



National Biomechanics Institute

National Biomechanics Institute
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Rami Hashish, PhD, DPT
Principal | Director, Biomechanics

Dr. Rami Hashish is a Principal at the National Biomechanics Institute. Dr. Hashish holds a PhD in Biomechanics from the University of Southern California (USC), a Doctorate of Physical Therapy (DPT) from the University of Washington School of Medicine, a Private Pilot license through the FAA, a Diploma in Traffic Crash Reconstruction for the Forensic Engineer from Northwestern University, and is a certified Slip and Fall Tribometrist by Excel Tribometers. Dr. Hashish specializes in determining injury causation and mitigation across a variety of settings, including, motor vehicle accidents, slip, trip, & fall events, workplace environments, and athletic participation.

Dr. Hashish's primary research focus is in human injury and performance biomechanics. He also has experience with human factors and medical imaging, examining the effects of dual tasking in both neurologically intact and impaired individuals, and conducting cadaveric and computational studies on the foot and calf. In addition to his role at NBI, Dr. Hashish is Adjunct Clinical Faculty in USC's Division of Biokinesiology and Physical Therapy, and serves on the committee for the Abbreviated Injury Scale as part of the Association for the Advancement of Automotive Medicine. As an instructor in musculoskeletal and systems anatomy at USC, Dr. Hashish has participated in more than 100 human cadaver dissections.

Dr. Hashish has more than 50 peer-reviewed publications and conference presentations, serves as an editor for the Journal of Ergonomics, and on the editorial review board for various high impact medical and biomechanics journals. Prior to joining NBI, Dr. Hashish served as a Senior Consultant in Biomechanics at Exponent, as the Director of Rehabilitation Medicine at UrbanMed in Los Angeles, California, as a Contributing Columnist for The Huffington Post, and as a Medical Expert for both Dignity Health and Runner's World.

Academic Credentials

PhD, Biokinesiology (Emphasis in Biomechanics), University of Southern California, 2014
DPT, Doctorate of Physical Therapy, University of Washington School of Medicine, 2009
BA, Communications (Emphasis in Journalism), University of Washington, 2006

Current Appointments

Principal, National Biomechanics Institute
Adjunct Clinical Faculty, USC Division of Biokinesiology and Physical Therapy
Abbreviated Injury Scale Subcommittee Member, Association for the Advancement of Automotive Medicine

Past Appointments

CTO, JavanScience, 2012-2016
Senior Associate in Biomechanics, Exponent, 2015-2016

Medical Correspondent / Contributing Columnist, Dignity Health, 2014-2016
Director of Physical Therapy, UrbanMed, 2014-2015
Co-Founder & CTO, JavanScience, 2012-2015
Teaching / Research Assistant, USC Division of Biokinesiology and Physical Therapy, 2009-2014

Editorial Review Board

Journal of Biomechanics
Journal of Pain Research
Medicine and Science in Sports and Exercise
Gait and Posture
Journal of Strength and Conditioning Research
Human Movement Sciences
International Journal of Sports Medicine
Journal of Sports Science & Medicine
Journal of Forensic & Legal Medicine

Licenses, Certifications & Selected Continuing Education

Private Pilot, Federal Aviation Administration, United States, #4256896
Licensed Physical Therapist, California, #38319
Traffic Crash Reconstruction for the Forensic Engineer, Northwestern University
Traffic Crash Analysis Using Virtual Crash Simulation, Forensic Training Group
CDR Technician Level 1 & 2, Collision Safety Institute
CXL, Excel Tribometers
Diploma in Photography, Shaw Academy
Advanced Photogrammetry, LightPoint Data

Peer-Reviewed Publications & Presentations

Cachau-Hansgardh, A; McCleery, C.; Limousis-Gayda, M.; Hashish, R. Analysis of Bicycle Helmet Damage Visibility for Concussion-Threshold Impacts. *International Biomechanics*. In-Press.

McCleery, C.; Limousis-Gayda, M.; Rubio, E.; Sie, M.; Hashish, R. The Effect of Rear-End Collisions on Triaxial Acceleration to Occupant Cervical and Lumbar Spines: An Analysis of IIHS Data. *Accident Analysis and Prevention*. In-Review.

Limousis-Gayda M, Hashish R. A Proposed Algorithm to Assess Concussion Potential in Rear-End Motor Vehicle Collisions: A Meta-Analysis. *Applied Bionics and Biomechanics*, 2020.

