# Journal of Athletic Training

http://www.natajournals.org

## Volume 51, Number 11, November 2016

Editor-in-Chief Craig R. Denegar, PhD, PT, ATC, FNATA University of Connecticut

## **Associate Editors**

David C. Berry, PhD, AT, ATC Saginaw Valley State University Paul A. Borsa, PhD, ATC, FACSM University of Florida Steven P. Broglio, PhD, ATC University of Michigan Douglas J. Casa, PhD, ATC, FNATA, FACSM University of Connecticut Mitchell L. Cordova, PhD, ATC, FNATA, FACSM Florida Gulf Coast University Joseph M. Hart, PhD, ATC, FNATA, FACSM University of Virginia J. Ty Hopkins, PhD, ATC, FNATA, FACSM Brigham Young University Kristin L. Kucera, PhD, MSPH, ATC University of North Carolina at Chapel Hill Stephanie M. Mazerolle, PhD, ATC, FNATA University of Connecticut Patrick O. McKeon, PhD, ATC, CSCS Ithaca College Joseph B. Myers, PhD, ATC Tampa Bay Rays James A. Oñate, PhD, ATC, FNATA The Ohio State University Darin A. Padua, PhD, ATC University of North Carolina at Chapel Hill Susan A. Saliba, PhD, PT, ATC, FNATA University of Virginia Tamara C. Valovich McLeod, PhD, ATC, FNATA Arizona School of Health Sciences Stacy E. Walker, PhD, ATC **Ball State University** Official publication of the following associations National Athletic Trainers' Association

Taiwan Athletic Trainers' Society Japan Athletic Trainers' Organization Athletic Rehabilitation Therapy Ireland

### **Senior Associate Editors**

Jay Hertel, PhD, ATC, FNATA, FACSM University of Virginia Jennifer M. Hootman, PhD, ATC, FNATA, FACSM Centers for Disease Control and Prevention

Sandra J. Shultz, PhD, ATC, FNATA, FACSM University of North Carolina at Greensboro

#### **Clinical Applications Editor**

Marjorie A. King, PhD, ATC, PT Plymouth State University

#### **Statistical Consultants**

R. Curtis Bay, PhD A.T. Still University Heather Bush, PhD University of Kentucky Stephen W. Marshall, PhD University of North Carolina at Chapel Hill Bryan L. Riemann, PhD, ATC, FNATA Armstrong State University

## **Statistical Consultant Emeritus**

Bruce M. Gansneder, PhD University of Virginia

## **Consulting Editors**

Christopher D. Ingersoll, PhD, ATC, FNATA, FACSM The University of Toledo Kenneth L. Knight, PhD, ATC, FNATA, FACSM Brigham Young University David H. Perrin, PhD, ATC, FNATA, FACSM University of Utah Clint Thompson, MA, ATC Seattle, WA Managing Editor

Leslie E. Neistadt, ELS

Editor

Kevin P. Clear

Indexes: Currently indexed in MEDLINE, PubMed Central, Focus on Sports Science & Medicine (ISI: Institute for Scientific Information), Research AlertTH (ISI: Institute for Scientific Information), Physical Education Index, SPORT Discus (SIRC: Sport Information Resource Centre, Canada), CINAHL (Currulative Index to Nursing & Allied Health Literature), AMED (Allied and Alternative Medicine Database), PsycINFO (American Psychological Association), EMBASE (Elsevier Science), Science Citation Index, Current Contents/Clinical Medicine, Science Citation Index Expanded (SciSearch), Journal Citation Reports/Science Edition, Biological Abstracts, and BIOSIS Previews.

The Journal of Athletic Training (ISSN 1062-6050) is published monthly (\$267 for 1-year institutional subscription; \$303 foreign) by the National Athletic Trainers' Association, Inc, 1620 Valwood Parkway, Ste. 115, Carrollton, TX 75006. Periodicals postage paid at Carrollton, TX, and at additional mailing offices. Claims for copies lost in the mail must be received within 90 days (180 days foreign) of the issue date to ensure replacement at no charge.

POSTMASTER: Send address changes to Journal of Athletic Training, c/o NATA, 1620 Valwood Parkway, Ste. 115, Carrollton, TX 75006. CHANGE OF ADDRESS: Request for address change must be received 30 days prior to date of issue with which it is to take effect. Duplicate copies cannot be sent to replace those undelivered as a result of failure to send advance notice. ADVERTISING: Although advertising is screened, acceptance of the advertisement does not imply NATA endorsement of the product or the views expressed. Rates available upon request. The views and opinions in the *Journal of Athletic Training* are those of the authors and are not necessarily of the National Athletic Trainers' Association, Inc.

Copyright 2016 by the National Athletic Trainers' Association, Inc. All rights reserved. Printed in the United States. The Journal of Athletic Training is printed on paper that meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).



