

James L. Moeller / Sami F. Rifat



WINTER SPORTS MEDICINE

Handbook

Foreword by Eric A. Heiden, MD

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WINTER SPORTS MEDICINE

HANDBOOK

James L. Moeller, MD, FACSM

Sports Medicine Associates, PLC
Auburn Hills, Michigan
Chief, Division of Sports Medicine
William Beaumont Hospital
Troy, Michigan

Sami F. Rifat, MD, FACSM

Sports Medicine Associates, PLC
Auburn Hills, Michigan
Clinical Associate Professor
School of Health Sciences
Oakland University
Head Team Physician
Oakland University
Rochester, Michigan

McGraw-Hill

Medical Publishing Division

New York Chicago San Francisco Lisbon London
Madrid Mexico City Milan New Delhi San Juan
Seoul Singapore Sydney Toronto

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DEDICATION

*To my wife Marlo and my beautiful daughters
Lindsay, Hannah, and Kelsey—daddy's
“hat trick”—for your understanding, support,
and love throughout the creation of
this book and always.*

JAMES L. MOELLER

*To my wife Dana and my wonderful children
Alex and Chloe. You make it all possible.*

SAMI F. RIFAT



CONTRIBUTORS

Michael R. Bracko, EdD, CSCS, FACSM

Director, Institute for Hockey Research
Calgary, Alberta
Canada

Eugene Byrne, MD

Lake Placid Sports Medicine Center
Orthopaedic Consultant
United States Olympic Training Center
Lake Placid, New York

Janus D. Butcher, MD

Chief Flight Surgeon, 179th Fighter Squadron
Duluth, Minnesota
Head Physician, Cross-Country Team
U.S. Ski and Snowboard Association
SMDC Department of Orthopedics
Duluth, Minnesota

Jim Carrabre, MD, MPE, FACSM

Chairman
Medical Committee of the International Biathlon Union
Watertown, Minnesota

Adam deJong, MA

Assistant Director
Preventative Cardiology and Rehabilitation
William Beaumont Hospital
Royal Oak, Michigan

Jos J. deKoning, PhD, FACSM

Assistant Professor, IFKB Faculty of Human Movement Studies
Vrije Universiteit Amsterdam
Amsterdam
The Netherlands

Carol S. Federiuk, MD, PhD

Sports Medicine Fellow
Department of Family Medicine/Sports Medicine
Thomas Jefferson University
Philadelphia, Pennsylvania
Clinical Associate Professor
Department of Emergency Medicine
Oregon Health and Science University
Portland, Oregon

Carl Foster, PhD, FACSM

Professor, Department of Exercise and Sport Science
University of Wisconsin-La Crosse
LaCrosse, Wisconsin

Barry Franklin, PhD, FACSM

Director, Cardiac Rehabilitation and Exercise Laboratories
William Beaumont Hospital
Royal Oak, Michigan

Eric A. Heiden, MD

Team Physician, U.S. Speedskating
Assistant Professor, Arthroscopy and Sports Medicine
Department of Orthopaedic Surgery
University of California, Davis, Health System
Davis, California

Scott M. Koehler, MD

Team Physician, U.S. Snowboarding
Medical Director, Allina Medical Clinic
Center for Sports Medicine and Rehabilitation
Head Team Physician, Carleton and St. Olaf Colleges
Northfield, Minnesota

James Macintyre, MD, MPE, FACSM

Team Physician, U.S. Speedskating, U.S. Ski and Snowboarding
Advanced Orthopedics and Sports Medicine
Associate Director, Primary Care Sports Medicine Fellowship
Clinical Assistant Professor
Department of Family and Preventive Medicine
University of Utah

William O. Roberts, MD, MS, FACSM

Phalen Village Clinic
Department of Family Practice and Community Health
University of Minnesota Medical School
St. Paul, Minnesota

Kenneth W. Rundell, PhD, FACSM

Professor of Health Science
Marywood University
Director of the Human Performance Laboratory
Keith J. O'Neill Center for Healthy Families
Scranton, Pennsylvania

