

VOLUME 1

# ASPETAR SPORTS MEDICINE COLLECTION

Edited by **Nebojsa Popovic**



**ASPETAR**  
SPORTS MEDICINE JOURNAL



ASPETAR SPORTS MEDICINE COLLECTION – VOLUME 1

Published By:

**Aspetar Orthopaedic and Sports Medicine Hospital**

Sport City Street

P.O. Box 29222,

Doha, Qatar

Contact:

Tel +974 4413 2000

info@aspetar.com

www.aspetar.com

Print run: 1,000

**Printed in Qatar by Aspire Printing Press**

Distribution:

**Marketing Department, Aspetar**

Aspetar Orthopaedic and Sports Medicine Hospital is not liable for the accuracy or completeness of the information in this publication. The information in this publication cannot replace professional advice and is not intended to present the only or necessarily best methods or procedures for the medical situations discussed. The opinions expressed in all articles published in Aspetar Sports Medicine Collection are those of the authors.

## ASPETAR

SPORTS MEDICINE JOURNAL

Aspetar Sports Medicine Journal is a free publication produced and distributed by Aspetar Orthopaedic and Sports Medicine Hospital, member of the Aspire Zone Foundation.

Contact:

journal@aspetar.com

www.aspetar.com/journal

©2020 Aspetar Orthopaedic and Sports Medicine Hospital, Qatar, member of the Aspire Zone Foundation.

Reproduction in whole or part of any contents of Aspetar Sports Medicine Collection without prior permission of the editor is strictly prohibited. Photograph on the front cover by OSTILL/iStock Photos.

# ASPETAR SPORTS MEDICINE COLLECTION

## VOLUME 1

**PART A: SPORT SCIENCE**

**PART B: MEDICINE OF SPORT**

Editor-in-Chief

**Nebojsa Popovic, MD, PhD**

Senior Medical Advisor, DG Office  
Editor-in-Chief of Aspetar Sports Medicine Journal  
Aspetar Orthopaedic and Sports Medicine Hospital  
Associate Professor of Clinical Orthopedic Surgery,  
Weill Cornell Medicine – Qatar

Doha, Qatar

# THE EDITORIAL TEAM

## HONORARY BOARD

**Mohammed G. A. Al Maadheed, MD, PhD**

**Khalifa Al Kuwari, MD, ABCM**

**Mohamed Ghaith Al-Kuwari, MD, ABCM, FFPH**

## EXECUTIVE COMMITTEE

**Mohammed Khalifa Al-Suwaidi**

Chief Executive Officer  
Aspire Zone Foundation

Director General  
Aspetar Orthopaedic and Sports Medicine Hospital  
Doha, Qatar

**Abdulaziz Jaham Al-Kuwari, MD**

Chief Executive Officer  
Aspetar Orthopaedic and  
Sports Medicine Hospital  
Doha, Qatar

**Khalid Ali Al-Mawlawi**

Chief Administrative Officer  
Aspetar Orthopaedic and  
Sports Medicine Hospital  
Doha, Qatar

**Hakim Chalabi, MD, MBSM**

Assistant Director General for  
International Medical Affairs  
Aspetar Orthopaedic and  
Sports Medicine Hospital  
Doha, Qatar

## LAYOUT AND COVER DESIGN

**Ivan Stankovic**

Managing Editor & Designer  
Aspetar Sports Medicine Journal  
Aspetar Orthopaedic and Sports Medicine Hospital  
Doha, Qatar

## EDITORIAL COORDINATOR

**Nasim Mansour Al Abbi**

Journal Coordinator  
Aspetar Sports Medicine Journal  
Aspetar Orthopaedic and Sports Medicine Hospital  
Doha, Qatar

## CO-EDITORS

### **Mathew G. Wilson, PhD**

Professor  
Institute of Sport Exercise and Health, University College London,  
London, UK  
Aspetar – Orthopaedic and Sport Medicine Hospital  
Doha, Qatar

### **Karim Khan, MD, PhD, MBA**

Department of Family Practice and School of Kinesiology  
Professor University of British Columbia  
Vancouver, Canada  
Editor in Chief British Journal of Sport Medicine  
Former Director of Research and Education  
Aspetar Orthopaedic and Sports Medicine Hospital  
Doha, Qatar

