

**LAWRENCE STROUD NORDHOFF, JR., D.C., Q.M.E., A.C.T.A.R.**  
**ACTAR Accredited Traffic Accident Reconstructionist #1185**  
**Injury Biomechanics, Diagnosis, Management, and Prognosis**  
**4133 Mohr Avenue, Suite F, Pleasanton, CA 94566-4750**  
**Office (925) 484-2167, Fax (925) 484-8443**

**Curriculum Vitae**  
**Date: October 01, 2009**

**FORMAL EDUCATION**

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| D.C., Doctor of Chiropractic, Life Chiropractic College West, San Lorenzo, California, cum laude. California License No. 16654. | 1984 |
| B.S., California State University Hayward, California. Major: Physical education (kinesiology program option).                  | 1980 |

**POST-GRADUATE MEDICAL EDUCATION**

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|---|-----|-------|
| • Injuries/injury biomechanics/ crash dynamics/crashes /management/diagnosis/disability/prognosis | 544 | Hours |
| • Orthopedics and neurology   | 526 | Hours |
| • Spinal adjusting techniques   | 131 | Hours |
| • Radiology   | 82  | Hours |
| • Disability-Impairment   | 134 | Hours |

**PROFESSIONAL EXPERIENCE-CHIROPRACTIC**

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| • Pleasanton, California. Active Practice      | 1987 to present |
| • San Francisco, California. Active Practice   | 1984 to 1987    |
| • Managed about 3,500 trauma cases since 1984. | 1984 to present |

**PROFESSIONAL EXPERIENCE-HOSPITAL**

I have worked in several civilian and military hospitals, and have worked in orthopedic wards, neurology wards, intensive care, surgery, general medicine, emergency room, coronary care, and as an ambulance driver. I have made many casts and splints for various musculoskeletal injuries and disorders. I have had extensive training and experience with spinal sprain/strain injuries and fracture management. I had personal treatment experience with approximately 5,000 trauma cases from 1971 to 1984.

**EDITORIAL BOARD POSITION**

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| Editorial Board: Journal of Whiplash and Related Disorders. Haworth Medical Press. | 2004 |
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**CERTIFICATIONS**

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|---|------|
| • ACTAR #1185. (Accreditation Commission for Traffic Accident Reconstruction)   | 2001 |
| • Completed the 300 hour post-graduate Chiropractic orthopedic program through the Los Angeles College of Chiropractic, Whittier, California. | 1993 |
| • Qualified Medical Evaluator, California, QME License No: 919382.  | 1992 |
| • Licensed Vocational Nurse, California.  | 1975 |
| • Emergency Medical Technician, National.   | 1974 |
| • Ambulance Driver, California.   | 1973 |
| • Cast Room Technician, U.S. Navy.  | 1971 |
| • Hospital Corpsman, U.S. Navy; with honorable discharge.   | 1971 |

### **CURRENT ORGANIZATION MEMBERSHIP**

- Association for the Advancement of Automotive Medicine; member. 2004
- California Association of Accident Reconstruction Specialists; member. 2000
- Society of Automotive Engineers; member. 1997

### **TEACHING EXPERIENCE. BIOMECHANICS-RECONSTRUCTION**

- Presentation: Human Volunteer Testing in Rear-End Impacts: Historical and Current Biomechanical Perspectives. International Whiplash Trauma Congress. June 3, 2006, Portland, Oregon. Review of 50 years of human subject testing. 2006
- Instructor for 20 hour module III for Texas A&M University System, Texas Engineering Extension Services, Accident Reconstruction Course on Automotive and Medical Review of Literature pertaining to Low-Speed Crashes. This March course reviewed biomechanical literature pertaining to rear-end crashes. 2000
- Co-instructor for Module III. Texas A&M University, August 19-20, 2000. Focus on human linear and angular velocity and acceleration studies. 2000

### **RELICENSURE-CONTINUING EDUCATION SPEAKER**

Dr. Nordhoff currently provides ongoing relicensure seminars (MCLE and CE credits) in the United States and Canada to chiropractors on the topics of:

- Motor Vehicle Collision Injuries. Seminar topics (typically 12 hours) include vehicle and occupant dynamics, crash speeds and injury risk, injury biomechanics in frontal, side, and rear-end crashes, human and vehicle factors influencing injury severity and outcome. Topics include; mild head injuries, cervical-dorsal-lumbar strains/sprains, hip, shoulder, disc injuries, and upper and lower extremity injuries. Includes research on treatment options, evidence-based medicine, documentation, history taking, examination protocols, radiographic protocols, diagnosis, disability, and prognosis. Record keeping and documentation issues are discussed.

