
YEAR BOOK®

YEAR BOOK OF ORTHOPEDICS® 2001

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2001

The Year Book of ORTHOPEDICS®

Editor-in-Chief

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**2001
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ORTHOPEDICS®**

Statement of Purpose

The YEAR BOOK Series

The YEAR BOOK series was devised in 1901 by health professionals who observed that the literature of medicine and related disciplines had become so voluminous that no one individual could read and place in perspective every potential advance in a major specialty. That has never been more true than it is today.

More than merely a series of books, YEAR BOOK volumes are the tangible results of a unique service designed to accomplish the following:

- to *survey* a wide range of journals
- to *select* from those journals papers representing significant advances and statements of important clinical principles
- to provide *abstracts* of those articles that are readable, convenient summaries of their key points
- to provide *informed commentary* about their relevance

These publications grow out of a unique process that draws on the talents of outstanding authorities in clinical and fundamental disciplines, trained literature specialists, and professional writers—all supported by the resources of Mosby, the world's preeminent publisher for the health professions.

The Literature Base

Mosby and its editors survey approximately 500 journals published worldwide, covering the full range of the health professions. On an annual basis, the publisher examines usage patterns and polls its expert authorities to add new journals to the literature base and to delete journals that are no longer useful as potential YEAR BOOK sources.

The Literature Survey

More than 250,000 peer-reviewed articles per year are scanned systematically—including title, text, illustrations, tables, and references—by the publisher's team of literature specialists. Each scan is compared, article by article, to the search strategies that the publisher has developed in consultation with the nearly 200 outside experts who form the pool of YEAR BOOK editors. A given article with broad scientific or clinical implications may be reviewed by any number of YEAR BOOK editors, from one to a dozen or more, regardless of the discipline for which the paper was originally published. In turn, each editor who receives the article reviews it to determine whether it should be included in his or her volume. This decision is based on the article's inherent quality, its relevance to readers of that YEAR BOOK, and the editor's goal to represent a comprehensive picture of a given field in each volume of the YEAR BOOK. In addition, the editor indicates when to include figures and tables from the article to help the YEAR BOOK reader better understand the information.

Of the quarter million articles scanned each year, only 5% are selected for publication within the YEAR BOOK series, thereby assuring readers of the high value of every selection.

The Abstract

The publisher's abstracting staff is headed by a seasoned medical editing professional and includes individuals with extensive experience in writing for the health professions. When an article is selected for inclusion in a YEAR BOOK, it is assigned to a member of the abstracting staff. The abstractor, guided in many cases by notations supplied by the physician editor, writes a structured, condensed summary designed to rapidly communicate to the reader the essential information contained in the article.

The Commentary

The YEAR BOOK editorial boards, sometimes assisted by guest contributors, write comments that place each article in perspective. This provides the reader with insights from authorities in each discipline that point out the value of the article and that often reflect the authority's thought processes in assessing the article.

Additional Editorial Features

The editorial boards of each YEAR BOOK organize the abstracts and comments to provide a logical and satisfying sequence of information. To enhance the organization, editors also provide introductions to sections or individual chapters, comments linking a number of abstracts, citations to additional literature, and other features.

The published YEAR BOOK contains enhanced bibliographic citations for each selected article, including extended listings of multiple authors and identification of author affiliations. Each YEAR BOOK contains a Table of Contents specific to that year's volume. From year to year, the Table of Contents for a given YEAR BOOK may vary, depending on developments within the field.

Every YEAR BOOK contains a list of the journals from which articles have been selected. This list represents a subset of approximately 500 journals surveyed by the publisher and occasionally reflects a particularly pertinent article from a journal that is not surveyed routinely.

Finally, each volume contains a comprehensive subject index and an index to authors of each selected article.

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Year Book of Nuclear Medicine®: Drs Gottschalk, Blaufox, Coleman, Strauss, and Zubal

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Journals Represented

Mosby and its editors subscribe to and survey approximately 500 US and foreign medical and allied health journals. From these journals, the editors select the articles to be abstracted. Journals represented in this YEAR BOOK are listed below.

