

**WILSON C. "TOBY" HAYES, Ph.D.**  
**PROFESSIONAL QUALIFICATIONS AND EXPERIENCE**

*Contact Information*

President/CEO

Hayes+Associates, Inc.

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*Summary of Expertise*

Dr. Wilson C. "Toby" Hayes is a preeminent authority on the biomechanics of injury, with more than 60 years of experience in academic research and forensic consulting. As the former Maurice Edmond Mueller Professor of Biomechanics at Harvard Medical School, Professor at the Harvard-MIT Division of Health Sciences and Technology, and faculty member at the University of Pennsylvania and Stanford University, his laboratories were continuously funded by the NIH, CDC, and NSF to define the foundational principles of skeletal mechanics, injury causation, and fracture risk. His work has been recognized with the highest awards in his field, including the Kappa Delta Award from the American Academy of Orthopaedic Surgeons and the Giovanni Borelli Award from the American Society of Biomechanics. In 2022, the Beth Israel Deaconess Medical center at Harvard named The Wilson C. Hayes Distinguished Lecture Series in Musculoskeletal Health in his honor.

As President and Founder of Hayes+Associates, Inc., Dr. Hayes applies this unparalleled expertise to provide clear, scientifically-grounded answers on injury causation for legal and commercial clients. His practice focuses on the biomechanical analysis of vehicle collisions, premises safety, products liability, and criminal matters.

**CORE PRACTICE AREAS**

- Vehicle Collisions
- Premises Safety
- Slips & Falls
- Products Liability
- Worker Safety
- Sports & Recreation
- Patent Litigation
- Criminal Matters



## PROFESSIONAL CONSULTING PRACTICE

*Founder, President & Principal (1998–Present)*

Hayes+Associates, Inc., Corvallis, OR

Expert witness and consulting firm focused on the biomechanical causation of injuries in vehicular, industrial, premises, and product-related incidents. Provides expert analysis, accident reconstruction, and litigation support.

## REPRESENTATIVE OUTCOMES

- **\$36 Million Award (Products Liability / Vehicle Collisions):** Contributed analysis helping to show a manufacturing defect in a 2001 Nissan Xterra was responsible for a paralyzing injury.
- **\$30.9 Million Award (Products Liability / Sports & Recreation):** Provided analysis for a case involving a woman severely injured by a high-performance speedboat.
- **\$4.5 Million Award (Products Liability / Worker Safety):** Analysis contributed to a plaintiff award in a case involving a falling forklift.
- **Not Guilty Verdict (Criminal Matters):** Conducted testing and analysis of police baton impact forces that contributed to a "not guilty" verdict for a defendant in Salem, OR.

## KEY ACADEMIC APPOINTMENTS & LEADERSHIP

- **Maurice Edmond Mueller Professor of Biomechanics,** Harvard Medical School (1988–1998)
- **Professor of Biomechanics,** Harvard-MIT Division of Health Sciences and Technology, Massachusetts Institute of Technology (1983–1998)
- **Vice Provost for Research,** Oregon State University (1998–2001)
- **Professor & Vice Chair for Research,** Department of Orthopaedics, Oregon Health & Sciences University (1998–2004)
- **Founder & Director,** Orthopaedic Biomechanics Laboratory, Beth Israel Hospital, Harvard Medical School (1979–1998)
- **Associate Professor,** Department of Orthopaedic Surgery, University of Pennsylvania (1976–1979)
- **Assistant Professor,** Dept. of Mechanical Engineering and Division of Orthopaedic Surgery, Stanford University (1971–1976)

## EDUCATION & POSTDOCTORAL TRAINING

- **Ph.D., Theoretical and Applied Mechanics,** Northwestern University (1970)
- **M.S., Mechanical Engineering,** Stanford University (1966)
- **B.S., Mechanical Engineering,** Stanford University (1964)



- **Postdoctoral Fellow**, Karolinska Institute, Stockholm, Sweden (NIH Special Research Fellow)
- **Postdoctoral Fellow**, Laboratory for Experimental Surgery, Davos, Switzerland

#### SELECTED HONORS & AWARDS

- **The Wilson C. Hayes Distinguished Lecture Series**, Harvard Medical School (2022–Present)
- **Giovanni Borelli Award**, American Society of Biomechanics (1995)
- **American Academy of Orthopaedic Sports Medicine Research Award** (1983)
- **Kappa Delta Award**, American Academy of Orthopaedic Surgeon's (1981)
- **Research Career Development Award**, National Institutes of Health (1978–1983)

