administration (Psychological Abstracts)

^aAlso indexed in Cumulated Index to Nursing and Allied Health.

^bAncillary indexing in Cumulated Index to Nursing and Allied Health.

TABLE 3

Rehabilitation journals not indexed in bibliographical sources

American Archives of Rehabilitation Therapy
American Children's Prosthetics and Orthotics
AOPA Almanac (American Orthotic and Prosthetic Association)
Assistive Technology
Augmentative and Alternative
Communication British journal of Rehabilitation
Clinical Rehabilitation
Cognitive Therapy
Computer Applications in Occupational Therapy (newsletter)
Contemporary Perspectives in Rehabilitation
Critical Reviews in Physical Medicine and Rehabilitation
Current Concepts in Rehabilitation Medicine
Disability Studies Quarterly
Industrial Rehabilitation Quarterly
International Rehabilitation Review
IRMA Monograph Series (International Rehabilitation Medicine Association)
Journal of Cardiopulmonary Rehabilitation
Journal of Neurological Rehabilitation
Journal of Prosthetics and Orthotics
NARIC Quarterly
Pediatric Habilitation
Pediatric Physical Therapy
Physical Medicine and Rehabilitation: State of the Art Reviews
Rehabilitation Briefs (reviews)
Rehabilitation Nursing
Springer Series on Rehabilitation
Trends in Rehabilitation

Beginners Guide to Accessing Rehabilitation Journals

The National Library of Medicine (NLM) reviews the journal articles, assigns the MESH headings, and disseminates the information that is published within *Index Medicus*. The identical information is accessed through NLM's online computer search Medline, which includes *Index Medicus*, *Index of Dental Literature* and *International Nursing Index*, or is retrieved from the user-friendly off-line systems such as Medline CD-ROM used for this search. The time necessary for the NLM to review the journal articles and then disseminate the information for placement on an electronic bibliographic retrieval system is 3-6 months.

The journals with the most articles relevant to rehabilitation are those that you may want to read regularly, and you do not need access to computer literature searching capability to do this. You can refer to the following lists of journals (by topic area) to establish a reading pattern. If you do have access to a Medline search system you may reproduce this search for your own specialized interests, but it will be difficult for any but the most skilled user to recreate the entire search on any system other than the Compact Cambridge CD-ROM. Portions, however, can be easily done with Grateful Med software.

Despite the use of a computer, the search for rehabilitation articles remains a challenge. Articles are not indexed by medical specialty in the Medline. Rehabilitation is inherently eclectic because of the multiplicity of diagnoses that cross many different medical specialties. Therefore, an extensive taxonomic review of NLM's classification was necessary to choose the Medical Subject Headings (MESH) relevant to rehabilitation. Appendix 1 lists the MESH headings used to create a rehabilitation article reference base. This was combined with all the articles published in 20 journals directly related to rehabilitation. This search strategy was specifically constructed to give articles directly related to rehabilitation; no matter how this master list is divided, at least two-thirds will be highly relevant to the topic at hand. A search strategy for every possible article (including many which are not relevant) would require a different approach. The search also is less thorough in visual, hearing and language impairments and psychological aspects of rehabilitation. Mental illness and drug abuse are not included.

At the end of 1989, 6329 references from 1988 Medline were retrieved from Compact Cambridge CD-ROM by using this computerized literature search, representing 954 different journals, although 668 had 5 or fewer articles. These were ranked in descending order by number of articles found per journal, and the search was repeated for 1987 and 1989 to verify the most important journals. Those journals with more than 16 rehabilitation articles a year are listed (Tables 4 and 5), along with the total number of articles published and the percentage of articles directly related to rehabilitation. Some of the journals are 100% related to rehabilitation because they were defined as such in the search strategy.

But even this list of journals is overwhelming, and therefore, the references and journals were divided into topic areas, using the study syllabus to physical medicine and rehabilitation as a guideline to select topics. The base 6329 articles were cross referenced with these specific areas of interest within physical medicine and rehabilitation: geriatric, amputee, spinal cord injury, traumatic brain injury, cerebral palsy, stroke, cardiac, decubitus ulcer, electrodiagnosis, rehabilitation engineering, multiple sclerosis, neuromuscular disease, orthopedic, pain, pediatric, pulmonary, rehabilitation research, sexual rehabilitation, self-help devices, spine (back pain), sports, urologic and arthritis and connective tissue diseases.