Acta Orthopaedica Scandinavica
American Journal of Physical Medicine & Rehabilitation
American Journal of Roentgenology
American Journal of Sports Medicine
American Journal of Surgical Pathology
Annals of Plastic Surgery
Annals of the Royal College of Surgeons of England
Archives of Pediatrics and Adolescent Medicine
Archives of Physical Medicine and Rehabilitation
Arthroscopy
British Journal of Anaesthesia
British Journal of Surgery
British Medical Journal
Canadian Journal of Anesthesia
Canadian Journal of Surgery
Cancer
Clinical Orthopaedics and Related Research
Foot & Ankle International
Injury
International Journal of Obesity
International Journal of Radiation, Oncology, Biology, and Physics
Journal of Arthroplasty
Journal of Bone and Joint Surgery (American Volume)
Journal of Bone and Joint Surgery (British Volume)
Journal of Bone and Mineral Research
Journal of Hand Surgery (American)
Journal of Hand Surgery (British)
Journal of Neurosurgery
Journal of Neurosurgery: Spine
Journal of Orthopaedic Research
Journal of Orthopaedic Trauma
Journal of Pain and Symptom Management
Journal of Pediatric Orthopaedics
Journal of Rheumatology
Journal of Surgical Oncology
Journal of Trauma: Injury, Infection, and Critical Care
Journal of Ultrasound in Medicine
Journal of Urology
Journal of the American Academy of Orthopaedic Surgeons
Journal of the American Geriatrics Society
Lancet
Medicine and Science in Sports and Exercise
Microsurgery
New England Journal of Medicine
Orthopedics
Plastic and Reconstructive Surgery
Radiotherapy and Oncology

Scandinavian Journal of Rehabilitation Medicine
Skeletal Radiology
Spine
Stroke
Urology

STANDARD ABBREVIATIONS

The following terms are abbreviated in this edition: acquired immunodeficiency syndrome (AIDS), anterior cruciate ligament (ACL), anteroposterior (AP), avascular necrosis (AVN), cardiopulmonary resuscitation (CPR), central nervous system (CNS), cerebrospinal fluid (CSF), computed tomography (CT), deoxyribonucleic acid (DNA), electrocardiography (ECG), health maintenance organization (HMO), human immunodeficiency virus (HIV), intensive care unit (ICU), intramuscular (IM), intravenous (IV), magnetic resonance (MR) imaging (MRI), range of motion (ROM), ribonucleic acid (RNA), total hip arthroplasty (THA), total knee arthroplasty (TKA), ultrasound (US), and ultraviolet (UV).

NOTE

The YEAR BOOK OF ORTHOPEDICS® is a literature survey service providing abstracts of articles published in the professional literature. Every effort is made to assure the accuracy of the information presented in these pages. Neither the editors nor the publisher of the YEAR BOOK OF ORTHOPEDICS® can be responsible for errors in the original materials. The editors' comments are their own opinions. Mention of specific products within this publication does not constitute endorsement.

To facilitate the use of the YEAR BOOK OF ORTHOPEDICS® as a reference tool, all illustrations and tables included in this publication are now identified as they appear in the original article. This change is meant to help the reader recognize that any illustration or table appearing in the YEAR BOOK OF ORTHOPEDICS® may be only one of many in the original article. For this reason, figure and table numbers will often appear to be out of sequence within the YEAR BOOK OF ORTHOPEDICS®.

Publisher's Preface

The publication of the 2001 YEAR BOOK series marks the 100th anniversary of the original Practical Medicine Series of Year Books. To commemorate this milestone, each 2001 Year Book includes an anniversary seal on the cover. The content and format of the Year Books remain unchanged from the beginning of the last century—each volume consists of abstracts of the best scholarly articles of the year, accompanied by expert critical commentaries.