#### NATIONAL SCIENTIFIC LEADERSHIP & REVIEW

- **Committee Member/Reviewer**: National Institutes of Health (NIH) Study Sections; Centers for Disease Control and Prevention (CDC) Injury Research Grant Review; U.S. Surgeon General's Workshop on Health Promotion and Aging
- **Founding Co-Editor-in-Chief**, *Journal of Orthopaedic Research* (1983–1995)
- **Scientific Advisory Board**, Harborview Injury Prevention & Research Center (2005–2006)

#### PROFESSIONAL SOCIETY MEMBERSHIPS

- Society of Automotive Engineers (SAE)
- Association for the Advancement of Automotive Medicine (AAAM)
- Human Factors and Ergonomics Society (HFES)
- Orthopaedic Research Society (ORS)
- American Society of Biomechanics (ASB)
- American Society of Mechanical Engineers (ASME)

#### TESTIMONY & LITIGATION EXPERIENCE

Dr. Hayes has extensive experience providing deposition and trial testimony in state and federal courts nationwide on matters of injury causation, accident reconstruction, products liability, and criminal conduct.

#### KEY PEER-REVIEWED PUBLICATIONS

- Power, E.D., Bauer, J.J., Hayes, W.C.: Reconstruction of a shooting incident to determine position of shooter and timing of each shot fired. **Ann For Res Anal** 5(1): 105, 2018.
- Lee, E.L., Lee, P.J., Hayes, W.C.: Head accelerations in out-of-position postures in low speed rear impacts... **SAE Int** 2014-01-0490: 1-7. 2014.
- Lee, E.L., Lee, P.J., Erickson, M.S., Hayes, W.C.: Increase in vehicle front, rear, and side stiffness

coefficients in the past twenty years... **SAE Int** 2014-01-0351: 1-6, 2014.

- Erickson M.S. and Hayes, W.C.: Drag factor attenuation for rotating vehicles. **Accid. Reconstr. J.** 18(3): 19-23, 2008.
- Hayes, W.C., Erickson, M. S., Power, E. D., Forensic injury biomechanics. **Annu. Rev. Biomed. Eng.** 9(1): 55-86, 2007.
- Hayes, W.C., Myers, E.R., Robinovitch, S.N., et al.: Etiology and prevention of age-related hip fractures. **Bone**, 18:77S-86S, 1996.
- Greenspan, S.L., Myers, E.R., Maitland, L.A., Resnick, N.M., and Hayes, W.C.: Fall severity and bone mineral density as risk factors for hip fracture in ambulatory elderly. **JAMA**, 271: 128-133, 1994.
- Hayes, W.C., Myers, E.R., Morris, J.N., et al.: Impact near the hip dominates fracture risk in elderly nursing home residents who fall. **Calcif. Tissue Int.**, 52: 192-198, 1993.
- Robinovitch, S.N., Hayes, W.C., and McMahon, T.A.: Prediction of femoral impact forces in falls on the hip. **J. Biomech. Eng.**, 113: 366-374, 1991.
- Shea, M., Edwards, W.T., White, A.A., and Hayes, W.C.: Variations of stiffness and strength along the human cervical spine. **J. Biomech.**, 24: 95-107, 1991.
- Lotz, J.C. and Hayes, W.C.: The use of QCT to estimate risk of fracture of the hip from falls. **J. Bone Joint Surg. [Am]**, 72: 689-700, 1990.
- McBroom, R.J., Hayes, W.C., Edwards, W.T., et al.: Prediction of vertebral body compressive fracture using quantitative computed tomography. **J. Bone Joint Surg. [Am]**, 67: 1206-1214, 1985.
- Huberti, H.H. and Hayes, W.C.: Patellofemoral contact pressures: The influence of Q-angle and tendo-femoral contact. **J. Bone Joint Surg. [Am]**, 66: 715-724, 1984.

#### KEY PATENTS

- **Increasing bone fracture resistance by repeated application of low magnitude forces...** U.S. Patent 5,752,925, 1998.
- **Bone fracture prevention garment and method.** U.S. Patent 5,599,290, 1997.
- **Bone fracture prevention method.** U.S. Patent 5,545,128, 1996.
- **Bioerodible polymers for drug delivery in bone.** U.S. Patent 5,286,763, 1994.
- **Intramedullary nailing method and apparatus.** U.S. Patent 5,100,404, 1992.

