

Exponent®
Engineering & Scientific Consulting

William Newberry, P.E.

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Professional Profile

Mr. Newberry's experience is in the biomechanics of traumatic injury and human injury tolerance. He specializes in vehicle occupant dynamics and vehicle occupant protection system performance.

Mr. Newberry has more than 25 years of experience in the biomechanical analysis of occupant kinematics and trauma in motor vehicle accidents. He also analyzes matters of injury causation to determine whether a particular event presents the required mechanism and loading for a particular injury or pathology.

Mr. Newberry has analyzed a wide array of trauma resulting from various events including motor vehicle accidents, bicycle accidents, falls, recreational accidents, workplace accidents, and improper use of consumer products. He has evaluated injury mitigation and injury prevention as it relates to vehicle occupant protection systems, as well as the use of protective equipment such as helmets. Mr. Newberry's research in vehicle rollover includes the study of occupant kinematics, restraint system performance, including rollover-deployed curtain airbags and seatbelt pretensioners, as well as the performance of vehicle roof structures. His efforts in these areas involve computational modeling, component-level testing, and full-scale rollover testing.

In addition, Mr. Newberry has performed research involving occupant kinematics, kinetics, and response strategies in off-road vehicles during operation and during tip-over events. For more than five years, Mr. Newberry was based in Exponent's Test and Engineering Center in Phoenix, Arizona where he conducted various testing using anthropomorphic test dummies (ATDs) including full-scale automotive crash and sled testing.

Academic Credentials & Professional Honors

M.S., Mechanics, Michigan State University, 1996

B.S., Mechanical Engineering, Michigan State University, 1993

SAE Forest R. McFarland Award, 2009

SAE Arch T. Colwell Merit Award, 2006

Tau Beta Pi

40th Stapp Car Crash Conference Student Paper Award

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Licenses and Certifications

Professional Engineer, Michigan, #6201062065

Professional Engineer Mechanical, Texas, #150530

Professional Affiliations

Association for the Advancement of Automotive Medicine—AAAM (member)

American Society of Mechanical Engineers—ASME (member)

Society of Automotive Engineers—SAE (member)

Past-Chair of the Occupant Protection Committee, Society of Automotive Engineers

National Society of Professional Engineers

Michigan Society of Professional Engineers

Publications

Heller M, Sharpe S, Newberry W, Dibb A, et al. Occupant kinematics and injury response in steer maneuver-induced furrow tripped rollover testing. SAE International Journal of Transportation Safety 2015; 3(2). doi:10.4271/2015-01-1478.

Newberry W, Imler S, Carhart M, Dibb A, et al. Belted occupant kinematics and head excursion during the airborne phase of vehicle rollover: Evaluation of the effects of rollover-deployed curtain airbags. SAE Technical Paper 2014-01- 0527, 2014, doi:10.4271/2014-01-0527.

Newberry W, Carhart M, Larson R, Bridges A, Fowler G. Biomechanics of occupant responses during recreational off-highway vehicle (ROV) riding and 90-degree tip-overs. SAE Technical Paper 2012-01-0096. SAE International Journal of Passenger Cars - Mechanical Systems 2012; 5(1): 2012. doi:10.4271/2012-01-0096.

Baumer T, Passalacqua N, Powell J, Newberry W, Smith W, Fenton T, Haut R. Age-dependent fracture characteristics of rigid and compliant surface impacts on the infant skull—A porcine model. Journal of Forensic Science 2010; 55(4):993-997.

Rundell SA, Isaza J, Day JS, Guillory S, Newberry WN, Kurtz SM. The importance of posterior muscle strength and facet contact in preventing lumbar disc herniation during forward bending, Student Paper Competition Finalist; Proceedings of the ASME 2010 Summer Bioengineering Conference (SBC2010), Naples FL, June 16-19, 2010.

Heller MF, Newberry WN, Smedley JE, Eswaran S, Croteau JJ, Carhart MR. Occupant kinematics and injury mechanisms during rollover in a high strength-to-weight ratio vehicle. 2010 Society of Automotive Engineers (SAE) World Congress, SAE 2010-01-0516.

Passalacqua NV, Fenton TW, Powell BJ, Baumer TG, Newberry WN, Haut RC. A forensic pathology tool to predict pediatric skull fracture patterns, Part 2: Fracture quantification and further investigations on infant cranial bone fracture properties. Presented at the American Academy of Forensic Sciences 62nd Annual Meeting, Seattle, WA, 2010.

