Skiing Trauma and Safety: Seventh International Symposium

Robert J. Johnson, C. D. Mote, Jr., and Marc-Hervé Binet, editors
Foreword

The Seventh International Symposium on Ski Trauma and Skiing Safety was presented at Chamonix, France, on 11-15 May 1987. ASTM Committee F-27 on Snow Skiing, the International Society for Skiing Safety (ISSS), and Groupe Populaire Assuraance (G.P.A.) co-sponsored the symposium. Marc-Hervé Binet, Centre Medical Avoriaz, France, served as chairman of the symposium. Robert J. Johnson, University of Vermont College of Medicine, C. D. Mote, Jr., University of California, Berkeley, and Marc-Hervé Binet are the editors of the resulting publication.
Contents

Introduction 1
Overview 3

EPIDEMIOLOGY OF SKIER INJURIES

Risk Factors for Ski Injuries: A Crash Course of Epidemiologic Methods with Emphasis on Comparability in Experiments and Case-Control Studies—PAUL G. KNIPSCHILD AND LEX M. BOUTER 9

Experimental Prospective Skiing Injury Study—WOLFHART HAUSER 18

Skier Injury Trends—ROBERT J. JOHNSON, CARL F. ETTLINGER, AND JASPER E. SHEALY 25

A Five-Year Survey of Skiing Injuries in Hemsedal, Norway—HARALD LYSTAD 32

Skiing Injuries in Alpine Recreational Skiers—ARNE EKELAND, ÅGE HOLTMOEN, AND HARALD LYSTAD 41

An Investigation into Ski Injuries and Equipment in Switzerland: Objectives, Means, and Observations—ALEXIS BALLY AND FRANCOIS BONJOUR 51

Fatal Skiing Accidents in Austria—Epidemiology and Analysis—FRANZ BERGHOLD 63

Collision Injuries in Alpine Skiing—HARALD LYSTAD 69

Snowboarding Injuries on Alpine Slopes—JASPER E. SHEALY AND PAUL D. SUNDMAN 75

SKIER BEHAVIOR, ABILITY, AND CONDITIONING

Skiing Behavior of Alpine Recreational Skiers—ARNE EKELAND, ÅGE HOLTMOEN, AND HARALD LYSTAD 85

Ability and Physical Condition in Relation to Injury Risk in Downhill Skiing—LEX M. BOUTER, PAUL G. KNIPSCHILD, AND ALEXANDER VOLOVICS 94

SPECIFIC SKIER INJURIES

Cruciate Ligament Injuries in Female Alpine Ski Racers—BARRY R. ELLMAN, EDGAR M. HOLMES III, JAMES JORDAN, AND PATRICK MCCARTY 105
More on the Lesions of the Anterior Cruciate Ligament and Their Prevention in Skiers—José M. Figueras, Aleix Vidal, Félix Escalas, José A. Merino, José M. Espadaler-Gamisans, and Francesc Castanyer

Unilateral Fracture of the Posterior Elements of the Lumbar Spine in Alpine Skiing—Tsuneo Yamagishi and Ken Ichi Yahashi

Eyewear-Related Eye Injuries in Snow Skiing—Robert L. Piziali

Acute Arterial Occlusion Caused by High Ski Boots Treated with Low-Dose Streptokinase—Axel Essinger

Ski Boot Mechanics

Influences on the Foot Pressure Pattern in Ski Boots—Peter S. Schaff, Ruprecht Schattner, Martin Kulot, and Wolfhart Hauser

Dorsiflexion of the Human Ankle as It Relates to Ski Boot Design in Downhill Skiing—Jasper E. Shealy and David A. Miller

Measurements of the Forces Needed to Take Off Classic and Rear Entry Ski Boots—Marc-Hervé Binet, Bernard Montillet, Gilbert Delouche, and M. Thomas

A New Lower Leg Prosthesis with Simulation Device for the Achilles Tendon—Wolfgang Menke, Friedrich Bodem, Josef Casel, and Rolf Volkert

Problems Encountered in Flex Measurements on Alpine Ski Boots—François Bonjour and Gilbert Delouche

Binding Mechanics


A Mechanical Alpine Ski Binding with Programmable Release—Glenn S. Wunderly and Maury L. Hull

The Effect of Ankle Motion on Ski Binding Release Tests Using an Anthropometric Dummy—Eugene Bahnium, Ramona Schneider, and Edward Tompkin

Elevated Racer Binding Settings and Inadvertent Releases—Laurence R. Young

Biomechanics of the Lower Extremity in Skiing

Measurement of Strength and Loading Variables on the Knee During Alpine Skiing—Scott M. Maxwell and Maury L. Hull
Three-Dimensional Loading of the Knee During Internal-External Rotation: The Effect of Ankle Constraint—T. P. QUINN, C. D. MOTE, JR., AND H. B. SKINNER 252

Modeling Forces on the Anterior Cruciate Knee Ligament During Backward Falls While Skiing—ALEXIS BALLY, MICHEL BOREIKO, FRANCOIS BONJOUR, AND CHRISTOPHER A. BROWN 267

Axial Rotation of the Lower Limb Under Torsional Loading: I. Static and Dynamic Measurements in Vivo—MAURY L. HULL AND CURTIS JOHNSON 277

Axial Rotation of the Lower Limb Under Torsional Loading: II. Parameter Identification of a Dynamic System Model—CURTIS JOHNSON AND MAURY L. HULL 291

BIOMECHANICS OF THUMB INJURIES

Skier’s Thumb: Continuing Biomechanical Analysis—MICHAEL K. LAMONT 311

Metacarpophalangeal Sprain of the Thumb in Downhill Skiers: Ergonomic Study—XAVIER LEDOUX, ALAIN LEDOUX, AND NICOLAS DROUET 316

MISCELLANEOUS BIOMECHANICAL SUBJECTS

On the Skiability of Snow—CHRISTOPHER A. BROWN AND JOHN O. OUTWATER 329

Skiing Safety

Television Programs to Prevent Skiing Injuries—JOSÉ M. FIGUÉRAS 339

Organization of Skiing Safety in Norway—ARNE EKELAND, SVENRE RØED LARSEN, AASE GRO TUXEN, AND PER NYGAARD 342

BIOMEDICAL TESTING

Biomedical Tests During a High Mountain Ski Touring Competition (Raid Blanc)—PAOLO ZUCCO, ALBERTO BONVECCHIO, ANNA CASATI, AND RENZO MINELLI 357

CLOTHING

A Technique for Analyzing the Thermal Resistance of Ski Gloves—CHARLES C. ROBERTS, JR. 367

A Clothing Design Prototype to Meet Male Alpine Ski Instructors’ Needs for Thermal Comfort—DALYCE C. LAINE AND SUSAN B. HESTER 374

Index 385