Ann Snyder, PhD, FACSM

Professor and Director of Human Performance Laboratory
Department of Human Movement Sciences
University of Wisconsin-Milwaukee
Milwaukee, Wisconsin

Bradford A. Stephens, MD

Medical Director
Lake Placid Sports Medicine Center
Orthopaedic Consultant
United States Olympic Training Center
Lake Placid, New York



FOREWORD

Most professionals involved in sports medicine either have a basic interest in sport or have had the experience of overcoming a sports injury. Sometimes it is both. For me, breaking a leg as a young skater was, at the time, a catastrophe. How was I going to stay in shape? Would I be able to salvage the season? With hindsight, it was this experience that influenced my decision to pursue sports medicine and has brought me to where I am today.

Most sports physicians have a formal education in either orthopaedic surgery or sports medicine. As a whole, we are comfortable treating musculoskeletal injuries, and there is an abundance of texts written on the diagnosis and treatment of such injuries. There is a plethora of literature on the biology of healing bones, ligaments, tendons, articular cartilage, and so forth, and there is no substitute for having extensive knowledge of these basic principles. In recent years our knowledge of the medical aspects of athlete care has grown tremendously. How physicians incorporate this vast array of knowledge in treating athletes is when the science of sports medicine becomes a true art.

To be involved in sports as a physician today means being part of a comprehensive team, including physicians, trainers, physical therapists, physiologists, biomechanists, kinesiologists, psychologists, nutritionists, and equipment designers. It also requires a broad understanding of the sport, its demands, and current trends. We can prescribe a treatment plan, but for that plan to be followed, an athlete must have confidence in our understanding of their sport. Where are they in their season? At what level do they compete? Can they take time off? Answers to these questions must be known if we are to implement a sound treatment plan for the aspiring athlete. It is from these ideas that Drs. Jim Moeller and Sami Rifat found the inspiration to write *Winter Sports Medicine Handbook*. The “sports medicine team” concept is evidenced in this book by the diversity of the contributing authors who have lent their expertise.

Winter Sports Medicine Handbook is a unique and interesting book that will be an excellent addition to the library of physicians, trainers,

therapists, and sports scientists involved in the training and care of winter sport athletes. Coaches and the athletes themselves can also benefit from its information.

The focus of the book, winter sports, is an area of sports medicine that is often overlooked in other texts. The sport-by-sport organization of the book, which includes the history, physiology, and mechanics of the sport as well as the medical and musculoskeletal problems encountered, allows for a more comprehensive understanding of the medical issues involved in the various winter sports. The quick reference guides in the front of the book are a unique feature that allows the busy practitioner an opportunity to rapidly learn the key aspects of an injury or disease process that is discussed in greater detail in the text.

That brings me back to where I am today, providing care for and traveling with the U.S. Speedskating Team. We recently found ourselves living in a small town (population of about 1,000 people, plus or minus a couple of moose) high in the mountains of Norway. Despite a treacherous, hair-raising, two-hour drive to the rink (which had a nice hotel right next door) we lived in the mountains to maximize the physiologic benefits of altitude. My formal education had left me inept regarding the physiologic benefits and risks of altitude exposure and how it affects performance. Years of experience have educated me in this area. Traveling with the team has made me aware of the importance of a well-rounded knowledge base that physicians must possess in order to provide appropriate care for their athletes.

ERIC A. HEIDEN, MD

*Team Physician, U.S. Speedskating
Assistant Professor Arthroscopy and Sports Medicine
Department of Orthopaedic Surgery
University of California, Davis, Health System*



PREFACE

Winter Sports Medicine Handbook is written based on the premise that the most effective sports medicine practitioners not only understand the medical problems encountered in active people but understand their sport as well. The book exclusively uses this sports-centered approach.

Each winter sport is addressed individually, with experts examining its physiology and biomechanics as they relate to commonly encountered injuries and illnesses. Physicians, biomechanists, and exercise scientists with expertise in working with winter sport athletes have contributed to this unique format. We are proud to have many National Team Physicians, International Sport Committee members, and other nationally recognized authors contributing to the book.