Each area of interest required a separate literature search. The broadest MESH headings were chosen and searched *without* regard to rehabilitation subheadings. This very large result was then cross referenced with the rehabilitation article database, and those articles found in both searches were used to prepare the area of rehabilitation interest tables. The MESH headings used for the individual tables are listed in Appendix 2, and the same procedure could be used for other subject areas. (For instance, to prepare this paper, the articles with the word "information" in the title were selected from the large pool of rehabilitation articles.)

Even though the Medline remains the most extensive index of medical and related literature, it does not include all journals. Therefore, both local and national specialists in each subject area were asked to annotate each list with journals specifically dealing with research in rehabilitation, but not general pathophysiology or medical management. The journals with the greatest number of articles in seven topic areas are shown in Tables 6-12. Greater detail for these areas, and the entire set of 24 tables may be requested from the author.

TABLE 4

Highly related journals (>21 articles / yr.)

	Rehabilitation Articles	Total Articles	Rehabilitation
Kango Gijutsu (Japanese Journal of Nursing Arts)	71	210	34
Nursing Times	58	869	6
Clinical Orthopaedics and Related Research	52	495	10
Spine	41	290	14
European Heart Journal	10	427	10
British Medical Journal (Clinical Research)	36	975	3
Journal of Learning Disabilities	32	118	25
Ortopediia Travmatologiya I Protezirovaniie (Kharkov) (Russian)	31	310	10
Kardiologiya (Polish)	30	418	7
Diabetes Education	30	91	33
Sovetskaia Meditsina (Moskva) (Russian)	29	468	6
Zhurnal Nevropatologii I Psikiatrii Imeni S.S. Korsakova (Moskva) (Russian)	26	377	7
Zeitschrift fur Arztliche Fortbildung (Jena) (German)	26	286	9
Hospital and Community Psychiatry	26	235	11
Orthopedics	26	167	16
Journal of Burn Care and Rehabilitation	26	141	18
JAMA	26	1306	2
American Journal of Sports Medicine	25	150	17
Zeitschrift fur die Gesamte Hygiene und Ihre Grenzgebiete (German)	25	246	10
Journal of Medical Engineering and Technology	25	45	55
Orthopedic Review	24	119	20
Clinical Sports Medicine	23	59	39
Journal of Hand Surgery	23	243	10
Annals of Clinical Research	22	85	26
Meditsinskaya Sestra--Nursing (Russian)	22	225	10
Journal of Bone and Joint Surgery, American Volume	22	272	8

DISCUSSION

The extensive search necessary to prepare the above journal tables demonstrates the difficulties inherent in Medline and electronic retrieval of bibliographic information. For quantity of articles this system has no equal. The rehabilitation literature search located a large quantity of articles within -1000 journals. The quality and quantity of articles retrieved depends on the medical subject headings chosen and their combined subheadings. The "recipe" of MESH headings and journals allowing you to create your own rehabilitation medicine article base with suggested variations is provided in Appendix 1.

The core journals within PM&R (Table 1) includes many journals chosen for inclusion within the original search for references. Each of these journals is directly concerned with rehabilitation. Some of the journals included within the core are non-English journals. These are included because many of the abstracts are written in English, and also because many individuals are multilingual. Each therapeutic group within the rehabilitation team is included within Table 1 regardless of whether or not that journal was included within the original search. For example, two journals relevant to speech pathology are included. All of the major diagnostic categories have nonrehabilitation

journals included within the core table. Orthopedics, cardiology, neurology, neurosurgery, internal medicine, sports medicine, rheumatology, biomedical engineering, psychology, sociology, developmental medicine and pediatrics are all represented within the core journals table. Both major disease management and rehabilitation can be followed by using this table.