### **Milena Tomovic, MD, MSc**

Sport and Exercise Medicine Specialist  
Independent Researcher  
Thessaloniki, Greece

### **Abdulla Saeed Al-Mohannadi, MPH**

Manager of Community Outreach Department  
Aspetar Orthopaedic and Sports Medicine Hospital  
Doha, Qatar



# CONTRIBUTORS

## **Adam Weir, MD, PhD**

Erasmus MC  
Rotterdam, Netherlands  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Doha, Qatar

## **Ali Guermazi, MD, PhD**

Department of Radiology  
Professor of Radiology  
Boston University School of Medicine  
Boston, USA

## **Andy Lane, PhD**

Professor of Sport Psychology  
University of Wolverhampton  
Wolverhampton, UK

## **Celeste Geertsema, MD**

Sports Medicine Physician  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Assistant Professor, Weill Cornell Medicine –  
Qatar  
Doha, Qatar

## **Daniel Kings, PhD**

Assistant Director Sports Science  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Doha, Qatar

## **Gregoire Chick, MD, PhD**

Hand Surgeon  
Hopital de la Tour Geneva Switzerland  
Visit Hand Surgeon, Aspetar Orthopaedic and  
Sports Medicine Hospital  
Assistant Professor, Weill Cornell Medicine –  
Qatar  
Doha, Qatar

## **Khalid Al Khelaifi, MD**

Orthopedic Surgeon  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Assistant Professor, Weill Cornell Medicine –  
Qatar  
Doha, Qatar

## **Lee Taylor, PhD**

Reader in Exercise and Environmental  
Physiology  
School of Sport, Exercise and Health Sciences  
Loughborough University  
Loughborough, UK

## **Liesel Geertsema, MD**

Sports Medicine Physician  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Assistant Professor, Weill Cornell Medicine –  
Qatar  
Doha, Qatar

## **Louis Holtzhausen, MD, PhD**

Senior Consultant,  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Assistant Professor, Weill Cornell Medicine –  
Qatar  
Doha, Qatar

## **Marco Cardinale, PhD**

Executive Director of Research and Scientific  
Support  
Professor of Sport Science and Physical Activity  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Doha, Qatar

## **Mats Brittberg, MD, PhD**

Cartilage Repair Unit  
Regional Halland Orthopedic  
Kungshälska Hospital  
Professor of Orthopedic Surgery  
University of Gothenburg  
Gothenburg, Sweden

## **Mohammed Ihsan, PhD**

Physiologist  
Research and Scientific Support Department  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Doha, Qatar

## **Olivier Girard, PhD**

Associate Professor, Exercise and Sport Science  
Department,  
School of Human Sciences  
The University of Western Australia,  
Perth, Australia

## **Paul Dijkstra, MD**

Sport Medicine Physician  
Director, Department of Medical Education  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Assistant Professor, Weill Cornell Medicine –  
Qatar  
Doha, Qatar

## **Peter Dzendrowskyj, MD**

Director of Anaesthesia  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Doha, Qatar

## **Peter Fowler, PhD**

Visiting Research Fellow & Sessional Academic  
Queensland University of Technology,  
School of Exercise & Nutrition Sciences  
Brisbane, QLD, Australia  
The Recovery Room  
Birtinya, QLD, Australia

## **Pieter D'Hooghe, MD, PhD, MBA**

Chief of Surgery  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Assistant Professor, Weill Cornell Medicine –  
Qatar  
Doha, Qatar

## **Roald Bahr, MD, PhD**

Director, Aspetar Injury and Illness Prevention  
Program  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Doha, Qatar  
Professor & Chair, Oslo Sports Trauma Research  
Center, Department of Sports Medicine  
Norwegian School of Sport Sciences,  
Oslo, Norway  
Chief Medical Officer, Olympiatoppen &  
Norwegian Olympic Training Center,  
Oslo, Norway

## **Rod Whiteley, FACP, PhD**

Assistant Director of the Rehabilitation  
Department  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Doha, Qatar

## **Sebastien Racinais, PhD**

Head of Research  
Research and Scientific Support Department  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Doha, Qatar

