

APPLIED BIOMECHANICS

Curriculum Vitae

Brian J. Doherty, Ph.D.

Summary

Biomedical Engineer, specializing in biomechanics, impact injury and human tolerance, accident reconstruction and mechanical engineering. Experienced in head and spine injuries, implanted orthopedic devices, and bioengineering. Specific expertise in mechanical response to injury and traumatic failure of the cervical and lumbar spine.

Education

Ph.D., Biomedical Engineering, Duke University, Durham, North Carolina, 1990

M.S., Biomedical Engineering, Duke University, Durham, North Carolina, 1986

B.S.E., Bioengineering, with a concentration in Mechanical Engineering, University of Pennsylvania, Philadelphia, Pennsylvania, 1984

Professional Experience

- Senior Engineer
Applied BioMechanics, Alameda, California, 1999 – present
- Senior Biomechanical Engineer
FTI / Anamet, Hayward, California, 1994 – 1999
- Mathematical Statistician, Acting Informatics Chief
VA Hospital, Palo Alto, California, 1994 – present
- Assistant Professor
Department of Biomedical Engineering, University of Northern California, Petaluma, California, 1995 – present
- Research Bioengineer/Research Assistant Professor
Department of Orthopedic Surgery, Baylor College of Medicine, Houston, Texas, 1990 – 1995

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- Research Bioengineer
The Methodist Hospital, Houston, Texas, 1990 – 1993
- Research Assistant
Duke University, Durham, North Carolina, 1984 – 1990
- Graduate Research Fellow
Armstrong Aerospace Medical Research Laboratory, Modeling Division, Wright-Patterson Air Force Base, Ohio, Summer 1986
- Research Assistant
University of Pennsylvania, Philadelphia, PA, 1983 – 1984

Professional Honors

Best Paper, Annual Meeting of the Orthopedic Trauma Association, 1992

Research Prize, 19th Annual meeting of the Cervical Spine Research Society, 1991

Siegel Research Award, 35th Stapp Car Crash Conference, 1991

Siegel Research Award, 32nd Stapp Car Crash Conference, 1988

U.S. Air Force Summer Research Fellowship, 1986

Duke University Research Fellowship, 1984 – 1990

National Merit Scholarship, 1980 – 1984

Training and certification

CXLT – English XL tribometer certified

CDR Analyst – Crash Data Recorder trained

Peer Review Activities

Participant in journal article review process for *Journal of Biomechanics* and *Spine*.

Contributed several “Point of View” commentaries for *Spine*.

Patents

Hold two issued patents and one patent pending, surgical devices for internal fixation of the spinal column. Two patents assigned to a major international medical devices company, where commercial development is currently underway.

Grants Received

“Bone Grafting of Osseous Defects: The Effect of Delayed Grafting on Bone Healing.” (Co-PI with R.W. Lindsey), funded by Dove Grant for Orthopedic Research, The Methodist Hospital, 1994

“The Variation in Segmental Bone Mineral Density in the Cervical Spine.” (Co-PI with R. W. Lindsey), funded by AO/ASIF Research Commission, 1994.

“Biochemical and Biomechanical Investigation of *Ligamentum Flavum* Properties in Adolescent Idiopathic Scoliosis Patients.” (Co-PI with N.A. Hadley), funded by the Shriner’s Hospital Research Fund; 1993-1994.

“The Effects of Bone Mineral Density on the Quality of Cervical Spine Plate Fixation.” (Co-PI with R.W. Lindsey), funded by AO/ASIF Research Commission, 1993.

“The Use of Anatomic Landmarks in Intraoperative Radiography.” (Co-PI with R.W. Lindsey), funded by Ace Medical Company, 1993.

“A Biomechanical Study of Odontoid Fracture,” funded by The Methodist Hospital Foundation; 1992

Selected Publications

Heggeness, M.H. and Doherty, B.D. “Morphologic Study of Lumbar Vertebral Osteophytes.” *South Med J* 91, No. 2, 1998.

Roberts, D.A., Doherty, B.J. and Heggeness, M.H. “Quantitative Anatomy of the Occiput and the Biomechanics of Occipital Screw Fixation.” *Spine* 23, No. 10, 1998.