TABLE 5
Moderately related journals (16-21 articles/yr)

	Rehabilitation Articles	Total Articles	Rehabilitation
Postgraduate Medical Journal	21	304	7
State of the Art Reviews: Occupational Medicine	21	55	39
Journal of Rheumatology	21	462	5
American Journal of Sports Medicine	21	100	20
Hand Clinics	20	58	35
Revue de Chirurgie Orthopedique et Reparatrice de l'Appareil Moteur (French)	20	234	10
Journal of the American Geriatrics Society	20	213	10
IEEE Transactions on Biomedical Engineering			
IEEE Transactions on Biomedical Engineering	19	157	12
Vrachebnoe Delo (Russian)	19	601	3
Ugeskrift for Laeger (Danish)	19	959	2
Perceptual and Motor Skills	18	242	7
Zeitschrift fuer die Gesamte Innere Medizin und Ihre Grenzgebiete (German)	18	199	9
Revue de Laryngologie Otologie Rhinologie (French)	18	99	20
Therapeutische Umschau (German)	18	130	14
Developmental Medicine and Child Neurology	17	123	14
British Journal of Dermatology	17	277	6
Lancet	17	2652	<1
Journal of Pediatric Orthopedics	17	127	13
Psychiatrie Neurologie und Medizinische Psychologie (German)	17	83	20
Zeitschrift fuer Orthopaedia und Ihre Grenzgebiete (German)	17	116	15
Gigiena I Sanitariya (Russian)	17	416	4
Offentliche Gesundheitswesen (German)	17	139	12
Applied Neurophysiology	17	97	17
American Journal of Mental Deficiency	17	75	23
Social Science and Medicine	16	308	5
Acta Orthopaedica Scandivavica	16	152	10
Terapevticheskii Arkhiv (Russian)	16	508	3
American Journal of Mental Retardation	16	66	24
Journal of Bone and Joint Surgery British Volume	16	197	8
Chest	16	643	2

The probability of locating an article using this search method depends on factors other than MESH headings. These factors result from all stages of medical information dissemination from the publication to article

classification and finally your method of retrieval. Publication dates seldom coincide with the time you receive your journal. The time of receipt by National Library of Medicine (NLM) is one of the major factors for delay of articles being indexed in their year of publication and placed within the electronic retrieval systems. If NLM receives it after the publication date, the articles will be reviewed late and your chance of finding the article during that year will diminish. Each article is reviewed at which time the MESH headings are assigned. The time to review and classify articles is usually 3-6 months past the publication date, but the total delay to appearance on CD-ROM may be up to 2 years especially for foreign journals.

Within the NLM, not all journals submitted are chosen for review. Biomedical science is the theme for inclusion within Medline. And yet, examination of the tables generated shows the absence of relevant rehabilitation journals. Why is this? Budget limitations during the present federal era of austerity also affect the staffing at NLM. New journals take longer for review and potential acceptance. This is confounded by the present information explosion bringing new journals to the NLM at an ever increasing rate. *J Head Trauma Rehabilitation*, *J Cardiopulmonary Rehabilitation*, *J Neurologic Rehabilitation*, *Neurologic Rehabilitation* and *Topics in Geriatric Rehabilitation* are all newer journals.

TABLE 6
Geriatric rehabilitation

Journal	Rehabilitation Articles
Archives of Physical Medicine and Rehabilitation [813K] ^a	45
Physical Therapy [P6W]	21
Journal of the American Geriatrics Society [H6V]	19
Zeitschrift ffor Gerontologie [XXP]	15
Scandinavian journal of Rehabilitation Medicine [UD3]	13
Clinical Orthopaedics and Related Research [DFY]	11
International Disability Studies [HES]	11
Acta Belgica. Medica Physica [OCN]	10
Nursing Times [09U]	10
Gerontologist [FP51]	10
Journal of Gerontology [IAV]	10
Topics in Geriatric Rehabilitation ^b	

^aThe bracketed 3-character codes are the journal codes assigned by the National Library of Medicine.

^bRecommendation, not presently indexed by NLM. This journal is indexed within *Excerpta Medica*.