Baumer T, Passalacqua N, Powell J, Newberry W, Smith W, Fenton T, Haut R. Age-dependent fracture characteristics of rigid and compliant surface impacts on the infant skull—A porcine model. J Forensic

Sciences 2009, in press.

Beaudoin B, Smyth B, Hoover R, Newberry W, Peterson D. Restraint load marks in sled testing conducted with the Hybrid III 3-year-old and 6-year-old dummies. 2008-01-1239, SAE 2008 World Congress, Society of Automotive Engineers, Warrendale, PA, 2008.

Prange M, Newberry W, Moore T, Peterson D, Smyth B, Corrigan CF. Inertial neck injuries in children involved in frontal collisions: Sled testing using the 6-year-Old ATD. Proceedings, ASME Summer Bioengineering Conference, Abstract No. 176671, Keystone, CO, June 20-24, 2007.

Ashby B, Lai W, Carhart M, Newberry W, Weaver B, Corrigan C. Compressive neck preloading during the airborne phase of vehicle rollover. 2007-01-0377, SAE 2007 World Congress, Society of Automotive Engineers, Warrendale, PA, 2007.

Prange M, Newberry W, Moore T, Peterson D, Smyth B, Corrigan CF. Inertial neck injuries in children involved in frontal collisions. 2007-01-1170, SAE 2007 World Congress, Society of Automotive Engineers, Warrendale, PA, 2007.

Newberry, W, Lai W, Carhart M, Richards D, Brown J, Raasch C. Modeling the effects of seat belt pretensioners on occupant kinematics during rollover. SAE 2006-01-0246, SAE 2006 World Congress, Society of Automotive Engineers, Warrendale, PA, 2006 [2006 SAE Arch T. Colwell Merit Award Winner].

Fisher JL, Newberry WN, Krishnan R, Pierce J, Moore TLA. Late-phase occupant rebound after rear-end impact. Proceedings, ASME Summer Bioengineering Conference, Abstract 188080, Vail, CO, June 22-26, 2005.

Newberry W, Carhart M, Lai W, Corrigan C, Croteau J, Cooper E. A computational analysis of the airborne phase of vehicle rollover: Occupant head excursion and head-neck posture. SAE 2005-01-0943, SAE 2005 World Congress, Society of Automotive Engineers, Warrendale, PA 2005.

Lai W, Ewers B, Richards D, Carhart M, Newberry W, Corrigan C. Evaluation of human surrogate models for rollover. SAE 2005-01-0941, SAE 2005 World Congress, Society of Automotive Engineers, Warrendale, PA, 2005.

McElhaney J, Newberry W. Biomedical aspects of helmet design. Proceedings, 4th World Congress of Biomechanics, Calgary, Alberta, August 2002.

Werner S, Newberry WN, Fijan RS, Winter M. Modeling of bicycle rider collision kinematics. SAE Technical Paper Series, 2001-01-0765, SAE 2001 World Congress, Society of Automotive Engineers, Warrendale, PA, March 2001.

Ewers BJ, Newberry WN, Haut RC. Chronic softening of cartilage without thickening of underlying bone in a joint trauma model. Journal of Biomechanics 2000; 33:1689-1694.

Newberry WN, Garcia JJ, Mackenzie CD, Decamp CE, Haut RC. Analysis of acute mechanical insult in an animal model of post-traumatic osteoarthrosis. Journal of Biomechanical Engineering 1998; 120:704-709.

Atkinson PJ, Newberry WN, Atkinson TS, Haut RC. A method to increase the sensitive range of pressure sensitive film. Journal of Biomechanics 1998; 31:855-859.

Newberry WN, Haut RC. Subchondral bone thickening is not necessary for the degradation of cartilage in an animal model of post-traumatic osteoarthrosis. Proceedings, 45th Meeting of the Orthopaedic Research Society, 755, 1999.

Haut, R, Newberry, W, Mackenzie, C. Post-traumatic osteoarthrosis of the knee in subfracture

experiments in an animal. Proceedings, 3rd World Congress of Biomechanics, 148a, 1998.

Ewers BJ, Newberry WN, Garcia JJ, Haut RC. Alterations in the mechanical properties of bone underlying articular cartilage in a traumatized joint. Proceedings, 44th Meeting of the Orthopaedic Research Society, 459, 1998.