## **Souzan Al Sayegh, MPH**

Health Promotion Researcher  
Community Outreach Department  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Doha, Qatar

## **Stephen Targett, MD**

Sport Medicine Physician  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Assistant Professor, Weill Cornell Medicine –  
Qatar  
Doha, Qatar

## **Yorck Olaf Schumacher, MD, PhD**

Sport Medicine Physician  
Head of Sub-specialty Medicine  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Doha, Qatar

## **Zarko Vuckovic, MD**

General Surgeon & Groin Pain Specialist  
Aspetar Orthopaedic and Sports Medicine  
Hospital  
Doha, Qatar

# PREFACE

*"Each year, on the second Tuesday in February, the population of Qatar is granted a day off work to participate in a multitude of organised sporting events around the country."*

Qatar prioritises sport and physical activity. The Emir has decreed that sport is integral to 'the construction of bodies and minds' and that it is part of the 'aspiration for a better tomorrow'. To support the nation's commitment to sport, Qatar has pioneered a purpose-built healthcare centre to provide comprehensive and multidisciplinary care to athletes and physically active people — Aspetar Orthopaedic and Sports Medicine Hospital.

Since its inception in 2007, Aspetar has served over 350,000 patients and provided over 1.5 million appointments. It now delivers over 1000 successful surgeries annually. The lifeblood behind these impressive numbers is the more than 800 staff members from almost 70 different countries. Aspetar has at least one representative on staff from 1/3 of all nations on the planet. They work in a spirit of collaboration of their shared goals and in the strength of diversity.

## *The Aspetar Sports Medicine Journal*

Issue 1 of the Aspetar Sports Medicine Journal was published in April of 2012 and it celebrated the hospital's first five years. The Journal's purpose – as laid out on page 5 of that historic issue – was clear:

The Journal aims to provide an authoritative resource of knowledge to all professionals concerned with the health and care of sport participants, linking academic and scientific approaches to all disciplines in sports medicine.

The Journal reflects Aspetar's World-wide vision and expert faculty from Qatar, the Gulf Region and from all over the World. Every issue — whether focusing on specific sports, particular regions of the body that can fail in sport, or special populations of people who participate in sport and physical activity — has had a multidisciplinary and international input. From the very first issue, we have been committed to hearing from athletes and coaches. We have also launched regular features on the Legacy of Arabic Medicine. This journal mirrors the makeup of Aspetar Orthopaedic and Sports Medicine Hospital — it is athlete/patient focused – to elevate multidisciplinary prevention and treatment by an international family of dedicated staff.

I am extremely proud to have served as Editor-in-Chief of the Aspetar Sports Medicine Journal for all these years.. I have been inspired by my expert colleagues, and have gained friends from around the World from contributors who have delivered the vision of linking an academic/scientific approach with the clinical needs of sports medicine patients.





As of 2019, the Aspetar Sports Medicine Journal has published over 1,000 articles in over 4,000 pages. We have aimed to make the Journal easily accessible and distributed over 10,000 issues in print, before becoming more digitally based. To serve an even wider community – and to allow for the Journal to be conveniently accessed on mobile devices from Azerbaijan to Zambia – in 2014, we developed the online Aspetar Journal service ([www.aspetar.com/journal](http://www.aspetar.com/journal)). Our website (where all papers are available for free — open access) received more than 200,000 views in 2018 alone.

### *The Aspetar Sports Medicine Collection*

To serve our community of readers, we now highlight 200 of the best papers in this Aspetar Sports Medicine Collection. Aspetar is proud to share our authors' wisdom — to disseminate World's best practice widely. The papers are arranged as per a classic textbook of Sports Medicine, printed in Volume One and Volume Two, with major sections (Sports Science, The Medicine of Sport and Sports Injuries) that again reflect Aspetar's multidisciplinary approach to patient care. It is important to remember that this book aims to be wide-ranging – but not comprehensive. As medicine is both an art and a science, we celebrate the opinion of true expert authors, where appropriate.

I would like to thank our Director General, Mr. Mohammed K Al Suwaidi, and the Aspetar senior management team – Dr. Abdulaziz Jaham Al-Kuwari, Mr. Khalid Ali Al-Mawlawi and Dr. Hakim Chalabi – for their support for the Journal and for this Collection. I am grateful to all the authors of the original Aspetar Sports Medicine Journal articles (as named in each chapter here), the Collection Editors who curated and collated the material for this Collection, and to Velvet Garvey, the first Managing Editor, for outstanding work.

