

## **Whiplash Traumatology and Treatment: Injury Mechanisms, Neurophysiology, Pain, Special Testing and Treatment**

### **Course Presenter:**

Jason Mazzarella, DC, DAAPM, DCAPM, DAAETS, FIAMA, MVC-FRA, CATSM, CBIS, CMVT, CPM, CDRSC, CDAAC, BSc Kin, BSc HPA

Dr. Jason Mazzarella, the director of the North American Spine Institute has been actively engaged in Whiplash Traumatology and Treatment for the past 19 years. He has developed and lectured on the topics of Whiplash Traumatology and Treatment that were accredited for Chiropractic and Medical continuing education.

Academically, Dr. Mazzarella has reviewed over 20,000 research articles to date on Whiplash Traumatology, Chronic Pain, Crash Forensics, mild Traumatic Brain Injury, has developed and lectured both nationally and internationally on the topics of Whiplash Traumatology and Chronic Pain. His Whiplash Seminar Series (105 credit hours) was taught in 2008-2010 and is the only program on Whiplash ever to be accredited by both the Chiropractic and Medical community. Dr. Mazzarella has developed continuing education programs for the Toronto Police College on Accident Reconstruction, the Ontario Kinesiology Association on Nerve Mobilization, the American Chiropractic Association on Whiplash Traumatology and Treatment and Chronic Pain, McMasters University Medical School on Whiplash and Crash Forensics, and has spoken at numerous Chronic Pain symposiums.

Clinically, Dr. Mazzarella has treated and assessed over 40,000 motor vehicle accident patients and actively runs a Whiplash Traumatology and Chronic Pain treatment center located in Toronto, Ontario Canada. He has been selected as a medical advisor to Allstate Insurance Company to review and make recommendations on the provincial treatment guidelines for Whiplash. He has also been selected as a preferred treatment and assessment provider by Allstate Insurance Company, Pembridge Insurance Company, PAFCO Insurance Company, and Echelon Insurance Company.

Professionally, Dr. Mazzarella was elected as a board member by the Canadian Institute for the Relief of Pain and Disability, elected as a medical board journal review member by the Journal of Anesthesia & Pain Research, qualified as a Medical Expert in Virginia USA, and has appeared on Rogers TV on Daytime Toronto to discuss Physical Medicine Pain Management.

### **Program Contact:**

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## **Course Outline:**

### **Seminar Topics – Tentative Topics 32 Credit Hours (8 credit hours per module)**

#### **Module 1: Motor Vehicle Crash Forensics (10:00 AM to 6:30 PM Greenwich Mean Time (UTC))**

**April 2, 2022, and October 1, 2022**

**Presentation Format – Online – Zoom**

- What is Crash Forensics
- Types of Collision Vectors / PDOF
  - Roll over
- Rear Impact
  - Phases of Injury/Sequence of Events
  - General Crash Times – Kinematic response in msec.
  - Reverse S Curve
  - Neurophysiological consequences
  - Example Live Crash Testing
  - Common Injury Patterns Assessment and Diagnosis
    - Acceleration Deceleration Injury Patterns
- Front Impact
  - Phases of Injury/Sequence of Events
  - Kinematic Response
- Side Impact
  - Phases of Injury/Sequence of Events
  - Kinematic Response Near Side Collision
  - Kinematic Response Far Side Collision
- Special Considerations
  - Elastic vs. Plastic Collisions
  - Human factors affecting injury outcome
  - Force loads acting on the spine
- Accident Risk Factors
  - Acute Risk Factors
  - Late/Chronic Risk Factors
- Accident Reconstruction and Injury
  - ACR it's start in personal injury
  - General objective of ACR
  - ACR and Injury Analysis
  - ACR and court rulings on injury
- Introduction to Event Data Recorders

#### **Module 2: Physical Examination (10:00 AM to 6:30 PM Greenwich Mean Time (UTC))**

**April 9, 2022, and October 8, 2022**

**Presentation Format – Online – Zoom**

- History and Intake
- Relevant Past Medical History
- Physical Examination – Muscle
- Physical Examination – Neurological
  - Trauma Neurology
  - Spinal Cord Hypersensitivity after Trauma
  - Glia Cell Response
  - Brain fMRI studies and pain
  - Receptive Field enlargement
- Consideration of alterations in Endocrine function
  - Hypothalamus controls limbic system and affect on autonomic and endocrine function.