Winter Sports Medicine Handbook is designed for physicians, physical therapists, and athletic trainers. We feel the book will also be helpful for coaches and athletes. The book is written in an “expanded outline” format to help the reader find important points easily. For the practitioner who needs to learn the “bare bones” of an injury or disease process rapidly, there is a quick reference section as well. The book is not intended to cover all sports medicine topics, but rather only those common or particular to winter sport athletes.

For many people, certain winter sports are nothing more than a curiosity, something that peaks an interest every four years during the Olympic Games. For others, winter sports are a part of everyday life. For sports medicine practitioners to appropriately care for winter sport athletes, they must learn and understand as much about the different sports as possible. We are very pleased to bring you this information and hope that it assists you in your interaction with these athletes.

JAMES L. MOELLER
SAMJ F. RIFAT

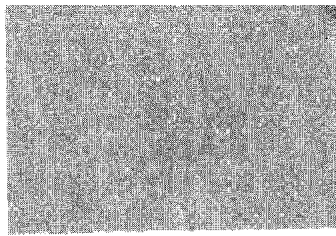
ACKNOWLEDGMENTS

The idea for this book grew from our interest in winter sports and the belief that an appreciation of the sport is essential to understanding the athlete. We thank all of those physicians involved in our sports medicine training who made us aware of this. We would also like to thank the residents and fellows we have worked with through the years. Teaching these young physicians motivates us to stay up-to-date and rekindles our professional enthusiasm.

We appreciate McGraw-Hill for believing in this concept, and we thank Darlene Cooke, Michelle Watt, and Jim Shanahan for their support and encouragement during this project. We would also like to acknowledge Niels Buessem of Andover Publishing Services for his editorial support.

We greatly appreciate the excellent work of all of our contributing authors. Their experience in the research and medical care of winter sport athletes is unsurpassed, and their enthusiasm for this project made them all a pleasure to work with. Thanks, too, to Dr. Eric Heiden for his contributions to this book, including writing the Foreword.

We also thank the athletic trainers, coaches, and parents we have worked with through the years. Finally, we want to express our appreciation to all the athletes who have trusted us with their medical care, for they are the greatest teachers of all.



QUICK REFERENCE GUIDE

MUSCULOSKELETAL ISSUES

Injury	Diagnosis	Management	Chapter
1st metatarsophalangeal joint injury (skier's toe)	<ul style="list-style-type: none">• Pain, swelling, and decreased motion at 1st MTP joint• More common with classic skiing technique• Local tenderness• May be signs of degeneration on examination and/or radiographs	<ul style="list-style-type: none">• Relative rest• Analgesics/NSAIDs• Supportive footwear• Surgery sometimes necessary	9. Cross-Country Skiing
Achilles tendon rupture	<ul style="list-style-type: none">• Acute posterior ankle pain• "Pop" often heard• Inability to actively plantar flex foot• Local tenderness• Palpable defect may be present• Positive Thompson's test	<ul style="list-style-type: none">• Analgesics• Surgery is usually indicated for young healthy athletes• Equine cast for those who are not surgical candidates	7. Freestyle Skiing
Acromioclavicular pseudo-sprain	<ul style="list-style-type: none">• Mainly in young athletes• AC pain after trauma• Swelling may be present• AC and distal clavicle tenderness• Initial x-rays usually normal	<ul style="list-style-type: none">• Ice• Analgesics• Sling for comfort	11. Ice Hockey