This Collection – a multidisciplinary, multinational team effort – further reinforces the absolutely incontrovertible role for specialised sport and exercise medicine in this 21st Century's health and healthcare. It is essential for providing quality care for athletes and for physically active people. I close with one of my favourite Arabic proverbs:

**"من يملك الصحة يملك الأمل. ومن يملك الأمل يملك كل شيء."**

This translates, in contemporary English, to: "The person who has health has hope. And the person who has hope has everything."

**Professor Dr. Nebojsa Popovic**  
**Editor-in-Chief**





# ACKNOWLEDGEMENT

One of the greatest pleasures in editing this book, is to be able to acknowledge and thank so many people from all around the World for their enormous amount of help and encouragement over so many years.

I am grateful to our Aspetar founder, **H.H. Sheikh Jassim Bin Hamad Al Thani**, The Personal Representative of the **Amir**, and **Aspetar executive board** for their support for the Aspetar Sport Medicine Journal and this Collection.

I am fortunate to have many friends who have been very happy to help, whenever they have been asked over the years. Some of my colleagues have been approached many times for their opinions or editorial suggestions. I apologize for not accepting their suggestions on every occasion. My editorial board has played a major role in making this Collection happen. My thanks go to **Ivan Stankovic**, Managing Editor & Designer, who has been incredibly patient with me the whole time. To my editorial team of young enthusiastic and skilled people: **Velvet, Jake, Nicola, Nasim** and **Catriona**. And to **Peter** – thank you for your editorial and grammatical corrections.

My co-editors: **Mathew, Karim, Milena** and **Abdulla** – **Head of chapters** and **all the authors**. All my efforts over the past ten years would not have been possible without the full support of all my **Qatari friends**. Thank you for your friendly wisdom and patient encouragement on each, and every, occasion – I'm very grateful.

**Nebojsa Popovic MD, PhD**



**CHAPTER 1: TRAINING METHODS AND ASSESSMENT**

Marco Cardinale

<b>INTRODUCTION .....</b>	<b>25</b>
<b>Training Periodization .....</b>	<b>26</b>
<i>Irineu Loturco and Fabio Y. Nakamura</i>	
<b>Want to See My Report, Coach? .....</b>	<b>33</b>
<i>Martin Buchheit</i>	
<b>Football</b>	
<b>Part 1: Monitoring Training Status with Player-Tracking Technology .....</b>	<b>40</b>
<b>Part 2: Monitoring Training Status with Player-Tracking Technology .....</b>	<b>50</b>
<i>Mathieu Lacome, Ben M. Simpson and Martin Buchheit</i>	
<b>Can Modern Football Match Demands be Translated into Novel Training and Testing Modes? .....</b>	<b>53</b>
<i>Paul S. Bradley, Michele Di Mascio, Magni Mohr, Dan Fransson, Carl Wells, Alexandre Moreira, Julen Castellano, Antonio Gomez, and Jack D. Ade</i>	
<b>Sprinting</b>	
<b>Sprint Running Mechanics .....</b>	<b>60</b>
<i>Jean-Benoit Morin</i>	
<b>Handball</b>	
<b>Competitive Demands of Elite Handball .....</b>	<b>67</b>
<i>Claude Karcher and Martin Buchheit</i>	
<b>Strength Training in Handball .....</b>	<b>76</b>
<i>Marco Cardinale</i>	
<b>Programming High-Intensity Training in Handball .....</b>	<b>82</b>
<i>Martin Buchheit</i>	
<b>Cycling</b>	
<b>Methods to Assess Performance in Elite Cyclists in The Field .....</b>	<b>92</b>
<i>Frederic Grappe</i>	
<b>Practical Considerations for Endurance Training with Power .....</b>	<b>97</b>
<i>Simon Jones</i>	
<b>Does Ischaemic Preconditioning Improve Exercise Performance? .....</b>	<b>108</b>
<i>Scott Cocking</i>	