TABLE 7
Cardiac rehabilitation

Journal	Rehabilitation Articles
Kardiologia [KU9]	28
Voprosy Kurortologii, Fizioterapii I Lechebnoi Fizicheskoi Kultury [XIG]	12
Kango Gijutsu [KMT]	11
American Journal of Cardiology [3DQ]	11
Vrachebnoe Delo [XLS]	10
Zeitschrift fuer die Gesamte Innere Medizin und Ihre Grenzgebiete [XUY]	9

European Heart Journal [EM8]	8	
Heart and Lung [G2V]	7	
Journal of the American College of Cardiology [H50]	7	
Journal of Cardiopulmonary Rehabilitation		^a

^aRecommendation, not presently indexed by NLM.

TABLE 8
Pediatric rehabilitation

Journal	Rehabilitation Articles
American journal of Occupational Therapy [304]	33
Archives of Physical Medicine and Rehabilitation [8BK]	33
Physical Therapy [P6W]	33
Journal of Autism and Developmental Disorders [HGW]	19
Journal of Pediatric Orthopedics [HSW]	18
Developmental Medicine and Child Neurology [E83]	18
Journal of Speech and Hearing Disorders [K5Z]	17
Journal of Learning Disabilities [IWO]	15
Voprosy Kurortologii, Fizioterapii	15
I Lechebnoi Fizicheskoi Kultury [XIG]	
Spine [UXK]	15
Zhurnal Nevropatologii 1	15
Psikhiatrii Imeni S. S. Korsakova (Moskva) [Y9Y]	
American journal of Sports Medicine [3YR]	14
Archives of Disease in Childhood [6XG]	14
American Annals of the Deaf [3BA]	14
Child Welfare [D2U]	14
Clinical Orthopaedics and Related Research [DFY]	13
Exceptional children [ENX]	13
Pediatrics [OYL]	12
Pediatrics [OXV]	11

You may choose to use Medline for exploration of your personal rehabilitation interests in addition to those discussed in these tables. Dr. R. W. Bohannon¹² correctly states that many topics do not have specific medical subject headings, and "finding an article through the use of the medical subject headings of Medline may be cumbersome, time consuming, and difficult." The Permuterm Index of Science Citation Index can be used to find key words and phrases from the titles of articles, and titles and abstracts can both be searched on the CD-ROM version of Index Medicus. The Science Citation Index remains a unique source, by accessing the end results from someone else's literature search. This has its obvious benefits, but using Medline you will find relevant articles in both core and the most peripheral journals. You will need to determine the relevance of each article yourself, using Medline.

Despite careful choice of headings, not every article within the rehabilitation references is related to physical medicine and rehabilitation. Approximately one quarter of the articles retrieved may not be directly related to PM&R.

TABLE 9
Rehabilitation research

Journal	Rehabilitation Articles
Physical Therapy ^a	34
Archives of Physical Medicine and Rehabilitation ^a	30

Pain ^a	25
Journal of Burn Care and Rehabilitation ^a	23
American Journal of Occupational Therapy ^a	15
Muscle and Nerve ^a	15
European Heart journal	14
State of the Art Reviews: Occupational Medicine	14
Zeitschrift ffor Arztliche Fortbildung (Jena)	13
American journal of Sports Medicine	13
Journal of Pediatric Orthopedics	11
Clinical Orthopaedics and Related Research	11
Electromyography and Clinical NeurophySiologya	10
Paraplegia ^a	10
journal of Rheumatology	10
Spine	10
IEEE Transactions on Biomedical Engineering	9
Brain Injury ^a	9
Journal of Speech and Hearing Disorders ^a	9
Zeitschrift fuer Orthopaedie und Ihre Grenzgebiete	8
JAMA	8
Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kultury	8
Journal of Communication Disorders ^a	8
American Journal of Physical Medicine and Rehabilitation ^a	8
Developmental Medicine and Child Neurology	7
Lancet	7
Recent Results in Cancer Research	7
Journal of Bone and joint Surgery American Volume	7
Annals of Clinical Research	7
Journal of Learning Disabilities	7
International Disability Studies ^a	7
Rehabilitation Nursing ^a	7
Diabetes Education	7

^aEntire journal searched for research articles.