continued

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Injury	Diagnosis	Management	Chapter
Acromioclavicular sprain	<ul style="list-style-type: none"> • AC pain after trauma • Swelling and/or deformity • AC tenderness • Positive crossover test 	<ul style="list-style-type: none"> • General measures include: sling for comfort, ice, and analgesics • Definitive treatment varies depending on severity 	11. Ice Hockey
Ankle tendinopathies	<ul style="list-style-type: none"> • Aggravated by activity • Localized swelling • Localized tenderness 	<ul style="list-style-type: none"> • Relative rest • Ice • Analgesics/NSAIDs • Rehabilitation 	12. Figure Skating
Anterior cruciate ligament injury	<ul style="list-style-type: none"> • Acute knee pain associated with injury • Effusion • Feeling of instability • Positive Lachman 	<ul style="list-style-type: none"> • Control swelling • Analgesics • Physical therapy • Surgical reconstruction for those in high demand sports 	5. Alpine Skiing
Apophyseal injuries	<ul style="list-style-type: none"> • Skeletally immature athlete • Pain and weakness of involved muscle • Apophyseal tenderness • X-rays usually reveal avulsion 	<ul style="list-style-type: none"> • Rest • Crutches if necessary • Ice • Analgesics • Flexibility and strength training when sufficiently healed • Surgical fixation for widely displaced fractures 	12. Figure Skating
Calcaneus stress fracture	<ul style="list-style-type: none"> • Heel pain • Symptoms worse with loading • Tenderness • Pain with squeeze test • X-rays usually negative • Bone scan usually confirms diagnosis 	<ul style="list-style-type: none"> • Relative rest • Analgesics • Immobilization sometimes necessary 	7. Freestyle Skiing
Cervical spine injury	<ul style="list-style-type: none"> • Neck/head trauma • Neck pain • Possible loss of consciousness • Cervical injury should be assumed in all unconscious athletes • Local tenderness • Neurologic signs may be present 	<ul style="list-style-type: none"> • Follow BLS guidelines • Stabilize cervical spine • Do NOT remove helmet • Immobilize cervical spine and place athlete on backboard • Prompt transport to hospital 	11. Ice Hockey

Injury	Diagnosis	Management	Chapter
Cervical strain	<ul style="list-style-type: none"> • Posterior neck pain • Usually neurologic symptoms absent • Tender paracervical and trapezius muscles • Decreased range of motion 	<ul style="list-style-type: none"> • Relative rest • Ice/heat • Analgesics/NSAIDs • ROM exercises • Strengthening 	14. Sliding Sports
Clavicle fracture	<ul style="list-style-type: none"> • Clavicle pain after trauma • Swelling and gross deformity • Local tenderness • Decreased ROM shoulder 	<ul style="list-style-type: none"> • Treatment is generally conservative • Ice • Analgesics • Sling for comfort • Reduction for severe angulation • Surgery if open or severely angulated and if neurovascular status is compromised 	11. Ice Hockey
Common peroneal nerve injury	<ul style="list-style-type: none"> • Usually secondary to trauma • Weakness ankle dorsiflexors and evertors • Sensory changes anterolateral leg and dorsum of foot 	<ul style="list-style-type: none"> • Recovery from blunt trauma is typically complete, but may take up to 6 months • Lacerations typically lead to long-term deficit 	11. Ice Hockey
Compression fracture thoracolumbar spine	<ul style="list-style-type: none"> • Pain after trauma • Midline pain without radiation • Midline tenderness • Usually no neurologic symptoms • X-rays usually confirm diagnosis 	<ul style="list-style-type: none"> • Varies depending on severity • Simple fractures are treated with rest, analgesics, ice, and a thoracolumbar orthosis • “Burst” fractures should be referred to a specialist 	5. Alpine Skiing
DeQuervain's tenosynovitis	<ul style="list-style-type: none"> • Radial wrist pain • Occasional swelling • Tenderness proximal to the radial styloid • Positive Finkelstein test 	<ul style="list-style-type: none"> • Activity modification • Ice • Analgesics/NSAIDs • Immobilization may be necessary • Rehabilitation • Corticosteroid injection • Surgery is the last resort 	15. Curling