Limousis-Gayda M, Huang T, Hashish R. Incidence of Brain Injury Across American Youth Sports. *Clinical Biomechanics*. *Clinical Biomechanics*. In-Review.

Hashish R, Limousis-Gayda M, McCleery CH. The Incident of Concussion across Popular American Youth Sports: A Retrospective Review. *World Academy of Science, Engineering and Technology, International Science Index, Biotechnology and Bioengineering* (2020), 14(1), 848.

Hashish R, Limousis-Gayda M, McCleery CH. Proposed Algorithms to Assess Concussion Potential in Rear-End Motor Vehicle Collisions: A Meta-Analysis. *World Academy of Science, Engineering and Technology, International Science Index, Biotechnology and Bioengineering* (2020), 14(1), 847.

Limousis-Gayda M, McCleery CH, Trujillo-Priego IA, Hashish R. Do Traditional Back Protectors Prevent Back Injuries in Skiing? XXVII Congress of the International Society of Biomechanics and 43rd Annual Meeting of the American Society of Biomechanics, Calgary, Canada, July 2019.

McCleery CH, Trujillo-Priego IA, Limousis-Gayda M, Hashish R. Biomechanical Implications of the Development of Countermeasures for Extended Exposure to Microgravity. XXVII Congress of the International Society of Biomechanics and 43rd Annual Meeting of the American Society of Biomechanics, Calgary, Canada, July 2019.

Trujillo-Priego IA, Limousis-Gayda M, McCleery CH, Hashish R. Implications of Walking Boot Use. XXVII Congress of the International Society of Biomechanics and 43rd Annual Meeting of the American Society of Biomechanics, Calgary, Canada, July 2019.

Limousis-Gayda M, Hashish R, Lee F. Countries Development Status and Driver Behavior. International Conference on Applied Human Factors and Ergonomics, Washington D.C., July 2019.

Lee, F., McCleery, C.H., Ngo, C., Limousis-Gayda, M., Hashish, R. Probability of Frontal Airbag Deployment in Bumper-Bumper and Underride Collisions. SAE Technical Paper 2019-01-0620. Warrendale, PA, 2019.

Lee F, Ngo C, McCleery C, Hashish R, Limousis-Gayda M. Delta-V Thresholds for Frontal Airbag Deployment in Bumper-Bumper and Underride Collisions. SAE World Congress. Detroit, Michigan, April 2019.

Limousis-Gayda M, Hashish R. The Use of 3DSSPP for Motor Vehicle Accidents. Human Factors & Ergonomics Society (HFES) Europe Chapter Conference. Berlin, Germany, October 2018.

Limousis-Gayda M, Hashish R, Kranjac D, Lee F. The Effect of Technology on Pedestrian and Driver Behavior. International Conference on Applied Human Factors and Ergonomics. Orlando, Florida, July 2018.

Hashish R, Komari O, Limousis-Gayda M. Determining Cervical Disc Injury Potential in Motor Vehicle Collisions. American Society of Biomechanics. Rochester, Minnesota. August 2018.

Komari O, Hashish R. The Bracing Paradox: Should Occupants Brace During Frontal Motor Vehicle Collisions? World Congress of Biomechanics. Dublin, Ireland. July 2018.

Hashish R, Badday H. Frequency of Acute Cervical and Lumbar Pathology in Common Types of Motor Vehicle Accidents: A Retrospective Record Review. BMC Musculoskeletal Disorders. 2017.

Hashish R, Toney-Bolger ME, Sharpe SS, Lester BD, Mulliken A. Texting During Stair Negotiation and Implications for Fall Risk. Gait & Posture, 2017. 58: 409-414.

Komari O, Hashish R. The Effect of Pre-Existing Damage on Delta-V Calculations in Rear-End Vehicle Collisions. American Society of Civil Engineers. Duluth, MN. September 2017.

Hashish R, Toney-Bolger ME, Sharpe SS, Lester BD. Texting During Stair Negotiation and Implications for Fall Risk. American Society of Biomechanics Midwest. Grand Rapids, MI. February 2017.

Hashish R, Samarawickrame S, Baker L, Salem GJ. The Influence of a Bout of Exertion on Novice Barefoot Running Dynamics. Journal of Sports Science & Medicine, 2016. 15: 327-334.

Hashish, R, Samarawickrame S, Sigward S, Azen SP, Salem GJ. Lower-limb dynamics and clinical outcomes for habitually shod runners who transition to barefoot running. Physical Therapy in Sport, 2016. In Press.