## **Editorial Board**

Ruben Echemendia, PhD PANBA, Inc

Todd A. Evans, PhD, ATC University of Northern Iowa

Reed Ferber, PhD, ATC, CAT(C) University of Calgary, Canada

Sandra Fowkes Godek, PhD, ATC West Chester University

Matthew S. Ganio, PhD University of Arkansas

Phillip A. Gribble, PhD, ATC, FNATA The University of Toledo

Kevin M. Guskiewicz, PhD, ATC, FNATA, FACSM University of North Carolina at Chapel Hill

Jolene M. Henning, EdD, ATC High Point University

Lee Herrington, PhD, MSc, MCSP University of Salford, United Kingdom

Mark Hoffman, PhD, ATC, FNATA Oregon State University

Tricia J. Hubbard-Turner, PhD, LAT, ATC, FNATA University of North Carolina at Charlotte

Lennart D. Johns, PhD, ATC Quinnipiac University

Daniel A. Judelson, PhD Nike Sport Research Lab

Thomas W. Kaminski, PhD, ATC, FNATA, FACSM University of Delaware

Sarah B. Knowles, PhD, MPH Palo Alto Medical Foundation Research Institute

Michael C. Koester, MD, AT Ret Slocum Center for Orthopedics and Sports Medicine

John E. Kovaleski, PhD, ATC University of South Alabama

Kevin G. Laudner, PhD, ATC, FACSM Illinois State University

Carl G. Mattacola, PhD, ATC, FNATA University of Kentucky

Timothy A. McGuine, PhD, ATC University of Wisconsin, Madison

Jennifer M. Medina McKeon, PhD, ATC, CSCS Ithaca College

Jason P. Mihalik, PhD, CAT(C), ATC University of North Carolina at Chapel Hill Kevin C. Miller, PhD, ATC Central Michigan University

John Nyland, EdD, PT, SCS, ATC, CSCS

Spalding University

Riann M. Palmieri-Smith, PhD, ATC University of Michigan

Brian G. Pietrosimone, PhD, ATC University of North Carolina at Chapel Hill

Scott G. Piland, PhD, ATC The University of Southern Mississippi

William A. Pitney, EdD, ATC, FNATA Northern Illinois University

Scott E. Ross, PhD, ATC University of North Carolina at Greensboro

Eric L. Sauers, PhD, ATC, CSCS, FNATA

Arizona School of Health Sciences

Randy J. Schmitz, PhD, ATC, FNATA University of North Carolina at Greensboro

JoEllen Sefton, PhD, ATC, CMT Auburn University

Susan M. Sigward, PhD, PT, ATC University of Southern California

Michael R. Sitler, EdD, ATC, FNATA Temple University

Chad Starkey, PhD, ATC, FNATA Ohio University

Erik E. Swartz, PhD, ATC, FNATA University of New Hampshire

Paula Sammarone Turocy, EdD, ATC Duquesne University

Bonnie L. Van Lunen, PhD, ATC Old Dominion University

Evert Verhagen, PhD EMGO Institute for Health and Care Research

Cailee E. Welch, PhD, ATC A.T. Still University

Erik A. Wikstrom, PhD, ATC, FACSM University of North Carolina at Chapel Hill

Gary B. Wilkerson, EdD, ATC, FNATA

University of Tennessee, Chattanooga

Jonathan E. Wingo, PhD University of Alabama

Susan W. Yeargin, PhD, ATC University of South Carolina

George Mason University

Lawrence E. Armstrong, PhD, FACSM University of Connecticut

Christopher M. Bailey, PhD Case Medical Center

Michael F. Bergeron, PhD Youth Sports of the Americas

J. Troy Blackburn, PhD, ATC University of North Carolina at Chapel Hill

Michelle C. Boling, PhD, LAT, ATC University of North Florida

Thomas G. Bowman, PhD, ATC Lynchburg College

Robert C. Cantu, MD Emerson Hospital

Thomas A. Cappaert, PhD, ATC, CSCS, CES Indiana University–Purdue University Indianapolis

Christopher R. Carcia, PhD, PT Duquesne University

Shane V. Caswell, PhD, ATC George Mason University

Michael W. Collins, PhD University of Pittsburgh

R. Dawn Comstock, PhD Colorado School of Public Health

Tracey Covassin, PhD, ATC, FNATA Michigan State University

Kevin M. Cross, PhD, PT, ATC University of Virginia

Gianluca Del Rossi, PhD, ATC, FNATA University of South Florida

Eamonn Delahunt, PhD, BSc (Physiotherapy) University College Dublin

Lindsay J. DiStefano, PhD, ATC University of Connecticut

Carrie L. Docherty, PhD, ATC, FNATA Indiana University

Michael G. Dolan, MA, ATC, CSCS Canisius College

Thomas P. Dompier, PhD, ATC Datalys Center for Sports Injury Research and Prevention, Inc

Jennifer E. Earl-Boehm, PhD, ATC University of Wisconsin-Milwaukee

Kyle Ebersole, PhD, ATC University of Wisconsin-Milwaukee