**CHAPTER 2: ENVIRONMENTAL PHYSIOLOGY (HEAT AND ALTITUDE)**

Sebastien Racinais, Olivier Girard and Lee Taylor

<b>INTRODUCTION .....</b>	<b>117</b>
<b>Adjustments in Football Performance Under Heat Stress .....</b>	<b>118</b>
<i>Julien Périard and Sébastien Racinais</i>	
<b>Improving Football Performance in The Heat .....</b>	<b>123</b>
<i>Paul B. Laursen</i>	

<b>Practical Recommendations for Endurance Cycling in Hot/Humid Environments .....</b>	<b>127</b>
<i>Dave Nichols</i>	
<b>Pearls for Best Endurance Running Performance in the Heat .....</b>	<b>134</b>
<i>Sébastien Racinais and Douglas Casa</i>	
<b>Heat Stress and Tennis Performance .....</b>	<b>140</b>
<i>Julien D. Périard</i>	
<b>Improving Endurance Performance With ‘Live High - Train Low’ Altitude Training .....</b>	<b>145</b>
<i>Paul Robach and Carsten Lundby</i>	
<b>Improving Team Sport Physical Performance .....</b>	<b>150</b>
<i>Olivier Girard, Franck Brocherie, Raphaël Faiss and Grégoire Millet</i>	

### CHAPTER 3: HYDRATION AND NUTRITION

**Dan Kings**

<b>INTRODUCTION .....</b>	<b>157</b>
<b>Fluids: Facts &amp; Fads .....</b>	<b>158</b>
<i>Louise M Burke</i>	
<b>Hydration Strategies for Football .....</b>	<b>163</b>
<i>Ron Maughan and Susan Shirreffs</i>	
<b>Nutritional Strategies for The Tour De France .....</b>	<b>166</b>
<i>James P. Morton and J. Marc Fell</i>	
<b>Oral Creatine Supplementation in Sports .....</b>	<b>173</b>
<i>Stephane Berman</i>	
<b>Ramadan And Football .....</b>	<b>176</b>
<i>Fuad Al Mudahka, Christopher Herrera and Abdulaziz Farooq</i>	

### CHAPTER 4: RECOVERY STRATEGIES

**Mohammed Ihsan**

<b>INTRODUCTION .....</b>	<b>183</b>
<b>Recovery Techniques for Athletes .....</b>	<b>184</b>
<i>Shona L. Halson</i>	
<b>Football Recovery Strategies .....</b>	<b>189</b>
<i>Grégory Dupont, Mathieu Nédélec, Alan McCall, Serge Berthoin and Nicola A. Maffiuletti</i>	
<b>Post-Game Recovery Strategies in Youth Football .....</b>	<b>197</b>
<i>Martin Buchheit, Alberto Mendez-Villanueva, Cosmin Horobeanu, Alain Sola and Valter Di Salvo</i>	
<b>Cold Water Immersion – Practices, Trends and Avenues of Effect .....</b>	<b>205</b>
<i>Hamish McGorm, Llion A. Roberts, Jeff S. Coombes and Jonathan M. Peake</i>	
<b>Post-Exercise Recovery – Effects of Whole-Body Cryostimulation Exposure .....</b>	<b>210</b>
<i>Christophe Hausswirth</i>	

## TABLE OF CONTENTS

### CHAPTER 5: SLEEP AND JETLAG

Peter Fowler

INTRODUCTION .....	221
Sleep as a Recovery Tool for Elite Athletes .....	222
<i>Charles Samuels and Lois James</i>	
Performance Recovery Following Long-Haul International Travel in Team Sport Athletes.....	228
<i>Peter M. Fowler</i>	
Sleep and Sporting Performance .....	237
<i>Yann Le Meur and Christophe Hausswirth</i>	
Coping with Jet Lag and Protecting Athlete Health When Travelling .....	247
<i>Dina C Janse Van Rensburg, Audrey Jansen van Rensburg and Martin P Schwellnus</i>	

### CHAPTER 6: SPORTS PSYCHOLOGY

Andy Lane

INTRODUCTION .....	257
Goals, Emotions and Performance .....	258
<i>Andy Lane</i>	
Performing in the 'Zone' - Achieving the Optimal Performance State .....	262
<i>Thomas Patrick and Amira Najah</i>	
Optimising Recovery in Sport - Psychological Considerations .....	266
<i>Thomas Patrick</i>	