Lester BD, Hashish R, Kim R, Moorman H, Hildebrand E, Schwark J, Rauschenberger R, Young D. Mobile device usage influences gaze patterns to obstacles during locomotion. The Industrial & Systems Engineering Research Conference, 2016.

Kim R, Lester BD, Hashish R, Cades D, Moorman H, Young D. Gaze behavior during curb approach: The effect of mobile device use. Human Factors and Ergonomics Society Annual Meeting, 2016.

Hashish R, Lester BD, Mulliken A, Koehring J, Perlmutter S. Texting Affects Gait Metrics Associated with Slips, Trips, and Falls. The Industrial & Systems Engineering Research Conference, Anaheim, CA, May 2016.

Hashish R, Samarawickrame S, Powers CM, Salem GJ. Lower Limb Dynamics Vary in Habitually Shod Runners who Acutely Transition to Barefoot Running, 2016. Journal of Biomechanics. 49: 284-288.

Dubois AM, Hashish R, Samarawickrame SD, Salem GJ. Changes in Joint Contributions to the Support Impulse During an Acute Transition to Barefoot Running. American College of Sports Medicine, San Diego, CA, May 2015.

Hashish R. Staggering Epidemiological Data Indicates the Need for a Paradigm Shift in Ergonomic Standards of Older Adult Footwear. Journal of Ergonomics, 2015. 7: Open Access.

Hashish R, Samarawickrame S, Wang MY, Yu SY, Salem GJ. The Association Between Unilateral Heel Rise Performance with Static and Dynamic Balance in Community Dwelling Older Adults. Geriatric Nursing, 2015. 36: 30-34.

Hashish R, Samarawickrame SD, Salem GJ. A Comparison of Dorsal and Heel Plate Foot Tracking Methods on Lower Extremity Dynamics. Journal of Biomechanics, 2014. 47:1211-1214.

Hashish R, Samarawickrame S, Gaur K, Salem GJ. Do Western Shoe Runners Inherently Adopt the Habituated Barefoot Pattern. World Congress of Biomechanics, Boston, MA, July 2014.

Samarawickrame S, Hashish R, Ward S, Colletti P, Salem G. Calf and Foot Muscle Adaptations in Western Shod Runners After a Transition to Barefoot Running. World Congress of Biomechanics, Boston, MA, July 2014.

Hashish R, Samarawickrame SD, Salem GJ. The Association Between Heel-Rise Performance and Static Balance in Community Dwelling Older Adults. International Society of Biomechanics Bi-Annual Conference, Brazil, August 2013.

Hashish R, Samarawickrame SD, Gaur K, Salem GJ. Tibialis Posterior Muscle Activation Strategies in Novice Barefoot Runners Before and After Exertion. International Society of Biomechanics – Footwear Biomechanics Group Bi-Annual Conference, Brazil, July 2013.

Samarawickrame SD, Hashish R, White E, Ward S, Colletti P, Salem GJ. Validity and Reliability of Foot Muscle Volume Determination by Magnetic Resonance Imaging. International Society of Biomechanics Bi- Annual Conference, Brazil, August 2013.

Wang MY, Yu SS, Hashish R, Samarawickrame SD, Kazadi L, Greendale GA, Salem GJ. The biomechanical demands of standing yoga poses in seniors: The Yoga Empowers Seniors Study (YESS). BMC Complementary and Alternative Medicine, 2013. Open Access.

Salem GJ, Yu SS, Wang MY, Samarawickrame SD, Hashish R, Greendale GA. Physical Demands of Hatha Yoga Postures Performed by Older Adults. Evidenced-Based Complementary and Alternative Medicine, 2013. Open Access.

Samarawickrame SD, Hashish R, Gaur K, Salem GJ. Adaptations in Plantar-flexor Performance and Length-Tension Relationship following a transition from Shod to Barefoot running. International Society of Biomechanics – Footwear Biomechanics Group Bi-Annual Conference, Brazil, July 2013.

Samarawickrame SD, Hashish R, Gaur K, Salem GJ. Exertion Modulates Ankle Joint Co-Activation During Novel Barefoot and Post-Transition Barefoot Running Conditions. American Society of Biomechanics, August 2012.

Hashish R, Samarawickrame S, Gaur K, Salem GJ. Mechanical Demand Distribution During Shod and Novice Barefoot Running. American Society of Biomechanics, August 2012.

Samarawickrame SD, Hashish R, Gaur K, Salem GJ. Adaptive Changes in Plantar-flexor Performance Following a Transition from Shod to Barefoot Running. American College of Sports Medicine, June 2012.