### **SEMINAR SPEAKER FOR HOSPITALS/MEDICAL SOCIETIES**

- Biomechanics and Accident Reconstruction. Workshop held on November 19, 2005, at the Hilton, in San Francisco. American Back Society and Saint Mary's Medical Center.
- Accident Reconstruction with Biomechanical and Photographic Analysis, Including Commentaries on Low-Speed Collisions. Taught 4 workshops at the December 10-12, 1998. American Back Society and Saint Mary's Regional Medical Center.
- Speaker for Canadian Society of Medical Evaluators in Toronto, Canada on Nov 6-7, 1998 with another speaker; Tom Szabo, Seminar Titled "Low-Speed Impacts."
- Panelist-Speaker at Saint Francis Memorial Hospital, San Francisco, California on Sept 18, 1997, titled "Controversies in Spine Management."
- Motor Vehicle Collision Injuries: The Biomechanics of Spinal Injury, Diagnosis, and Medical and Chiropractic Management. Taught 2 workshops at the December 10-13, 1997. The American Back Society and the Stanford University School of Medicine, in San Francisco; titled "Diagnosis and Treatment of Neck and Back Pain."
- Motor Vehicle Collision Injuries: Mechanisms, Diagnosis, Imaging, in addition to Medical and Chiropractic Management. Taught 2 workshops at the December 12-14, 1996. The American Back Society and Saint Mary's Spine Center co-sponsored this symposium in San Francisco titled "Diagnosis and Treatment of Back Pain."

### **PAST TEACHING EXPERIENCE-CHIROPRACTIC COLLEGE**

Part-time faculty at Life Chiropractic College West, Hayward, California. Dr. Nordhoff taught courses in emergency care, diagnosis, and neurology. 1989 to 2000

### **POST-GRADUATE COLLEGE FACULTY-SEMINARS FOR RELICENSURE**

- Life Chiropractic College West, San Lorenzo, California. 1992
- Western States Chiropractic College, Portland, Oregon. 1995

### **TYPES OF CRASHES OBSERVED WITH HUMAN TEST SUBJECTS**

Dr. Nordhoff has personally analyzed/observed a total of 74 vehicle impacts at various courses that have used human volunteers. All of these impacts had living human test volunteers sitting in the vehicles being impacted. All vehicles tested were instrumented for velocity and delta-V determination. About two-thirds of the tests involved instrumented subjects. All testing had video analysis and some tests had high speed video analysis done. Dr Nordhoff has personally observed in-line rear, off-center rear, over- and underride rear-end crashes, unaware versus aware occupants, effects of braking at low-speed collisions on human acceleration, out-of-position occupants, side crashes, side swipes, curb impacts, and moderate to high speed frontal crashes with air bag deployment with an instrumented occupant. All crashes provided pre-crash and post-crash vehicle inspections for damage. Vehicle isolator testing used for reconstruction purposes..