- Hypothalamus role in regulating neuroendocrine and immune response.
- Physical Examination – Vestibular
- Physical Examination – Orthopedic
- Types of Referred Pain
  - Neurotome
  - Angiotome
  - Dermatome
  - Myotome
  - Sclerotome
  - Viscerotomes
- Whiplash Traumatology Associated Common Syndromes/Disorders
  - Thoracic Outlet Syndrome
  - Carpal Tunnel Syndrome
  - Headaches
  - Sacroiliac Joint Injury
  - Vestibular Injury
  - Tinnitus
  - Traumatic Stress - Psychological components of Injury and Pain
  - Memory Acquisition and Storage

**Module 3: Neurophysiology (10:00 AM to 6:30 PM Greenwich Mean Time (UTC))  
 April 16, 2022, and October 15, 2022  
 Presentation Format – Online – Zoom**

- Concussion Injury Mechanisms
  - Coup Counter Coup Injuries
  - Pressure Gradient Injuries
  - Diffuse Axonal Injuries
  - Closed Head Injuries
- Concussion Sub-Types
  - Mild Traumatic Brain Injury
  - Blood Brain Barrier Disruption
  - White Matter Disruption
  - Grey Matter Disruption
  - Head Injury
  - Post-Concussion Syndrome
  - General Cognitive Processing Ability
  - Reduced Cerebral Metabolism
- Neuropathy Injury Mechanisms
  - Human Factors – Steering Wheel
  - Crash Factors – Offset Collision
  - Vehicle Factors – Seatbelt and Airbag
- Traumatic Stress
- Pain Pathophysiology
  - Pain Terminology
  - Pain Pathophysiology
  - Pain Generators
  - Pain Fiber Evaluation and Testing
  - Pain Neurotransmitters
  - Pain Response
    - Inflammation
    - Muscle Guarding/Splinting
    - Altered Biomechanics
  - Digital Algometry Testing
  - Nerve Adhesion Testing

- Biomechanics in Pain Assessment
- Neurophysiological Special Testing
  - Quantitative Electroencephalography (qEEG)
  - Surface Electromyography (sEMG)
  - Electromyography (EMG)
  - Nerve Conduction Velocity (NCV)
    - Motor NCV study
    - Sensory NCV study
  - AMA Guidelines 6<sup>o</sup> Edition Impairment

**Module 3: Treatment and Medicolegal Concepts (10:00 AM to 6:30 PM Greenwich Mean Time (UTC))**

**April 23, 2022, and October 22, 2022**

**Presentation Format – Online – Zoom**

- Vestibular Testing
  - Electronystagmography (ENG)
  - Visual Evoked Potentials (VEP)
  - Somatosensory Evoked Potentials (SEP)
  - Posturography Computerized Testing
  - AMA Guidelines 6<sup>o</sup> Edition Impairment

**Physical Medicine Treatment Options and Protocol**

- Postural Analysis
- Cervical Traction
- Alpha Stimulation
- Photobiomodulation
- Pulsed Radio Frequency
- Neurofeedback
- Biofeedback
- Nutrition
- Spinal Manipulation
- Acupuncture
  - Traditional Chineses Acupuncture
    - C-Fiber / Chronic
  - Auricular Acupuncture
  - fMRI Studies
  - Whiplash Treatment Options
- Electrical Therapy
  -
- Laser Therapy
- Exercise
  - Strengthening
  - Neurokinetic Exercises
  - Muscle Re-Education
  - Vestibular Exercises
  - Nerve Mobilization
- Massage Therapy
  - Lymph Drainage
  - Trigger Point Therapy
  - Counter Rotation
- Medical
  - Opioid Usage
  - Pharmaceuticals
  - Injections