Hashish R, Samarawickrame SD, Gaur K, Salem GJ. Adaptation of Contact Dynamics Following an Eight-Week Transition from Shod to Barefoot Running. American College of Sports Medicine, June 2012.

Wang MY, Yu SS, Haines M, Hashish R, Samarawickrame SD, Greendale GA, Salem GJ. Can Yoga Improve Balance Performance in Older Adults? American College Sports Medicine, June 2012.

Yu SS, Wang MY, Samarawickrame S, Hashish R, Kazadi L, Greendale GA, Salem GJ. The Physical Demands of the Tree (Vriksasana) and One-Leg Balance (Utthita Hasta Padangusthasana) Poses Performed by Seniors: A Biomechanical Examination. Evidence-Based Complementary and Alternative Medicine, 2012. Open Access.

Hashish R, Samarawickrame S, Powers CM, Salem GJ. Foot Contact Patterns and Joint Demands in Novice Barefoot Runners Before and After Exertion. APTA Combined Sections Meeting, February 2012.

Samarawickrame SD, Hashish R, Salem GJ. Kinematic and kinetic differences between shod and barefoot running. American Society of Biomechanics, August 2011.

Hashish R, Samarawickrame SD, Salem GJ. Ground reaction forces in barefoot running before and after exertion. American Society of Biomechanics, August 2011.

Wang MY, Yu SS, Hashish R, Samarawickrame SD, Haines M, Mulwitz L, Kazadi L, Greendale GA, Salem GJ. Biomechanics demands of therapeutic hatha yoga poses in older adults: modified chair and downward facing dog. American Society of Biomechanics, August 2011.

Yu SS, Wang MY, Mulwitz L, Haines M, Samarawickrame SD, Hashish R, Kazadi L, Greendale GA, Salem GJ. Conventional wisdom regarding yoga pose modification may not benefit healthy older adults: examining the modified tree pose. American Society of Biomechanics, August 2011.

Samarawickrame S, Wang M-Y, Hashish R, Yu S-Y, Haines M, Mulwitz L, Greendale G, Salem G. Biomechanical Characteristics of the Modified Downward Facing Dog Yoga Pose in Healthy Older Adults. Med Sci Sports Exerc. June 2011; 43(5): S652.

Hashish R, Samarawickrame S, Wang M-Y, Yu S-Y, Tsai LC, Salem G. The Influence Of Different Marker Sets On Lower Extremity Dynamics During Walking. Med Sci Sports Exerc. June 2011; 43(5): S639.

Yu SY, Wang MY, Haines M, Mulwitz L, Hashish R, Samarawickrame S, Kazadi L, Greendale G, Salem G. Lower-extremity Joint Kinematics in Older Adults Performing the Warrior I Pose of Hatha Yoga. Med Sci Sports Exerc. June 2011; 43(5): S652.

Hashish R, Samarawickrame SD, Wang MY, Yu SY, Salem GJ. Normalized Knee Extensor Strength and TUG Performance in Community Dwelling Older Adults. Physical Therapy June 2011.

Kelly VE, Schang AY, Hashish R, Eastman JR, Shumway-Cook A. Effects of Instructional Prioritization and Task Difficulty on Concurrent Walking and Cognitive Task Performance in Healthy Young Adults. J Neurol Phys Ther. 2008; 32(4): 218.

Selected Lay Presentations / Appearances

Dr. Phil. Episode: Trampled and Traumatized – Astroworld Aftermath. Original Airdate: November 18, 2021.

ID Discovery. Series: Breaking Homicide. Episode: Death at Dawn. Original Airdate: June 24, 2019.

U.S. Airforce. Maxwell Airforce Base. Application of Biomechanics Analyses in Legal Settings. May 13, 2019.

National Association of Criminal Defense Lawyers. The Application of Biomechanics in a Criminal Case. April 6, 2019.

Patents

Exercise System for Shifting an Optimum Length of Peak Muscle Tension

USPTO #: 13/897,618

Modular Shoe Systems and Methods of Using Same

USPTO #: 14/211,639

Co-Inventors: Sachithra D. Samarawickrame, Yuta Hyakusoku

Professional Affiliations

American Society of Biomechanics

American Physical Therapy Association

American Society of Mechanical Engineers

American Society of Civil Engineers

Association for the Advancement of Automotive Medicine

National Association of Traffic Accident Reconstructionists and Investigators

Languages

English

Arabic