TABLE 10
Rehabilitation self-help devices

Journal	Rehabilitation Articles
Journal of Rehabilitation Research and Development [JRD]	17
Journal of Medical Engineering and Technology [J141]	16
Archives of Physical Medicine and Rehabilitation [8BK]	11
British Medical journal [Clin Res] [B4X]	8
International journal of Rehabilitation Research [GRL]	7
Kango Gijutsu [KMT]	6
American journal of Occupational Therapy [304]	5
Journal of Biomedical Engineering [K6K]	4
Medicine and Science in Sports and Exercise [MG8]	4
Physical Therapy [P6W]	4
Rehabilitation (STUTTIG) [R3P]	4
Assistive Technology	a

^aRecommendation, not presently indexed within NLM.

TABLE 11
Sports medicine rehabilitation

Journal	Rehabilitation Articles
Clinical Sports Medicine [CSM]	22
American Journal of Sports Medicine [3YR]	21
Sports Medicine [SPO]	8
Archives of Physical Medicine and Rehabilitation [8BK]	6
Medicine and Science in Sports and Exercise [MG8]	6
Schweizerische Zeitschrift für Sportmedizin [UFL]	6
Australian Family Physician [9EC]	3
Physical Therapy [P6W]	3
Spine [UXK]	3
Postgraduate Medical journal [PFK]	3
Sportverletzung Sportschaden [VCL]	3
Journal of Orthopaedic and Sports Physical Therapy	a
Physician and Sports Medicine	a

^aNote the sport database should be used for specific searching in this area.

TABLE 12
Rheumatologic Rehabilitation

Journal	Rehabilitation Articles
Physical Therapy [P6W]	14
Archives of Physical Medicine and Rehabilitation [8BK]	12
Voprosy Kurortologii, Fizioterapii i Lechebnoi Fiziches koi Kultury [XIG]	11
Kango Gijutsu [KMT]	11
American journal of Sports Medicine [3YR]	9
Clinical Sports Medicine [CSM]	7
Journal of Pediatric Orthopedics [HSW]	5
Revue de Chirurgie Orthopedique et Reconstructrice de l'Appareil Moteur [RMP]	5
Journal of Bone and Joint Surgery British Volume [HK7]	5
Orthopedics [PCM]	5
Arthritis and Rheumatism [90m]	5
Scandinavian journal of Rheumatology [UDI]	5
British Journal of Rheumatology [BIT]	5
Zeitschrift für Rheumatologie [YOV]	5

TABLE 13
Grateful Med search for spinal cord injury

"MEDLINE"
"
"
10, 'Rehabilitation'
"Rehabilitation (sh)"
"Physical Medicine"
"Physical Therapy"

"Disability Evaluation'
"Handicapped'
"Self-Help Devices'
"Crutches'
"Walkers'
"Orthotic Devices'
1, 'Spinal Cord Injuries'
0, "
0, "
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"
",1,0
.....
MS
TW
MH

CONCLUSION

You must consider the limitations of your chosen literature search process when evaluating the articles recovered. The extensive search necessary to prepare the above journal tables demonstrates the difficulties inherent in Medline and electronic retrieval of bibliographic information. Computer software facilitates searching the Medline and also exposes the limitations of the NLM taxonomy. Careful review of the medical subject headings maintains the quality of articles retrieved. The overlap of medical specialties requires scanning articles retrieved using the reference base.

The journal tables prepared will enable you to follow the current issues within rehabilitation. Use them as a guide for your own interests. Prepare yourself for research and practice . . . at a moment's notice.

EXERCISES

Learning the Core Knowledge within Physiatry

The resident in training should begin with the table of core journals. Make your goal seeing the entire forest of the rehabilitation literature. Learn the newer information that supplements the rehabilitation medicine textbooks and explore your new interests.

Step 1. Critically approach articles within *Archives of Physical Medicine and Rehabilitation*, *American Journal of Physical Medicine and Rehabilitation*, *Physical Therapy* and *American Journal of Occupational Therapy* and begin your journal club here.