Oyen-Tiesma M, Newberry WN, Haut RC. Anti-arthritis drug helps mitigate early changes in a traumatized joint. Proceedings, 44th Meeting of the Orthopaedic Research Society, 461, 1998.

Newberry WN, Garcia JJ, Ewers BJ, Haut RC. Post-traumatic osteoarthrosis is dependent on impact-induced stresses in cartilage and bone. Proceedings, 44th Meeting of the Orthopaedic Research Society, 1998.

Newberry WN, Garcia JJ, Altiero NJ, Haut RC. A padded impact interface alters the stress state in subchondral bone and subsequent chronic remodeling in an in vivo animal model of post-traumatic osteoarthrosis. 8th Injury Prevention Through Biomechanics Symposium, Vol. 8, pp. 103-115, 1998.

Ewers BJ, Newberry WN, Garcia JJ, Orth MW, Haut RC. Early diagnosis, possible treatment, and etiology of osteoarthritis due to blunt impact of the rabbit patellofemoral joint. 8th Injury Prevention Through Biomechanics Symposium, Vol. 8, pp. 117-127, 1998.

Newberry WN, Mackenzie CD, Haut RC. Blunt impact causes changes in bone and in cartilage in a regularly exercised animal model. Journal of Orthopaedic Research 1998; 16:348-354.

Newberry WN, Zukosky DK, Haut RC. Subfracture insult to a knee joint causes alterations in bone and in the functional stiffness of overlying cartilage. Journal of Orthopaedic Research 1997; 15:450-455.

Newberry W, Garcia JJ, Altiero NJ, Haut RC. Post-traumatic osteoarthrosis--A stress-based criterion. 7th Injury Prevention Through Biomechanics Symposium, Vol. 7, pp. 75-84, 1997.

Oyen-Tiesma M, Newberry WN, Haut RC. Interventions for post-traumatic osteoarthrosis. 7th Injury Prevention Through Biomechanics Symposium, Vol. 7, pp. 65-73, 1997.

Garcia JJ, Newberry WN, Atkinson PJ, Haut RC, Altiero NJ. Comparison of stresses in human and rabbit knees as they pertain to injuries observed during impact experiments. Advances in Bioengineering, ASME, pp. 315-316, 1997.

Newberry WN, Haut RC. The effects of subfracture impact loading on the patellofemoral joint in a rabbit model. 40th Stapp Car Crash Conference, SAE paper 962422, p. 149, 1996.

Atkinson P, Newberry W, Staton T, Garcia J, Altiero N, Haut R. Animal and human studies on injury mechanisms during blunt insult to the knee. 6th Injury Prevention Through Biomechanics Symposium, Vol. 6, pp. 137-160, 1996.

Newberry WN, Haut RC. Regular, low-intensity joint loading accelerates a post-traumatic osteoarthrosis in the rabbit patello-femoral joint. Proceedings, 16th Annual Meeting of the Society for Physical Regulation in Biology and Medicine, Vol. 16, pp. 32-33, 1996.

Newberry WN, Zukosky DK, Haut RC. Blunt trauma to a joint produces surface damage to cartilage with subsequent changes in subchondral bone. Proceedings 41st Meeting of the Orthopaedic Research Society, 749, 1996.

Newberry WN, Shelp DE, Coles AX, Haut RC. Chronic alterations in the physiologically relevant properties of cartilage after mechanical insult. Proceedings 40th Meeting of the Orthopaedic Research Society, 383, 1995.

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Newberry W, Atkinson P, Li X, DeCamp C, Altiero N, Haut R. Tissue injuries resulting from blunt impact on the knee. 5th Injury Prevention Through Biomechanics Symposium, Vol. 5, pp. 21-39, 1995.

Newberry WN, Shelp DE, Atkinson PJ, Haut RC. The effect of temperature on the mechanical response of intact and scarified articular cartilage. Advances in Bioengineering. ASME, BED-28:73-74, 1994.

Shelp D, Newberry W, Li X, Dalimonte R, DeCamp C, Altiero N, Haut R. Tissue damage resulting from blunt impact on the knee: Animal and cadaver studies. 4th Injury Prevention Through Biomechanics Symposium, Vol. 4, pp. 43, 1994.

Additional Education & Training

Forensic Analysis of Medical Records in Injury Biomechanics and Accident Reconstruction Studies, SAE 2007.

Vehicle Accident Reconstruction Methods, SAE, 2006.

Northwestern University Center for Public Safety - Traffic Crash Reconstruction, 2011