## PART B: MEDICINE OF SPORT Edited by Karim Khan and Milena Tomovic

270

### CHAPTER 1: THE ROLE OF THE TEAM PHYSICIAN

Celeste Geertsema

INTRODUCTION .....	275
A Day in The Life of a Team Doctor .....	277
<i>Roger Palfreeman</i>	
The Chief Medical Officer in International Sports Federations .....	282
<i>Peter Jenoure, Michael Turner, Babette Pluim, Alain Lacoste, Mario Zorzoli and Katharina Grimm</i>	
The Role of The Specialist Sports and Exercise Medicine Physician in Elite Sport .....	288
<i>Paul Dijkstra and Noel Pollock</i>	

### CHAPTER 2: PRE-PARTICIPATION HEALTH EVALUATION

Milena Tomovic

INTRODUCTION .....	299
There Are Many Good Reasons to Screen Your Athletes .....	300
<i>Nicol van Dyk, Arnhild Bakken, Stephen Targett and Roald Bahr</i>	



<b>Screening in Football Players.....</b>	<b>306</b>
<i>Stephen Targett and Celeste Geertsema</i>	
<b>Screening for Team Handball.....</b>	<b>312</b>
<i>Stephen Targett and Celeste Geertsema</i>	
<b>Monitoring the Immature Athlete.....</b>	<b>317</b>
<i>Amanda Johnson</i>	

### CHAPTER 3: INJURY PREVENTION

Roald Bahr

<b>INTRODUCTION .....</b>	<b>323</b>
<b>Injury Prevention in Football and The FIFA 11+ .....</b>	<b>324</b>
<i>Mario Bizzini, Matthias Eiles, Mark Fulcher, Zohreh Haratian and Jiri Dvorak</i>	
<b>Injury Prevention and Performance Enhancement in Team Sports .....</b>	<b>332</b>
<i>Tim Gabbett</i>	
<b>Injury Prevention Training in Football.....</b>	<b>336</b>
<i>Darren Paul, George Nassis and Joao Brito</i>	
<b>Preventing Hamstrings Strains.....</b>	<b>340</b>
<i>Roald Bahr</i>	
<b>ACL Prevention in Female Football .....</b>	<b>345</b>
<i>Kathrin Steffen, Roald Bahr and Grethe Myklebust</i>	
<b>ACL Prevention in Female Handball.....</b>	<b>351</b>
<i>Grethe Myklebust</i>	
<b>Prevention of Running Related Injuries .....</b>	<b>356</b>
<i>Steef Bredeweg</i>	
<b>Injury Prevention and Management Among Athletic Populations.....</b>	<b>362</b>
<i>Kieran O'Sullivan, Sean McAuliffe and Gregory Lehman</i>	
<b>Principles of Injury Prevention in The Para Athlete .....</b>	<b>368</b>
<i>Nick Webborn and Peter Van de Vliet</i>	
<b>Uncertainty, Heuristics and Injury Prediction.....</b>	<b>373</b>
<i>Mladen Jovanovic</i>	

### CHAPTER 4: CONCUSSION IN SPORTS

Louis Holtzhausen

<b>INTRODUCTION .....</b>	<b>381</b>
<b>Implementing a Worldwide Concussion Programme.....</b>	<b>383</b>
<i>Martin Raftery and Ross Tucker</i>	
<b>Concussion Management in 2014.....</b>	<b>390</b>
<i>Paul McCrory</i>	
<b>The History and Current Principles of Concussion Management in Boxing.....</b>	<b>401</b>
<i>Mike Loosemore</i>	

