



---

CANADIAN CHIROPRACTIC ASSOCIATION

---

*Chair* Dr. Gerald Olin, BSc, DC

---

JCCA STAFF

---

*Editor* Kent Stuber, DC, MSc  
Division of Graduate Education & Research  
Canadian Memorial Chiropractic College, Calgary, Alberta

*Editor Emeritus* Allan Gotlib, C.M., DC  
Toronto, Ontario

*Associate Editors* Jeffrey Quon, DC, PhD  
School of Population & Public Health  
Faculty of Medicine, University of British Columbia, Vancouver, British Columbia

André Bussi eres, DC, FCCS(C), PhD  
Faculty of Medicine, McGill University, Montr eal, Qu ebec  
D epartement chiropratique, Universit e du Qu ebec   Trois-Rivi eres, Trois-Rivi eres, Qu ebec

Dana J. Lawrence, DC, MMedEd, MA  
Parker University, Dallas, Texas

*Assistant Editors* Gregory N. Kawchuk, DC, PhD  
University of Alberta, Edmonton, Alberta

Mohsen Kazemi, RN, DC, MSc, PhD, FRCCSS(C), FCCPOR(C)  
Faculty of Clinical Education, Graduate Studies and Research,  
Canadian Memorial Chiropractic College, Toronto, Ontario

*Production Co-ordinator* John Doiron

*Advertising* Editor, Journal of the Canadian Chiropractic Association  
186 Spadina Avenue, Suite 6, Toronto, Ontario M5T 3B2  
Tel: 416-585-7902 877-222-9303 Fax: 416-585-2970

Email: Dr. Kent Stuber<kstuber@jcca.ca>  
Website: www.jcca-online.org

---

TYPESETTING

---

Thistle Printing  
35 Mobile Drive, Toronto, Ontario M4A 2P6

# JCCA

## Journal of the Canadian Chiropractic Association

*(Formerly the Canadian Chiropractic Association Journal)*

*Copyright Registered © by the Canadian Chiropractic Association 1961*

*Copyright: The Canadian Chiropractic Association, 2019*

All rights reserved. Without limiting the rights under copyright above, no part of this publication may be reproduced, stored in or introduced into any retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording or otherwise), without the prior written permission with the copyright owner and the publisher.

Published by the Canadian Chiropractic Association and issued quarterly

EDITORIAL AND EXECUTIVE OFFICES,  
186 SPADINA AVENUE, SUITE 6, TORONTO, CANADA M5T 3B2

General Information: The Journal of the Canadian Chiropractic Association is the official publication by the Canadian Chiropractic Association. The JCCA is published by the Canadian Chiropractic Association as a medium of communication between the Association and its members and is a forum for fair comment and discussion of all matters of general interest to the chiropractic profession and the Association. Readers are invited to comment and express their opinions on relevant subjects. Views and opinions in editorials and articles are not to be taken as official expression of the Association's policy unless so stated. Publication of contributed articles does not necessarily imply endorsement in any way of the opinions expressed therein and the Journal and its publisher does not accept any responsibility for them. Business correspondence should be addressed to: the Editor of JCCA, 186 Spadina Avenue, Suite 6, Toronto, Canada M5T 3B2.

### INDEXING SERVICES

JCCA is indexed by PubMed Central, Scopus, CINAHL (Cumulative Index to Nursing and Allied Health Literature), MANTIS (formerly CHIROLARS), AMED, PASCAL, Index to Chiropractic Literature, and selectively by SPORTDiscus.

# Contents

JCCA Vol 63 No 3 ISSN 0008-3194 (Print) and ISSN 1715-6181 (Electronic)

## *Editorial*

- 143 JCCA December 2019 Sports Chiropractic Special Issue: 11<sup>th</sup> Edition  
Mohsen Kazemi, RN, DC, MSc, FRCCSS(C), FCCPOR(C), PhD

## *Original Articles*

- 144 The effect of a six-week plyometric training on dynamic balance and knee proprioception in female badminton players  
Raana Alikhani, MSc  
Shahnaz Shahrjerdi, PhD  
Masod Golpaigany, PhD  
Mohsen Kazemi, RN, DC, FRCCSS(C), FCCPOR(C), MSc, PhD
- 154 Use of the Mulligan concept in the treatment of lateral ankle sprains in the active population: an exploratory prospective case series  
Lucas Bianco, DAT, MS, LAT, ATC, CMP  
Smokey Fermin, DAT, MS, LAT, ATC  
Robert Oates, DAT, LAT, ATC  
James May, DAT, LAT, ATC  
Scott W Cheatham, PhD, DPT, OCS, ATC  
Alan Nasypany, EdD, LAT, ATC
- 162 Isolated musculocutaneous neuropathy: a case report  
Jaclyn A. Kissel, BSc, DC, FRCCSS(C)  
Cristina Leonardelli, BScKin, DC, MHK
- 171 Clinical presentation of an adolescent female synchronized swimmer with a simple bone cyst in the proximal humerus: a case report  
Mitchell Savic, BHSc (Hons), DC, FRCCSS(C)  
Alexander Lee, BSc (Hons), DC, FRCCSS(C)  
Ashley Hook, HBSc, DC, DACBR, MSc
- 178 Conservative management of Morel-Lavallée lesion: a case study  
Trevor Vander Doelen, BSc, MSc, DC  
Adam Manis, BSc, MSc, MD, Dip Sport Med
- 187 Exploring the role of microinstability of the hip: an atypical presentation of femoroacetabular impingement (FAI) and labral tear in a collegiate endurance athlete: a case report  
Mitchell Savic, BHSc (Hons), DC, FRCCSS(C)  
Kevin D'Angelo, BSc(Hons), DC, FRCCSS(C)
- 197 Pubic stress fracture presenting as a strain of adductor longus in a 16-year-old elite soccer player with Crohn's disease: a case report  
Cameron Marshall, DC, FRCCSS(C)  
Robert Gringmuth, DC, FRCCSS(C), FCCPOR(C)