Breeze, S.W., Doherty, B.J., Noble, P.S., LeBlanc, A. and Heggeness, M.H. “A Biomechanical Study of Anterior Thoracolumbar Screw Fixation.” *Spine* 23, No. 17, 1998.

Beckner, M.A., Heggeness, M.H. and Doherty, B.J. “A Biomechanical Study of Jefferson Fractures.” *Spine* 23, No. 17, 1998.

- Heggeness, M.H. and Doherty, B.J. "The Trabecular Anatomy of Thoracolumbar Vertebrae: Implications for Burst Fractures." *Journal of Anatomy* 191, 1997.
- Esses, S.I., Doherty, B.J., Crawford, M.J. and Dreyzin, V. "Kinematic evaluation of lumbar fusion techniques." *Spine* 15, No. 21, 1996.
- Curylo L., Lindsey, R.W., Doherty, B.J. LeBlanc A. "Segmental Variations of Bone Mineral Density in the Cervical Spine." *Spine* 1996 Feb 1;21(3):319-22.
- Smith, S.A., Lindsey, R.W., Doherty, B.J. and Dickson, J.H. "An In Vitro Biomechanical Comparison of the Orosco and Cervical Spine Locking Plate." *J. Spinal Disorders*, Vol. 8, No. 3, pp 220-223, 1995.
- Lindsey, R.W., Fenison, A.T., Doherty, B.J., Law, P. and LeBlanc, A. "Effects of Retained Diaphyseal Plates on Forearm Bone Density and Grip Strength." *Journal of Orthopedic Trauma*, Vol. 8, No. 6, pp 462-467, 1994.
- Lindsey, R.W., Diliberti, T., Doherty, B.J., and Watson, A.B. "Efficacy of Radiographic Evaluation of the Cervical Spine in Emergency Situations." *Southern Medical Journal* 86, No. 11, 1993.
- Kumar, A., Kozak, J.A., Doherty, B.J., and Dickson, J.H. "Interspace Distraction and Graft Subsidence Following Anterior Lumbar Fusion with Femoral Strut Allograft." *Spine* 18, No. 16, 1993.
- Leggon, R., Lindsey, R.W., Doherty, B.J., Alexander, J.W., and Noble, P.C. "The Holding Strength of Cannulated Screws Compared to Solid Core Screws in Cortical and Cancellous Bone." *Journal of Orthopedic Trauma* 7, No. 5, 1993.
- Sasso, R., Doherty, B.J., Crawford, M.J., and Heggeness, M.H. "Biomechanics of Odontoid Fracture and Fixation. Comparison of the One and Two Screw Technique." *Spine* 18, No. 14, 1993.
- Heggeness, M.H. and Doherty, B.J. "The Trabecular Anatomy of the Axis." *Spine* 18, No. 14, 1993.
- Heggeness, M.H. and Doherty, B.J. "Discography Causes Endplate Deflection." *Spine* 18, No. 16, 1993.
- Doherty, B.J., Heggeness, M.H., and Esses, S.I. "A Biomechanical Study of Odontoid Fractures and Fracture Fixation." *Spine* 18, No. 2, 1992.

Myers, B.S., McElhaney, J.H., Nightingale, R.W., and Doherty, B.J. "The Influence of End Conditions on Human Cervical Spine Injury Mechanisms and the Use of a Single Cervical Injury Criterion." *Proc. of the 35th Stapp Car Crash Conference*, 1991.

Myers, B.S., McElhaney, J.H., Doherty, B.J., Paver, J.G., and Gray, L. "The Role of Torsion in Cervical Spine Trauma." *Spine* 16, No. 8, 1991: 870-874.

Myers, B.S., McElhaney, J.H., and Doherty, B.J. "The Viscoelastic Responses of the Human Cervical Spine in Torsion: Experimental Limitations of Quasi-Linear Theory, and a Method of Reducing These Effects." *Journal of Biomechanics* 24, No. 9, 1991: 811-817.

McElhaney, J.H., Doherty, B.J., Paver, J.G., Myers, B.S., and Grey, L. "Flexion, Extension, and Lateral Bending Responses of The Cervical Spine." *AGARD Meeting on Neck Injury in Advanced Military Aircraft Environments*, Munich, 1989.

Doherty, B.J., and Paver, J.G. "Mathematical Modeling of the Hybrid III Manikin Head-Neck Structure." *Mathematical and Computer Modeling* 11, 1988:430.