# TABLE OF CONTENTS

## CHAPTER 5: CARDIORESPIRATORY HEALTH

Stephen Targett

<b>INTRODUCTION .....</b>	<b>409</b>
<b>Athlete's Heart - What Is It?.....</b>	<b>410</b>
<i>Francois Carré</i>	
<b>Sudden Death in Football.....</b>	<b>415</b>
<i>Sanjay Sharma and Mathew Wilson</i>	
<b>The Swimmer's Heart.....</b>	<b>421</b>
<i>Nathan Ridding</i>	
<b>The Veteran Athlete's Heart .....</b>	<b>428</b>
<i>Mathew Wilson</i>	
<b>Hypertension in Elite Athletes - New Insights into An Old Problem.....</b>	<b>434</b>
<i>Jelena Suzic Lazic and Victoria Watt</i>	
<b>Asthma, EIB and the athlete - Diagnosis, Prevalence, Treatment, And Anti-Doping.....</b>	<b>442</b>
<i>Greg Whyte</i>	
<b>Common Respiratory Disorders in Elite Swimmers - Diagnosis and Management .....</b>	<b>447</b>
<i>Jon Greenwell</i>	

## CHAPTER 6: ILLNESSES IN ATHLETES: ENVIRONMENT, IMMUNITY, TRAINING LOAD

Milena Tomovic

<b>INTRODUCTION .....</b>	<b>453</b>
<b>Overtraining Syndrome.....</b>	<b>454</b>
<i>Romain Meeusen, Susan Vrijotte, Kevin De Pauw and Maria Francesca Piacentini</i>	
<b>Relative Energy Deficiency in Sport - The Aquatic Disciplines .....</b>	<b>460</b>
<i>Margo Mountjoy</i>	
<b>Acute Effects of Exercise on Immunity .....</b>	<b>466</b>
<i>Carlo Giammattei, Riccardo Banducci, Giulia Pierami and Alberto Tomasi</i>	
<b>Infection Management in Elite Athletes.....</b>	<b>473</b>
<i>Tim Meyer</i>	
<b>Infections in Sports Medicine: MRSA .....</b>	<b>479</b>
<i>Larissa May</i>	
<b>Bringing the Games to the World – Air Pollution, Sport, and Health Hazards.....</b>	<b>483</b>
<i>Ola Ronsen</i>	
<b>Testing the Waters: Highlighting the Safety of Open Water Swimmers .....</b>	<b>490</b>
<i>David Gerrard and Sergio Migliorini</i>	



## CHAPTER 7: THE PARA ATHLETE

Nebojsa Popovic

INTRODUCTION .....	497
The Athlete with Spinal Cord Injury.....	498
<i>Jan Lexell</i>	
The Athlete with Limb Deficiency.....	504
<i>Stuart E. Willick</i>	
The Athlete with Visual Impairment.....	510
<i>Ciro Winckler and Andrea Jacusiel Miranda</i>	
The Athlete with Cerebral Palsy .....	515
<i>Phoebe Runciman and Wayne Derman</i>	
Sports Cardiology and the Paralympic Athlete.....	521
<i>Brett G. Toresdahl, Suzy Kim, Irfan M. Asif and Cindy J. Chang</i>	

## CHAPTER 8: EVENT MEDICAL SERVICES

Liesel Geertsema

INTRODUCTION .....	529
2022 FIFA World Cup Qatar – Medical Preparations .....	530
<i>Efraim B. Kramer, Jiri Dvorak and Martin Botha</i>	
Serious Medical Events in Football .....	536
<i>Stephen Targett, Mat Wilson, Gary O'Driscoll and Celeste Geertsema</i>	
Providing Medical Services to Aquatic Athletes .....	542
<i>Paul Dijkstra, Liesel Geertsema, Celeste Geertsema and Nejib Benzarti</i>	
From Hand to Foot, It Is The Mind That Matters – The Men's Handball World Championship 2015 .....	546
<i>Celeste Geertsema, Rachid Bouras and Katharina Grimm</i>	
Getting Our Athletes The Care They Deserve.....	551
<i>The Fédération Internationale des Sociétés d'Aviron (FISA) Sports Medicine Commission</i>	
Volunteers in Sport.....	555
<i>Caroline Ringuet</i>	

## CHAPTER 9: ETHICS IN SPORTS MEDICINE

Paul Dijkstra

INTRODUCTION .....	563
Overdiagnosis in Sports Medicine.....	566
<i>Robert-Jan de Vos</i>	
The Art of Treating Clearly .....	571
<i>Boris Gojanovic and François Fourchet</i>	
Treating Elite Athletes .....	577
<i>David Gerrard and Alan Vernec</i>	