Step 2. Find out which of the core journals listed here are available at your medical library. Scan the table of contents from the first 20 journals. Review those of interest or relevance. One trip to the library per week should accomplish this. Take copies of articles with you for review at a later time.

Step 3. Continue this for 3 months. Change your focus to the next 20 journals on your list. Follow these journals for another 3 months. After a year, you will have reviewed the most accessible journals of direct relevance to rehabilitation.

Step 4. For core journals to which you do not have ready access (and which are indexed in Medline), use your literature search service to retrieve all titles and abstracts. Review these and select the most relevant ones to request through interlibrary loan and add to your journal club.

Step 5. Subscribe (either yourself or at your local library) to the most relevant journals and regularly scan the table of contents of ones of lesser relevance so that you can request reprints. Journals such as *Current Contents* that provide copies of the title pages are even available on diskette so that you can automatically generate a reprint request postcard.

Learning the Current Issues within Rehabilitation

Each area of interest within physiatry has its own current issues and ongoing academic challenges. These are addressed within the journal literature.

You may develop your current interests through the more specific tables.

1. Choose an area of interest from Tables 6 through 12. You may choose more than one if the list is a relatively short one.
2. Follow these journals while you are developing new ideas for research projects and learning what else is happening in your area of focus.
3. If your specific area of interest is not represented within the tables presented here, develop your own specific search strategy.
4. When you are more comfortable with the current literature, call the author of one of the papers you admire most. You will learn at least his/her most recent research, will probably get guidance to other readings and may even make a new friend.

Keeping Current in Your Field

For most of the topic areas presented here, you can use the search strategies presented here to generate a reading list of less than 200 articles a year or less than 1 every day. Pediatric rehabilitation is too broad and must be narrowed further, and orthopedics, pain, pulmonary, arthritis and cardiac all generate more than 200 references. For these you will probably want to scan the abstracts only and selectively request articles. Except for the sports and cardiac areas, searches very similar to these can be accomplished using the Grateful Med version 4 software.⁵ An example of a search for spinal cord injury using this system is reproduced in Table 13. With version 4 of this software, you can type this into a file called "SCI.MED" and use it directly as a user search. With either version 4 or 5, you can recreate it (only 10 terms can be entered at a time). With either version, you have to search twice to duplicate these lists—first, selecting all articles on spinal cord injury from the large rehabilitation search, and secondly, all articles on spinal cord injury in rehabilitation journals. Grateful Med also allows you to retrieve only articles that have been added recently to Medline. Therefore, whenever you run out of reading material you can repeat your search. Thus you learn to swim in this sea of articles.

ACKNOWLEDGMENTS

We wish to express our appreciation for the input of Gregg Vanderheiden, Co-chair, and the other members of the NIH task force on medical rehabilitation research cross-cutting panel on information resources.

TECHNICAL INFORMATION ON LITERATURE SEARCHES

Appendix 1: Preparing Your Own Rehabilitation Article Reference Base

To execute this master search you will need a user friendly off-line computer that includes in its program a method to remember your search for future use (i.e., a macro program). Your librarian will be able to tell you if the system at your library is programmed for making your macro. This macro will allow you to repeatedly prepare the latest journal article base each time you use this search system. CD-ROM Medline (Compact Cambridge Abstracts, Bethesda, MD) was used with an IBM compatible personal computer to search the 1988 Medline. The search takes 4 min on a Compaq 286, and downloading the 6000 articles to hard disk takes 90 min. The following medical subject headings were concurrently searched using the "OR" command, including all subheadings of these categories, for example, activities of daily living are included under rehabilitation:

Rehabilitation E2.831*
Physical therapy E2.780*
Disability evaluation E1.373*
Handicapped M1.289*
Self-help devices E7.796*
Canes E7.858.442.250*

Crutches E7.858.442.281*
Walkers E7.858.442.980*
Physical medicine G2.403.790.508*
Artificial limbs E4.557.210*
Orthotics E7.858.442.743*
Prosthesis E4.659*

