Symposium on the Mechanism of Concussion in Sports

Sponsored by ASTM Committee F08 on Sports Equipment and Facilities

November 13, 2012
Hyatt Regency Atlanta
Atlanta, GA

Symposium Co-Chairmen: Mariusz Ziejewski, Ph.D.
North Dakota State University
Fargo, ND USA

Alan Ashare, M.D.
St. Elizabeth Medical Center and
Tufts Medical School
Boston, MA USA

TUESDAY, NOVEMBER 13, 2012

8:00 AM
Welcome Remarks
Dr. Alan Ashare and Dr. Mariusz Ziejewski, Symposium Co-Chairmen

8:20 AM
Angular Head Motion With and Without Head Contact Implications for Brain Injury
T. A. Smith and S. A. Kebschull, Dynamic Research Inc., Torrance, CA, USA; P. D. Halstead, E. McCalley, and S. Halstead, Southern Impact Research Center, Knoxville, TN, USA

8:35 AM
The Influence of Impact Angle on the Dynamic Response of a Hybrid III Headform and Brain Tissue Deformation
A. Oeur and T. B. Hoshizaki, University of Ottawa, Ottawa, Ontario, Canada; and M. D. Gilchrist, University College Dublin, Dublin, Belfield, Ireland

8:50 AM
Performance Criteria for a Child Specific Helmet
P. J. Bishop, University of Waterloo, Canada, Elmira, Ontario, Canada
9:05 AM
Developing Helmet Standards and Testing Methods to Protect from Brain Injury
J. D. Lloyd, University of South Florida, Tampa, Florida, and BRAINS, Inc., San Antonio, Florida, USA

9:20 AM
Fluid-Filled Helmet Liner for Sports Helmet Applications and Protection against Blast-Induced Traumatic Brain Injury
L. Young, Massachusetts Institute of Technology, Cambridge, MA, USA

9:35 AM
On the Importance of Using a Centric/Non-Centric Protocol for the Evaluation of Ice Hockey Helmet Performance
A. Post, A. Ouer and T. B. Hoshizaki, University of Ottawa, Ottawa, Ontario, Canada; M. D. Gilchrist, University College Dublin, Dublin, Ireland

9:50 AM  Break

10:15 AM
Evaluating the Relationship between Head Acceleration, Brain Tissue Strain, and Intracranial Pressure Gradient Using Multiple Finite Element Brain Models
R. P. Bolander, J. G. Beckwith, Simbex, Lebanon, New Hampshire, USA; S. Ji, H. Ghadyani and K. D. Paulsen, Thayer School of Engineering, Dartmouth College, Hanover, New Hampshire, USA; T. W. McAllister, J. C. Ford, L. A. Flashman, Geisel School of Medicine at Dartmouth, Hanover, New Hampshire, USA; R. Raman, K.ERNstrom, S. Jain, University of California, San Diego, California, USA; and R. M. Greenwald, Simbex and Thayer School of Engineering, Dartmouth College, Hanover, New Hampshire, USA

10:30 AM
Simulation, Fabrication and Validation of a Novel Football Helmet Padding System that Significantly Decreases Rotational Acceleration and Linear Impact Compared with Industry Standard
J. M. Johnston, H. Nigh, U. Vaidya, J.-E. Kim, Y.-H. Kim, D. Leonard, B. Soni, and J. B. Andrews, University of Alabama, Birmingham, Birmingham, AL, USA; and L. Cooper, PUSH Designs, Birmingham, Alabama, USA

10:45 AM
Concussions-Subconcussive Head Injuries: A Possible Solution to Reduce the Risk in Soccer
C. J. Abraham, Scientific Advisory Services, Ltd., Great Neck, New York, USA

11:00 AM
Development of an Advanced Football Helmet to Provide Increased Protection Against Concussion
D. M. Dressler and P. A. Cripton, University of British Columbia, Vancouver, British Columbia, Canada
11:15 AM
**Catastrophic Ice Hockey Registry: USA Hockey and Mayo Clinic**
M. J. Stuart and D. V. Gaz, Mayo Clinic, Rochester, Minnesota, USA

11:30 AM
**Incidence Rate of Sport-Related Traumatic Brain Injury Diagnoses in the General Population: An Analysis of Emergency Department Visits in 2001 and 2010**
K. A. Rodowicz Biomechanics Practice, Philadelphia, Pennsylvania, USA; and H. Watson, Statistical & Data Sciences Practice, Menlo Park, California, USA

11:45 AM
**HEP: Fair Play Implementation Issues and a Feasible Solution**
A. M. Smith, D. V. Gaz, C. P. Twardowski, and M. J. Stuart, Mayo Clinic, Rochester, Minnesota, USA