### **OTHER EDUCATION RELATING TO MOTOR VEHICLE COLLISIONS**

- Human Factors for Traffic Crash Reconstruction, Sacramento California. Instructor: Jeff Muttart. This 5-day course focused on driver perception, response and reaction times for night and daytime driving. Other topics included: lighting, glare, head lamp types, and evaluating driver responses to path intrusions, intersections, lead vehicles, and frontal crashes. Driver decision making factors based from studies were covered and included effects of age, distractions, experience, alcohol, fatigue, heights of vehicles, clothing contrast of pedestrians, and crash scene topography and complexity. 2009
- ARC-CSI Crash Conference, June 2-5, Las Vegas. This four day seminar included a full day of crash tests (vehicle-vehicle crashes, bus impact into a passenger car, pedestrian impacts with a passenger car, motorcycle with dummy rider impacting a side of a vehicle, and PIT maneuvers). Lecture topics included: Momentum and kinetic energy analysis, human factors, motorcycle crash analysis, pedestrian crash analysis, photogrammetry, PIT reconstruction, and rollover analysis. 2008
- Intersection Collisions. Light controls at intersections. One-day seminar taught at Vacaville PD. Sponsored by the California Association of Accident Reconstruction Specialists. Instructor: Chris Kauderer. Topics included nomenclature and types of signals, traffic signals (timing/phasing diagrams and detectors), pedestrian phases, and human factors (perception-reaction times). 2008
- Bicycle Collision Investigation and Reconstruction Dynamics. CAARS one-day seminar sponsored by the Vallejo Police Dept. on Jan 9, 2008. Instructor Roman Beck. 2008
- Crash Data Retrieval (CDR) Technician and Data Analysis Courses. Four day seminar at Vallejo PD on August 7-10, 2006 through Collision Safety Institute. Instructor: Rusty Haight. Technician course focused on how to extract data properly, safely, and in a format that is able to reconstruct a collision event. The data analysis portion covered the EDR components, interpretation skills, and understanding the data in reconstructing collisions. 2006
- Child Restraint Systems. One-day course on 07-19-06 in Vacaville by CAARS. Instructor Karen Haverkamp, a NHTSA trainer. Covered FMVSS 208, 212, and 225 regarding seatbelts and child restraints. Provided information about safety and installation. 2006

## EDUCATION CONTINUED

- Injury Scaling: Uses and Techniques. The 2005 Abbreviated Injury Scale (AIS). Two-day course was held in Banff, Canada on March 20-21, 2006. This course focused on the history of injury scaling, scales relating to body regions, extracting and interpreting injury information from medical charts, coding rules, and how to calculate Injury Severity Scores (ISS). Sponsor: Association for the Advancement of Automotive Medicine. 2006
- Santa Rosa CAARS Conference (3 days) on Motorcycle Investigation and Reconstruction. Focus on design, tire marks, crush patterns, rider habits, brake systems, helmets and injuries, vehicle code laws, lane sharing, perception-reaction time, formulas, physics and crash testing. Crashed series of motorcycle crashes into vehicles and did skid testing. 2004
- Evaluating crashes for injury potential. Two-day ARC-CSI Las Vegas conference. Course evaluated types of injuries seen in collisions and the biomechanical aspects of trauma. Six rear-end crashes were performed with an occupant in the bullet and target vehicles with delta-V's of target vehicle in the 1.5 to 4.9 mph range. Evaluated instrumented male/female occupants for effects of bracing and braking on acceleration profiles. Did driver front airbag, side airbag, and seatbelt retractor deployment in field tests. 2004
- ARC-CSI Crash Conference. Las Vegas. Four-day conference. Topics included crash testing perspectives, retrieval systems, passenger car & commercial vehicle Event Data Recorder (EDR) systems, using crash data, crush measuring protocols, seatbelts, airbag, and pretensioner systems, types of seatbelts, & momentum analysis. Did 6 crash tests, 2 into barrier without human and 4 crashes with human in moderate speed range in vehicle-to-vehicle crashes. Analyzed on-board EDR systems to other crash measuring systems. Analyzed airbag deployments. 2004
- Los Medanos College, Pittsburg, California. Computer Aided Diagramming course for collision scenes for traffic accident reconstructionists. This was a 40-hour Post Certified course held at the Contra Costa Law Enforcement Training Center, Martinez. 2003
- Los Medanos College, Pittsburg, California, Traffic Accident Reconstruction, Certified by the California Commission on Peace Officer Standards and Training. This 80-hour POST course included determining speed from crush, conservation of kinetic energy and momentum, perception reaction time, time-distance analysis, heavy duty/articulated vehicle collisions, and occupant-vehicle dynamics. 2001
- Los Medanos College, Pittsburg, California, Advanced Traffic Accident Investigation, Certified by the California Commission on Peace Officer Standards and Training. This 80-hour POST certified course included field site measurements and crush measurements. Also studied scale accident diagrams, time-distance analysis, photography, pedestrian and motorcycle crashes, vehicle damage factors, perception reaction time, time distance analysis, and environmental factors. 2001
- University of California, Riverside, California. Intermediate Collision Investigation: Skidmark Analysis. This 40-hour course included momentum, kinetic energy, scene investigation, perception reaction time, time distance analysis, and field skid testing of an 18-wheel truck, motorcycle, muni bus, and several cars. This course was held at the San Jose Police Department. 2000
- Texas A&M University and Spine Research Institute of San Diego, California. Three day seminar at the United States Naval Training Center included 16 crashes, including 10 low speed rear-end crashes, one high speed (Vc 36 mph) rear-end crash, side swipe, one 90 degree side, and 4 crashes involving rear-end (backing into) to side of another vehicle. All vehicles and occupants were instrumented with analyzed with high speed video (500 frames per second). 1999
- University of California Riverside. Principles of Investigating Low-Speed Impacts. 40 hour course. Did series of 18 crashes with instrumented vehicles, with 17 rear-end crashes and one being a side crash. 1998