The first Year Book appeared in 1900 when Gustavus P. Head, MD, produced the first *Year Book of the Nose, Throat and Ear*, a volume consisting of highlights from the previous year's best literature, enhanced by expert observations. Dr Head assembled a small group of distinguished physicians to serve as editors, and the first series of Year Books was published in 1901. The first volumes of the Year Book series—*General Medicine, General Surgery, The Eye, Gynecology, Obstetrics, Materia Medica and Therapeutics, Pediatrics, Physiology, and Skin and Venereal Diseases*—appeared at monthly intervals, with 10 volumes published in 1 year. The entire series was met with critical enthusiasm.

In 1904, Dr Head's brother, Cloyd, assumed responsibility for the management of the Year Books. In 1905, the volumes began to appear at regular intervals during the calendar year instead of on a monthly basis. By World War I, the Year Books had been established as an authority on medical and surgical progress.

The postwar period brought about a significant change in the practice of medicine: specialization. To accommodate the rise of specialization in medicine, the Year Books were now sold as individual volumes rather than only as a complete set. This change brought about a tremendous response and sales of the books increased. In 1922, the Year Books became even more specialized, as the books now had different editors for the different medical specialties covered in each volume. Later, in 1933, the title of the series changed from the Practical Medicine Series of Year Books to the Practical Medicine Year Books to reflect these new designs.

The Year Books have grown significantly from the first 10-volume series in 1901 to a diversified series of 32 volumes in 2001. That the Year Book series is the only series of their kind to have survived is a testament to the vision and commitment of its founders. Some minor changes in format and design have occurred throughout the years, but the mission of the Year Book series—to provide a record of exceptional medical achievements distinguished by the reflections of many of the great names in medicine today—has remained constant.

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1 Basic Science

Introduction

As with other medical disciplines, the focus of basic research in orthopedics is being directed at the molecular level. As such, the application is rather extensive, and in this section we have selected articles that discuss the growth factors to enhance fixation. In addition, because of the increased interest in the viscous enhancing agents, there have been 2 articles included that provide some scientific basis for that clinical practice. Finally, the general interest in cartilage healing continues at a significant pace, and 2 articles have been included that provide the reader with 2 approaches to this important and emerging area of investigation. It should be noted, however, that with each of the sections there are also basic science articles that deal with material properties and the effects of wear debris in the joint replacement sections. In the area of the shoulder, the basic molecular changes associated with some of the newer thermal shrinking procedures are reported. Finally, in the area of the foot and ankle, the physiologic data regarding the impact of immobilization are presented. Thus, the basic science that supports our clinical practice is "sprinkled through" the entire volume. There has been a specific and intentional effort to make these selections clinically relevant. It is hoped that the reader finds them such.

Bernard F. Morrey, MD

The Effects of Early Mobilization in the Healing of Achilles Tendon Repair

Pneumáticos SG, Noble PC, McGarvey WC, et al (Baylor College of Medicine, Houston)

Foot Ankle Int 21:551-557, 2000

1-1

Purpose.—Among patients undergoing surgical repair of a ruptured Achilles tendon, postoperative immobilization promotes healing but may also allow adhesions to form between the tendon and surrounding tissues. In hand surgery, early motion has been found to improve tendon gliding function as well as tensile stiffness and strength of the repair site. However, there is concern that permitting early motion after Achilles tendon repair might result in stretching or even rerupture of the tendon. The effects of early motion on repaired Achilles tendon ruptures were assessed in rabbits.

Methods.—The investigators performed tenotomy followed by suture repair of the left Achilles tendons of 24 male New Zealand white rabbits. In group A rabbits, the ankle was immobilized by pinning for 35 days. In group B, the ankle was immobilized for 14 days, after which the animals were allowed to move freely. The histologic and biomechanical findings of the 2 groups of tendons were compared.

Results.—In response to loading, average elongation of the neotendon was 9.5 mm in group A and 12.5 mm in group B, a nonsignificant difference. About half of the elongation occurred within the first 4 days postoperatively. At 35 days, the repaired tendon had gained 67.4% of the stiffness of the unoperated control in group A, compared with 82.9% in group B. In both groups, histologic examination showed evidence of disordered neocollagen fibers at the repair site within 4 days, with more mature collagen appearing later.

