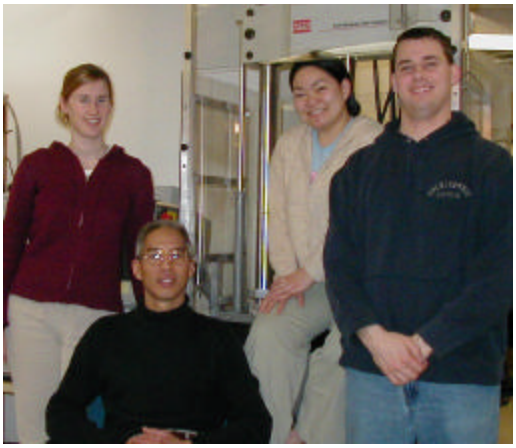
Applied Biomechanics Laboratory

Department of Orthopaedics and Sports Medicine



The mission of the Applied Biomechanics Laboratory at the University of Washington is the academic advancement of orthopaedic biomechanics knowledge for injury prevention and clinical management applications. The evaluation of intact, injured, and pathologic musculoskeletal conditions using biomechanical engineering principles and techniques underlies our experimental and computational research endeavors. Along with exploring the mechanisms and mechanics of musculoskeletal conditions and developing improved injury prevention strategies, the laboratory actively engages in the education and training of students in performing high-quality independent biomechanical research.

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Currently, the research focus of the ABL is on the characterization of the mechanical properties and failure tolerance of the developing cervical spine. Although much data exist for the adult male population, there is a paucity of information for small women and children which are needed to improve motor vehicle occupant protection and to establish neck injury safety criteria. This work is being funded by the Department of Transportation (National Highway Traffic Safety Administration), the Centers for Disease Control (National Center for Injury Prevention and Control), and the U.S. Air Force Research Laboratory (Wright-Patterson AFB). Other industry-sponsored research projects include the evaluation and development of various orthopaedic implants ranging from prosthetic intervertebral discs to new total hip replacement components.

Selected Publications

Ching RP, Carter JW, Raynak GC, Nuckley DJ, Mirza SK, Chapman JR, Tencer AF. Transient and Post-Traumatic Measurement of Cervical Spinal Canal and Neuroforaminal Deformation: Potential Mechanisms for Neurologic Injury. In: N. Yoganandan and e. al., Frountiers in Head and Neck Trauma: Clinical and Biomechanical. ed. Washington, D.C.:IOS Press Ohmsha, 1998:232-253.

Ching RP, Watson NA, Carter JW, Tencer AF. The Effect of Post-Injury Spinal Position on Canal Occlusion in a Cervical Spine Burst Fracture Model. Spine 1997;22:1710-1715.

Carter J, Mirza S, Tencer A, Ching R. Canal Geometry Changes Associated with Axial Compressive Cervical Spine Fracture. Spine 2000;25:46-54.

Raynak GC, Nuckley DJ, Tencer AF, Ching RP. Transducers for Dynamic Measurement of Spine Neural-Space Occlusions. Journal of Biomechanical Engineering 1998;120:787-91.

Nuckley DJ, Konodi MA, Raynak GC, Ching RP, Mirza SK. Effect of Normal Range of Motion on Cervical Spine Neural Space Integrity. Spine 2001;(in review).

Ching RP, Tencer AF, Anderson PA, Daly CH. Comparison of Residual Stability in Thoracolumbar Spine Fractures Using Neutral Zone Measurements. Journal of Orthopaedic Research 1995;13:533-541.