The following headings were searched with the rehabilitation subheading and the "OR" command:

Bacterial and fungal diseases C1*(RH)
Viral diseases C2*(RH)
Parasitic diseases C3*(RH)
Neoplasms C4*(RH)
Musculoskeletal diseases C5*(RH)
Digestive system diseases C6*(RH)
Respiratory tract diseases C8*(RH)
Otolaryngeal Disease C9*(RH)
Nervous system diseases C10*(RH)
Urologic and male genital diseases C12*(RH)
Female genital diseases and disorders of pregnancy C13*(RH)
Cardiovascular diseases C14*(RH)
Hematologic and lymphatic diseases C15*(RH)
Skin diseases C17*(RH)
Endocrine diseases C18*(RH)
Nutritional and metabolic diseases C19*(RH)
Immunologic diseases C20*(RH)
Injuries, occupational diseases and poisoning C21-(RH)
Symptoms and general pathology C23*(RH)
Surgery, operative E4*(RH)
Childhood developmental disorders F3.305*(RH)
Cognition disorders F3.126.185*(RH)
Communication disorders F3.126.219*(RH)
Dementia F3.709.680.610.392*(RH)
Equipment and supplies E7*(RH)

Articles from the following specifically psychiatric journals were also included in the literature search for a separate bibliographic database of rehabilitation articles. These were searched using the "EXPAND" command:

Acta Belg Med Phys
Adv Clinical Rehabil
Am J Physical Medicine
American J Physical Medicine and Rehabilitation American J Occup Therapy
Archives of Physical Med and Rehabil
International J Rehabilitation Research
International Rehabil Med
International Disability Studies
J American Paraplegia Society
J Rehabil Research and Devel
Paraplegia
Physical Therapy
Rehabil Nursing
Rehabilitation (Stuttg)
Scandinavian J Rehabilitation Medicine

Appendix 2: Specific Rehabilitation Topic Areas

Specific topic areas below were searched and crossed with the entire reference list of rehabilitation articles (-6000) using the AND command to select articles in both lists. The specific MESH headings and total number of articles found are indicated.

Geriatrics-aged M1.471.116.100*, geriatrics G2.403.398* and health services for the aged N2.421.320*-685 articles
Amputation-amputees M1.289* and amputation E4.557.69*-68 articles
Spinal cord injuries C21.866.819*-122 articles
Brain injuries C21.866.460.152*-81 articles
Cerebrovascular disorders C10.228.140.300* -193 articles
Cardiac-Cardiovascular diseases C14* and heart surgery E4.920.490*. The more specific headings cerebrovascular disorders C14.907.253*, varicose veins C14.907.927*, venous insufficiency C14.907.952*, phlebitis C14.907.681*, telangiectasis C14.907.823* and varicocele C14.907.903* were excluded using the "ANDNOT" command 361 articles
Decubitus ulcer C17.893.289-17 articles
EMG-electrophysiology G7.453*, electromyography E1.399.403 and neural conduction G11.561.537*-151 articles
Engineering-biomedical engineering G2.77*, electronics H1.288* and medical information applications L1.700.508*-46 articles
Multiple sclerosis C10.228.337.578*-28 articles
Neuromuscular diseases C5.651.661*-48 articles
Orthopedics E4.557*-263 articles
Pain-pain C23.888.592.612*, pain measurement E1.236.563.540*, pain, postoperative C23.814.533* and myofascial pain syndromes C5.651.651*-246 articles
Pediatrics-adolescence M1.471.392* and child M1.471.392*-1203 articles
Pulmonary-respiratory tract disease C8*, respiratory therapy E2.880* and diagnosis, respiratory tract system E1.302*-230 articles
Research-statistics E5.318.740*, study design E5.318.780*, analytic studies E5.318.760.500*, clinical trials E5.318.760.535*, sampling studies E5.318.760.875, epidemiologic factors G3.850.490*, mathematics H1.548*, models, theoretical H1.770.461*, reproducibility of results H1.770.644.601, research design H1.770.644.728*, research support H1.770.727, systems theory H1.770.878 and training support H1.770.878*-1046 articles
Sexuality-sex G8.520.900*, sex behavior F1.145.792*, sex counseling F2.784.176.700*, sex disorders C12.294.644*, sex education 12.233.332.749*, sexual partners M1.778* and sexually transmitted diseases C2.800*-59 articles
Self-help devices E7.796*-174 articles
Spinal diseases C5.520.900*-86 articles
Sports-sports medicine G2.403.830*, athletic injuries C21.866.115*, sports 13.450.642* and the journals Sports Medicine, Med Sci Sports Exerc, Med Sci Sports, J Sports Med Phys Fitness, J Sports Med, Int Sports Med, Clin Sports Med, Br I Sports Med, *Am Sports Med* and *Schweiz Z Sportsmed*-140 articles
Urology-urolologic and male genital diseases C12* and urology G2.403.810.860*-165 articles
Rheumatology-joint diseases C5.550*, rheumatism C5.799* and connective tissue diseases C23.505*-277 articles