12:00 Noon  Lunch (On Your Own)

1:00 PM
**The Analysis of a Helmeted Human Head under Ballistic Impact Loads**
M. Salimi Jazi, A. Rezaei, G. Karami, F. Azami, and M. Ziejewski, North Dakota State University, Fargo, North Dakota, USA

1:15 PM
**The Effect of Inbound Mass on the Dynamic Response of the Hybrid III Headform and Brain Tissue Deformation**
C. Karton, T. B. Hoshizaki, University of Ottawa, ON, Canada; M. Gilchrist, University College Dublin, Dublin, Ireland

1:30 PM
**Impact Attenuation Values and Prevention of Head Injuries on Sports Fields**
R. Huber, Everplay International Inc., Brampton, Ontario, Canada

1:45 PM
**The Evaluation of a Centric/Non-Centric Impact Protocol Using a Monorail Impacting System**
K. Nishizaki, T. B. Hoshizaki, A. Post, A. Ouer, and E. Walsh, Neurotrauma Impact Science Laboratory, Ottawa, Ontario, Canada; W. Marino, University of Windsor, Windsor, Ontario, Canada; M. Gilchrist, University College Dublin, Belfield, Ireland

2:00 PM
**Comparative Analysis of the Hybrid III Neckform to Unbiased Neckforms Using a Centric and Non-Centric Impact Protocol**
E. S. Walsh, T. B. Hoshizaki and M. D. Gilchrist, University of Ottawa, Ottawa, Ontario, Canada
2:15 PM  
**Helmet Shape and Size Considerations in Short Track Speed Skating Crash Pad Impacts**  
S. Maw and A. Morris, Mount Royal University, Calgary, Alberta, Canada; A. Clark, University of Calgary, Calgary, Alberta, Canada  

2:30 PM  
**A Comparison Analysis for the Measurement of Head Accelerations in Ice Hockey Helmets using Non-Accelerometer Based Systems**  
D. Crossman and S. Foreman, Impakt Protective Inc., Kanata, Ontario, Canada  

2:45 PM  
**The Influence of Striker Cap Size on the Dynamic Response of a Hybrid III Headform**  
L. Dawson, University of Ottawa, Ottawa, Ontario, Canada  

3:00 PM  
Break  

3:15 PM  
**Protective Capacity of Ice Hockey Player Helmets against Puck Impacts**  
P. Rousseau, T. B. Hoshizaki, University of Ottawa, Ottawa, Ontario, Canada; and M. D. Gilchrist, University College Dublin, Dublin, Ireland  

3:30 PM  
**Video Incident Analysis of Concussion Mechanisms in Boys’ and Girls’ High School Lacrosse**  
A. E. Lincoln and R. E. Dunn, MedStar Health Research Institute, Baltimore, Maryland, USA; S. V. Caswell, George Mason University, Manassas, Virginia, USA; J. L. Almquint, Fairfax County Public Schools, Falls Church, Virginia, USA; and R. Y. Hinton, MedStar Union Memorial Hospital, Baltimore, Maryland, USA  

3:45 PM  
**Head Angular Acceleration Characteristics Influence Behavioral Outcomes Following Concussion**  
B. D. Stemper, H. Sikora, M. McCrea, M. D. Budde, A. S. Shah, and F. A. Pintar, Medical College of Wisconsin, Milwaukee, Wisconsin, USA  

4:00 PM  
**The Effects of Player Anticipation and Involvement on Head Impact Biomechanics in College Football Body Collisions**  
J. P. Mihalik, K. F. Moise, K. E. Ocieje, K. M. Guskiewica and J. K. Register-Mihalik, The University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA  

4:15 PM  
**Strengthening Epidemiology of Ice Hockey Research Using Reliable Exposure Time Software**  
C. P. Twardowski, A. M. Smith, D. V. Gaz, D. R. Larson, and M. J. Stuart, Mayo Clinic, Rochester, Minnesota, USA
4:30 PM
The Effect of Brain Training on Cognitive Assessment: A Pilot Investigation
D. Mann, Glassboro, New Jersey, USA

4:45 PM
The Effect of Shoulder Pad Design on Reducing Peak Resultant Linear and Rotational Acceleration in Shoulder to Head Impacts
M. Kendall, A. Post, P. Rousseau and T. B. Hoshizaki, University of Ottawa, Ottawa, Ontario, Canada

5:00 PM
Closing Remarks
Dr. Alan Ashare and Dr. Mariusz Ziejewski, Symposium Co-Chairs

5:30 PM
SYMPOSIUM ADJOURNS

6:00 PM - 8:00 PM
Reception