## EDUCATION CONTINUED

- Texas A&M University. Low Speed Collision Analysis. 40-hour course. Did series of 10 low-speed impacts with instrumentation to occupants and vehicles. Did underride and override crashes, offset and direct rear-end, dump truck, and curb impacts. Taught by Szabo, Haight, and Welcher. 1998
- Completed Traffic Accident Reconstruction and Vehicle Dynamics courses through Northwestern University Traffic Institute, Evanston, IL. Northwestern Instructors held courses at the San Jose Police Department. Studied mathematics and physics, motion and skid analysis, heavy truck crashes, motorcycle crashes, kinetic energy and momentum, human and vehicle factors, perception reaction time, and determining speed from crush. 1997
- Attended a 36-hour course at MacInnis Engineering in Vancouver, Canada. Did actual series of 6 low-speed rear-end and 4 side crashes and 4 high-speed crashes in various vectors. Did analysis of bumpers, isolators, delta-V, crush, skid marks, and computer reconstruction using PC-Crash. 1997
- Analyzed a series of 6 low-speed instrumented rear-end crashes in Banff, Canada with MacInnis Engineering (Mark Bailey instructor). 1995

## BOOK REVIEWER FOR SOCIETY OF AUTOMOTIVE ENGINEERS

Dr Nordhoff consulted to provide two book reviews (Pedestrian Injuries and Motorcycle Crashes) for the Society of Automotive Engineers in 1996.

## PUBLICATIONS

- Nordhoff LS, Freeman MD, and Siegmund GP, eds. Human Subject Crash Testing: Innovations and Advances. SAE, PT-134, Society of Automotive Engineers, Warrendale, PA, 2007.
- Nordhoff LS. Motor Vehicle Collision Injuries: Biomechanics, Diagnosis, and Management, Second Edition. Jones and Bartlett Publishers, 2005. Has contributions from 7 MD's and 6 DC's.
- Nordhoff LS and Oppenheim EB. Deposition and Trial Questions: Vehicle Injury Litigation. Litigation One Publishing, Tustin, CA. 2003. This binder is no longer in print.
- Nordhoff LS. Cervical Spine Injury Biomechanics in Low-Speed Rear-End Crashes. In Bryans R, editor for Canadian Chiropractic Association, Whiplash Committee, Whiplash: A Practitioner's Guide to Understanding Whiplash Associated Disorders (WAD), 2001.
- Nordhoff LS. Cervical Trauma Following Automobile Crashes. In Murphy DR, editor, Conservative Management of Cervical Spine Syndromes, McGraw-Hill Co, New York, 2000.
- Nordhoff LS. Mechanics of Low Speed Rear-End Motor Vehicle Collisions. In Murphy DR, editor, Conservative Management of Cervical Spine Syndromes, McGraw-Hill Co, 2000.
- Nordhoff LS. Whiplash Module for Masters Program, Los Angeles College of Chiropractic, 1998.
- Nordhoff LS. Motor Vehicle Collision Injuries: Mechanisms, Diagnosis, and Imaging in addition to Medical and Chiropractic Management. American Back Society (ABS) in association with The Saint Mary's Spine Center. Symposium on the Diagnosis and Treatment of Back Pain: The Next Level. San Francisco, Dec 11-14, 1996. Published in ABS Newsletter, Winter/Spring issue, page 15.
- Nordhoff LS. Motor Vehicle Collision Injuries: Mechanisms, Diagnosis, and Management. 1996, Aspen, Maryland. This book was reviewed favorably by a medical doctor in the December 1996 issue of the New England Journal of Medicine. Dr Nordhoff wrote chapters on diagnosis, history and examination, management, soft tissue healing, disability, prognosis, medicolegal reports, collision dynamics, injury tolerance and injury factors.