Conclusions.—Early mobilization of repaired Achilles tendons enhances the tendons' mechanical properties without negatively affecting the functional outcome. Early mobilization appears to restore tendon function more rapidly than continuous immobilization. Early controlled motion appears to provide the best outcome after Achilles tendon repair.

► This experimental study provides yet additional data on the value of physiologic stresses to healing soft tissue injuries. The tenuousness of the repair or reconstruction is seen in the first several days, after which the healing process seems to stabilize, resulting in a rather predictable return of stiffness and ultimate strength. The impact of strength and elongation does favor early mobilization, at least in this experimental state.

B. F. Morrey, MD

Ultrastructural Findings After Intraarticular Application of Hyaluronan in a Canine Model of Arthropathy

Wenz W, Breusch SJ, Graf J, et al (Orthopaedic Univ Clinic Heidelberg, Germany; Euromed Clinic, Fürth, Germany; Inst for Anatomy of WWU, Münster, Germany)

J Orthop Res 18:604-612, 2000

1-2

Background.—The effects of hyaluronan on chondromalacia patellae have not been documented in the literature. These effects were investigated in experimentally induced chondromalacia patellae in a dog model.

Methods and Findings.—The Pond-Nuki technique was used to induce chondromalacia. This method involved severing and resecting the ACL in the dogs. Initially, the effect of resection of the ACL with no therapy was determined. Patellar specimens were retrieved at 3, 6, and 12 weeks after surgery. Subsequently, dogs receiving intra-articular injections of hyaluronan were compared with dogs receiving saline. Three dogs from the treatment and placebo groups were given 5 injections of hyaluronan during 1 of the 4-week intervals. The uninvolved contralateral knee served

as a control in both groups. Specimens were obtained from the medial and lateral patellar poles. The hyaluronan-treated group had a significant reduction in cartilaginous lesions compared with the saline-treated group.

Conclusions.—Intra-articularly applied hyaluronan effectively delays the degenerative process of cartilage degradation. The use of hyaluronan may be indicated in the early stages of chondromalacia.

► This basic research is particularly relevant in that it provides a scientific basis to an emergent clinical practice, with the FDA approval of the viscous-enhancing agent. However, the mechanism of action is still not fully understood. While this contribution does not directly address the issue of mechanism of action, it does provide at least a descriptive insight of outcome. More viable cartilage is present after the introduction of hyaluronic acid. This provides some encouragement and basis for the emergent clinical practice of the use of these agents.

B. F. Morrey, MD

Hyaluronan-based Polymers in the Treatment of Osteochondral Defects

Solchaga LA, Yoo JU, Lundberg M, et al (Case Western Reserve Univ, Cleveland, Ohio)

J Orthop Res 18:773-780, 2000

1-3

Background.—Efforts to promote self-repair of articular damage in older animals have met with limited success. Successful tissue regeneration requires not only cells that can differentiate into the necessary phenotype at the site of damage but also a microenvironment that encourages their proliferation and differentiation. Hyaluronan plays a crucial role during development by inducing chondrogenic differentiation of embryonic mesenchymal cells. A new generation of delivery vehicles based on hyaluronan has been developed, and these polymers have been shown to support the proliferation and differentiation of progenitor cells into chondrocytes and osteocytes. The authors hypothesized that hyaluronan-based polymers would re-create an embryonic type of environment in which host progenitor cells could regenerate damaged articular surface and underlying bone. They tested this hypothesis in a rabbit model.

Methods.—The subjects were 36 4-month-old New Zealand White rabbits. Full-thickness osteochondral defects were created on the femoral condyle of each knee. Defects were either left empty ($n = 24$) or filled with an ACP sponge that is a cross-linked derivative of hyaluronan and degrades within 10 to 14 days ($n = 24$) or an HYAFF-11 sponge made of benzylated hyaluronan that degrades within 6 to 8 weeks ($n = 24$). Animals were killed 4 or 12 weeks after surgery, and condyles were removed for histologic examination. Defects at 12 weeks were rated according to a 29-item total histologic score that assessed the percentage of hyaline articular cartilage, surface regularity, degenerative changes, structural integrity, thickness, integration at the anterior and the posterior