McElhaney, J.H., Doherty, B.J., Paver, J.G., Myers, B.S., and Grey, L. "Combined Bending and Axial Loading Responses of the Human Cervical Spine." *SAE Transactions*. No. 881709, 1988.

Stamato, T., Weinstein, R., Peters, B., Hu, J., Doherty, B.J., and Giaccia, A. "Delayed Mutation in Chinese Hamster Cells." *Somatic Cell and Molecular Genetics* 13, No. 1, 1987:57-66.

Doherty, B.J., and Paver, J.G. "A Computer Simulation of the Hybrid II Manikin Head-Neck System." *SAFE Journal*. 17(4) Winter, 1987.

Presentations – Abstracts Published

Doherty, B.J. and Heggeness, M.H. "The Role of Facet Angle Asymmetry in Fractures of the First Cervical Vertebra," SAE International Congress, Detroit MI, 1997.

Lindsey, R.W. Curylo, L., Doherty, B.J. and LeBlanc, A. "Segmental Variations of Bone Mineral Density in the Cervical Spine," Proc., 10th Annual Meeting, North American Spine Society, 1995.

Beckner, M., Heggeness, M.H. and Doherty, B.J. "Segmental Variations of Bone Mineral Density in the Cervical Spine," Proc., 10th Annual Meeting, North American Spine Society, 1995.

Smith, S.A., Lindsey, R.W., Doherty, B.J., Alexander, J.W. and Dickson, J.H. "In Vitro Biomechanical Testing of the Cervical Spine Locking Plate," Proc. 7th Annual Meeting of North American Spine Society, 1992.

Heggeness, M.H. and Doherty, B.J. "Discography Causes Endplate Deflection," Proc. 7th Annual Meeting of North American Spine Society, 1992.

Kumar, A., Kozak, J.A., Doherty, B.J. and Dickson, J.H. "Interspace Distraction and Graft Subsidence Following Anterior Lumbar Fusion with Femoral Strut Allograft," Proc. 7th Annual Meeting of North American Spine Society, 1992.

Doherty, B.J., Heggeness, M.H. and Esses, S.I. "The Biomechanical Study of Occipital Cervical Fixation," Proc. 26th Annual Meeting, Canadian Orthopedic Research Society, 1992.

Doherty, B.J., Heggeness, M.H. and Esses, S.I. "A Biomechanical Study of Odontoid Fractures and Fracture Fixation," Proc. 26th Annual Meeting, Canadian Orthopedic Research Society, 1992.

Doherty, B.J. "A Mechanical Basis for Evaluation of Spine Trauma," Proc., Orthopedic Research Society, 1992.

Doherty, B.J. "A Viscoelastic Model of Lumbar Spinal Responses to Complex Loads," Proc. Orthopedic Research Society, 1992.

Lindsey, R.W., Diliberti, T., Babinski, C. Doherty, B.J. and Watson, A.B. "The Efficacy of Radiographic Evaluation of the Cervical Spine in the Emergency Setting," Proc. 7th Annual Meeting, North American Spine Society, 1992.

Smith, S.A., Lindsey, R.W., Doherty, B.J., Alexander, J.W. and Dickson, J.H. "In-Vitro Biomechanical Testing of the Cervical Spine Locking Plate," Proc. 7th Annual Meeting, North American Spine Society, 1992.

Kumar, A., Doherty, B.J., Kozak, J.A. and Dickson, J.H. "Interspace Behavior following Femoral Strut Allograft Anterior Lumbar Fusion," Proc. 7th Annual Meeting, North American Spine Society, 1992.

Heggeness, M.H. and Doherty, B.J. "Discography Causes End Plate Deflection," Proc. 7th Annual Meeting, North American Spine Society, 1992.

Doherty, B.J. and Heggeness, M.H. "The Quantitative Anatomy of the Atlas," Proc. Cervical Spine Research Society, 1992.

Doherty, B.J. "A Biomechanical Basis of Evaluation of Cervical Spine Trauma," Orthopedic Trauma Association, 1991.

Doherty, B.J., McElhaney, J.H. and Myers, B.S. "Combined Bending and Axial Loading Responses of the Human Lumbar Spine," First World Congress on Biomechanics, 1990.

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