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Injury	Diagnosis	Management	Chapter
Distal radius fracture	<ul style="list-style-type: none"> • Typically occurs as a result of a fall onto an outstretched hand • Wrist pain • Distal radius tenderness • Deformity may or may not be present • Confirmed by X-ray 	<ul style="list-style-type: none"> • Treatment depends on severity • Nondisplaced fractures are treated with cast immobilization for 4–6 weeks • Displaced, angulated, and comminuted fractures should be treated by an orthopedic surgeon 	6. Snowboarding
Elbow dislocation	<ul style="list-style-type: none"> • Usually caused by a fall onto outstretched arm • Immediate pain • Gross deformity • Inability to move elbow • Neurovascular status may be affected • X-rays confirm diagnosis and may reveal fracture 	<ul style="list-style-type: none"> • If neurovascular status is affected, on-field reduction may be attempted by qualified personnel • If neurovascularly intact, stabilize and transport to hospital • Reduce 	6. Snowboarding
Chronic exertional compartment syndrome	<ul style="list-style-type: none"> • Leg pain worse with exercise • Relieved by rest • Weakness may or may not be present • Examination may be normal • Diagnosis confirmed with compartment pressure measurement 	<ul style="list-style-type: none"> • Rest, ice, massage • Conservative treatment often ineffective • Fasciotomy is the definitive treatment 	13. Speed Skating
Extensor carpi ulnaris tendonitis	<ul style="list-style-type: none"> • Ulnar wrist pain • Aggravated by wrist extension and ulnar deviation • Tender ulnar wrist • Pain with resisted wrist extension and ulnar deviation 	<ul style="list-style-type: none"> • Activity modification • Ice • Analgesics/NSAIDs • Immobilization sometimes necessary • Physical therapy • Corticosteroid injection 	9. Cross-Country Skiing
Femur fracture	<ul style="list-style-type: none"> • Immediate thigh pain after trauma • Inability to bear weight • Femoral tenderness • Swelling may be present • Gross deformity may be present • X-ray confirms diagnosis 	<ul style="list-style-type: none"> • Stabilize and transport to hospital • Should be referred to orthopedic surgery for definitive treatment 	7. Freestyle Skiing

Injury	Diagnosis	Management	Chapter
Fibula stress fracture	<ul style="list-style-type: none"> • Lateral lower leg pain • Focal tenderness • X-rays usually negative • Bone scan confirms diagnosis 	<ul style="list-style-type: none"> • Relative rest • Ice • Analgesics • Address predisposing factors 	12. Figure Skating
Forearm periostitis	<ul style="list-style-type: none"> • Forearm pain • Symptoms worse with activity (e.g., slapshot) • Ulnar tenderness • X-rays usually negative • Bone scan can confirm diagnosis 	<ul style="list-style-type: none"> • Relative rest • Ice • Analgesics 	11. Ice Hockey
Greater trochanteric bursitis	<ul style="list-style-type: none"> • Deep aching lateral hip pain • May radiate down toward knee • Local tenderness • Pain with resisted hip abduction and external rotation 	<ul style="list-style-type: none"> • Activity modification • Ice • Analgesics/NSAIDs • Address flexibility deficits • Corticosteroid injection 	9. Cross-Country Skiing
Hamate fracture	<ul style="list-style-type: none"> • Tenderness over the hypothenar eminence/hamate bone • X-ray with carpal tunnel views • CT scan may be necessary 	<ul style="list-style-type: none"> • Nondisplaced fractures treated with cast • Displaced fractures are usually treated surgically 	11. Ice Hockey
Hamstring strain	<ul style="list-style-type: none"> • Acute pain often accompanied by a pop or tear in posterior thigh • Bruising often present • Limp • Tenderness sometimes accompanied by a palpable defect 	<ul style="list-style-type: none"> • Relative rest • Ice • Analgesic/NSAIDs • ROM exercise • Physical therapy • Surgery if tendinous avulsion 	14. Sliding Sports
Hand contusion	<ul style="list-style-type: none"> • Pain after trauma • Swelling • Bruising • Local tenderness • X-rays negative 	<ul style="list-style-type: none"> • Relative rest • Ice • Analgesics/NSAIDs 	14. Sliding Sports
Hip dislocation	<ul style="list-style-type: none"> • Usually caused by a hard fall • Immediate pain • Unable to bear weight • Pain with any attempted movement • The hip may appear shortened, internally rotated, and adducted • X-rays confirm diagnosis 	<ul style="list-style-type: none"> • Stabilize and transport to hospital • Refer to orthopedic surgery 	7. Freestyle Skiing

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