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3. *Health Hotlines*, January 1990: Available from Specialized Information Services, National Library of Medicine, 8600 Rockville Pike, Bethesda, MD 20894 (301-496-1131).
4. Enders A, Hall M (eds): *Assistive Technology Sourcebook*. Washington, DC: RESNA Press, 1990. Available from Rehabilitation Society of North America, Suite 700, 1101 Connecticut Avenue NW, Washington, DC 20036 (202-857-1199).
5. Grateful Med can be ordered for \$29.95 plus \$3.00 handling from US Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 (703-487-4650). Both IBM and Macintosh versions are available. Questions about this program can be directed to the National Library of Medicine (800-638-8480).

6. hyperABLEDATA available from TRACE Center, University of Wisconsin, 151 Waisman Center, 1500 Highland Avenue, Madison, WI 53705-2280.
7. CRISP may also be accessed by contacting the Research Documentation Section, Information Systems Branch, Division of Research Grants, NIH, 5333 Westbard, Room 134, Bethesda, MD 20892 (301-496-7543).
8. VA Rehabilitation Database, Dori Grasso, Office of Technology Transfer, VA Prosthetics R&D Center, 103 South Gay St., Baltimore, MD 21202 (301-962-1800).
9. OT Source, Mary Binderman, AOTA, 1383 Piccard Dr., Rockville, MD 20850-4375 (301-948-9626).
10. *Disability Studies Quarterly*: Department of Sociology, Brandeis University, Waltham, MA.
11. *United Nations Disability Statistics Data Base, 1975-1986*: Statistical Office, United Nations, New York, NY 10017 (on diskette in spreadsheet format).
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The Archives of Physical Medicine and Rehabilitation publishes original, peer-reviewed research and clinical reports on important trends and developments in physical medicine and rehabilitation and related fields. This international journal brings researchers and clinicians authoritative information on the therapeutic utilization of physical, behavioral and pharmaceutical agents in providing comprehensive care for individuals with chronic illness and disabilities. Archives began publication in 1920, publishes monthly, and is the official journal of the American Congress of Rehabilitation Medic... What is Physical Medicine and Rehabilitation? Physical medicine and rehabilitation (PM&R), also known as physiatry or rehabilitation medicine, aims to enhance and restore functional ability and quality of life to those with physical impairments or disabilities affecting the brain, spinal cord, nerves, bones, joints, ligaments, muscles, and tendons. A physician having completed training in this field is referred to as a physiatrist. Unlike other medical specialties that focus on a medical "cure," the goals of the physiatrist are to maximize patients' independence in activities of daily living. International Physical Medicine & Rehabilitation Journal (IPMRJ) is an internationally acclaimed multi-disciplinary open access journal which deals with the development in the field of physical medicine which is also known as physiatry and rehabilitation emphasizing the prevention, diagnosis, and treatment of disorders of all ages with physical and cognitive impairment and disability particularly related to the nerves, muscles, bones and brain, tissues, nervous system. This journal scope also includes management of comorbidities and co-impairments, diagnostic and therapeutic injection str... IPMRJ is most delighted to accept research articles, quality reviews, rapid