## TABLE OF CONTENTS

<b>The Lance Armstrong Case</b> .....	581
<i>David Mottram</i>	
<b>Why Do Athletes Take Drugs?</b> .....	587
<i>David Mottram</i>	
<b>Drug Testing in Sport</b> .....	594
<i>David Mottram</i>	
<b>Doping and Anti-Doping in Cycling</b> .....	600
<i>Yorck Olaf Schumacher</i>	
<b>Doping in Handball</b> .....	605
<i>Yorck Olaf Schumacher</i>	
<b>Inadvertent Use of Drugs in Sport</b> .....	609
<i>David Mottram</i>	
<b>Gender Equality in Olympic Sport</b> .....	614
<i>Jennifer Hargreaves</i>	
<b>The Rise of The Women's Game</b> .....	620
<i>Rebecca Smith</i>	
<b>Women's Struggle in The Beautiful Game</b> .....	624
<i>Moya Dodd</i>	
<b>Female Participation in Sport and Active Recreation</b> .....	628
<i>Caroline Riot</i>	

## SECTION: EXERCISE & LIFESTYLE MEDICINE Edited by Abdulla Saeed Al-Mohannadi

634

### I: EXERCISE IS MEDICINE

<b>The Exercise Is Medicine® Global Health Initiative</b> .....	636
<i>Robert Sallis</i>	
<b>Exercise Is Medicine® Qatar</b> .....	641
<i>Mohamed Ghaith Al-Kuwari, Husam Rezeq, Izzeldin El Jack Ibrahim, Ahmed Al Hamdani and Suzan Sayegh</i>	
<b>The Exercise Is Medicine® Global Research and Collaboration Center</b> .....	648
<i>Felipe Lobelo</i>	
<b>The Power of Physician-Prescribed Physical Activity – Greenville Programme</b> .....	654
<i>Jennifer L. Trilk and Ann Blair Kennedy</i>	
<b>What Is 'Implementation' And Why Is It Important for Sports Medicine and Physical Activity?</b> .....	660
<i>Ivana Matic and Heather McKay</i>	

<b>Physical Activity and Cardiorespiratory Fitness in The Management of Cardiovascular Disease in Preventive Cardiology .....</b>	<b>668</b>
<i>Tim Grove</i>	
<b>Smart Moves: Physical Activity's Contribution to Educational Achievement.....</b>	<b>674</b>
<i>Richard Bailey</i>	

## **II: HEALTHY LIFESTYLE – PROMOTION, BARRIERS & FACILITATORS**

<b>Moving Towards an Active Living Society – Singapore .....</b>	<b>678</b>
<i>Robert A. Sloan and Sam S. Sloan</i>	
<b>Nation-Wide Physical Activity Program.....</b>	<b>684</b>
<i>Izzeldin El Jack Ibrahim, Suzan Sayegh, Mercia Van Der Walt, Abdulla Saeed Al-Mohannadi</i>	
<b>The Effect of Weather Conditions on The Seasonal Variation of Physical Activity .....</b>	<b>688</b>
<i>Abdulla Saeed Al-Mohannadi and Mohamed Ghaith Al-Kuwari</i>	
<b>Promoting Physical Activity .....</b>	<b>692</b>
<i>Mark A. Tully and Ruth F. Hunter</i>	
<b>Sedentary Lifestyle – An Alarming Epidemic .....</b>	<b>698</b>
<i>Ahmed Al Hamdani and Stephen Targett</i>	
<b>Promoting Health Enhancing Physical Activity – The New Role of The Sport Sector .....</b>	<b>703</b>
<i>Mohamed Ghaith Al-Kuwari and Izzeldin Ibrahim</i>	

## **III: HEALTHY LIFESTYLE – TARGETED POPULATIONS**

<b>Promoting Physical Activity Among Arab Women .....</b>	<b>707</b>
<i>Ahmed Al Hamdani and Stephen Targett</i>	
<b>The Pandemic of Low Physical Activity in Children and Adolescents.....</b>	<b>713</b>
<i>John Reilly</i>	
<b>Children's Right to Practice Health-Enhancing Physical Activity.....</b>	<b>719</b>
<i>Liliana Leone, Caterina Pesce, Laura Capranica</i>	