# Editorial Board

*Alan H Adams*, DC  
Texas Chiropractic College  
Pasadena, Texas

*Carlo Ammendolia*, DC, PhD  
University of Toronto

*Paul Bruno*, DC, PhD  
Faculty of Kinesiology and Health  
Studies  
University of Regina

*Brian Budgell*, DC, PhD  
CMCC

*Jason Busse*, DC, PhD  
McMaster University

*Carol Cancelliere*, DC, PhD  
Toronto, Ontario

*Scott Cheatham*, PT, DPT, PhD(C), ATC  
California State University  
Dominguez Hills  
Carson, California.

*Raphael K Chow*, MD, FRCP(C)  
University of Toronto

*Colin M Crawford*, B App Sc (Chiro),  
FCCS(C), MSc, Grad Dip Neuro, MB BS  
Perth, Australia

*Edward Crowther*, DC, EdD  
Anglo-European College of  
Chiropractic  
Bournemouth, England

*Diana De Carvalho*, DC, PhD  
Memorial University  
St. John's, Newfoundland

*Martin Descarreaux*, DC, PhD  
Université du Québec à Trois-Rivières

*John A. Dufton*, DC, MSc, MD, FRCP  
Staff Radiologist  
University Hospital of Northern  
British Columbia  
Prince George, British Columbia

*Peter Emary*, BSc, DC, MSc  
Cambridge, Ontario

*Mark Erwin*, DC, PhD  
University of Toronto

*Brian Gleberzon*, DC, MHS  
CMCC

*Richard Goldford*, BSc, DC, MBA,  
FRCCSS(C), FCCPOR(C)  
Toronto, Ontario

*Bart Green*, DC, MEd, DACBSP  
Naval Medical Center, San Diego  
San Diego, California

*David Gryfe*, BSc, DC, FRCCSS(C)  
Etobicoke, Ontario

*François Hains*, DC, FCCS(C), MSc  
Dorval, Québec

*Scott Haldeman*, DC, MD, PhD, FRCP(C)  
University of California  
Irvine, California

*Jill Hayden*, DC, PhD  
Dalhousie University  
Halifax, NS

*Walter Herzog*, PhD  
University of Calgary

*Scot Howitt*, BA, CK, MSc, DC, FRCCSS(C),  
FCCPOR  
CMCC

*Thomas E Hyde*, BA, DC, DACBSP  
N Miami Beach, Florida

*Claire Johnson*, DC, MEd, DACBSP  
National University of Health Sciences  
Lombard, Illinois

*Clark R Konczak*, MSc, DC, DABCO,  
FCCO(C), FRCCSS(C)  
Victoria, BC

*Deborah Kopansky-Giles*, DC, FCCS(C),  
FICC, MSc  
St. Michael's Hospital  
Toronto, Ontario

*Doug M Lawson*, BA, DC, MSc  
D'Youville College

*Cynthia Long*, PhD  
Palmer Centre for Chiropractic  
Research  
Davenport, Iowa

*Michelle Mick*, DC, DACBR  
St. Paul, Minnesota

*Silvano Mior*, DC, FCCS(C), PhD  
CMCC

*Robert D Mootz*, DC  
Associate Medical Director for  
Chiropractic, State of Washington  
Department of Labor and Industries  
Olympia, WA

*Bernadette Murphy*, DC, PhD  
University of Ontario Institute of  
Technology

*Martin Normand*, DC, PhD  
UQTR

*Jason Pajaczkowski*, BSc, BS, DC,  
FRCCSS(C), FCCPOR(C)  
CMCC

*John A. Papa*, DC, FCCPOR(C)  
New Hamburg, Ontario

*Steven Passmore*, DC, PhD  
Faculty of Medicine  
University of Manitoba

*Stephen Perle*, DC, MS  
University of Bridgeport  
Bridgeport, CT

*Mathieu Piché*, DC, PhD  
UQTR

*John J Riva*, DC, MSc  
Department of Family Medicine  
McMaster University  
Hamilton, Ontario

*Sandy Sajko*, DC, MSc, RCCSS(C)  
Oakville, Ontario

*John Z Srbely*, DC, PhD  
University of Guelph

*Brynne Stainsby*, BA, DC, FCCS(C)  
CMCC

*Igor Steiman*, MSc, DC, FCCS(C)  
CMCC

*John S Stites*, DC, DACBR  
Palmer College of Chiropractic  
Davenport, Iowa

*Gabrielle M van der Velde*, BSc, DC,  
FCCS(C), PhD  
Toronto Health Economics  
and Technology Assessment  
Collaborative  
University of Toronto

*Carol Ann Weis*, DC, MSc  
CMCC

*Jessica J. Wong*, DC, MPH, FCCSC  
CMCC