- Trigger Point Injections
    - Nerve Blocks
    - Epidural Steroid Injections (ESI)
    - Botox
    - Radiofrequency Neurotomy (RFN)
  - Surgery
- Complimentary Care Post Rehabilitation
  - Yoga
  - Pilates
- Consequences of Inadequate or Under Treatment

#### Additional Special Testing

- Radiographic Examination
  - Primary Views of Consideration
  - Primary Lines of Measurement
  - Standard of Care – Davis Series
- Videofluoroscopy Examination
- MRI Examination
  - Diffuse Tensor Imaging (DTI)
  - Magnetic Transfer Imaging (MTI)
  - Magnetic Resonance Spectroscopy (MRS)
  - Magnetic Source Imaging (MSI)
  - Functional MRI (fMRI)
  - BOLD fMRI (Blood Oxygen Level Dependent fMRI)
  - Contrast-Enhanced MRI
  - PET (Positron Emission Tomography)
  - Radionuclide Bone Scan
  - SPECT (Single Photon Emission Computed Tomography)
- CT Examination
  - Myelography
- Discography
- Bone Scan
- Thermography
- Regional Cerebral Bloodflow Perfusion Examination
- POCUS US
  - Angiography and Color-Coded Duplex Sonography (CCDS)
  - Muscular Evaluation

#### Sample Assessment and Report Writing – MedLegal

- Sample report review
  - Documentation
  - Intake and Examination Forms
  - Outcome Assessments
  - Report Writing for Success
  - Medical Review and Rebuttals
  - Example Rebuttal Reports.
  - What I learned as a Preferred Provider for Allstate.

#### **Background Reading:**

1. Fox S, Croft A: Whiplash Injuries: The Cervical Acceleration / Deceleration Syndrome. Lippincott Williams & Wilkins Nov 1, 1995.

Thank you,  
**Dr. Jason Mazarella, D.C.**

Doctor of Chiropractic  
Director North American Spine Institute  
Medical Advisor Crawford and Company Canada  
Elected Board Member – Canadian Institute for the Relief of Pain and Disability 2013  
Elected Medical Board Peer Review – Journal of Anesthesia and Pain Management 2019  
International Post Graduate Lecturer - Medical curriculum on Crash Forensics, Whiplash Traumatology and the Biopsychosocial Model of Pain  
International Post Graduate Lecturer - Chiropractic curriculum on Crash Forensics, Whiplash Traumatology and the Biopsychosocial Model of Pain  
Graduate Lecturer Accident Reconstructionist - Occupant Kinematics, Injury Biomechanics and Crash Forensics  
Diplomate American Academy of Integrative Pain Management 2018  
Diplomate American Academy of Pain Management 2011 and 2016  
Diplomate Canadian Academy of Pain Management 2011  
Diplomate American Academy of Experts in Traumatic Stress 2010  
Fellowship International Academy of Medical Acupuncture 2006  
Registered Acupuncturist CTCMPAO 2014  
Certification Motor Vehicle Trauma 2011  
Certification Pain Management 2010  
Certification Acute Traumatic Stress Management 2011  
Certification Motor Vehicle Crash – Forensics Risk Analysis 2006  
Certification Brain Injury 2009  
Certificate Whiplash and Brain Traumatology 2005  
Advanced Certificate of Competency Whiplash and Brain Traumatology 2011  
NBCE Certified Physiotherapy Competency 2005  
BSc. Kinesiology Movement Science 2001  
BSc. Health Policy and Administration 2001  
Crash Data Retrieval System Operators (Technician) Certification 2012  
Crash Data Analysis and Application Certification 2013  
Certification Accident Investigation 2011  
Certification Accident Investigation and Reconstruction Level 2 2012  
Certification Accident Investigation and Reconstruction Level 3 2013