JOHN FISKE BROWN
ASSOCIATES, INC.
Forensic Engineers

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05/2010

JACK CARL DEBES, Ph.D.

TECHNICAL AREA OF SPECIALIZATION: BIOMECHANICS

- Biomechanics/Human Kinetics
- Injury Causation Analysis
- Accident Reconstruction
- Biomaterials and Implant Design

PROFESSIONAL EXPERIENCE

- **Biomechanical Engineer, John Fiske Brown Associates, Inc. (1998 - present)**
  - -Forensics
  - -Expert Witness
  - -Consulting

- **Physics Instructor, Adjunct Faculty, DeVry University, San Diego, CA (2009)**
  - -Undergraduate Physics

- **Manager of Research, INTERPORE-CROSS, Irvine, CA (1994 – 2001)**
  - -Biomedical research and development in orthopaedics and dentistry
  - -Management of in-house research projects and staff
  - - Management of collaborative research projects (primarily at universities)
  - - Technical development of:
    - -Advances in existing products
    - -Invention of new products
    - - Identification of new technologies
  - -Adherence to regulatory guidelines:
    - -ISO 9001
    - -GMP
    - -FDA
  - -Science and Engineering advisor
  - -Scientific Education of sales force

PROFESSIONAL EXPERIENCE (Cont.)

. **Visiting Scholar, University of California, San Diego, Department of Surgery, Plastic Surgery Laboratory (April 1994 - 1999)**

-Biology of Bone Graft Substitutes and Dental Implants

-Histology and Histomorphometry using techniques of:

-Scanning Electron Microscopy

-Light Microscopy

-Digital Image Processing

. **Post Doctoral Research Associate, Biomedical Engineering Center, Purdue University (1992-1994)**

-Tissue Engineering research on biological graft materials

-Biomechanics of materials:

-vascular

-skin and other soft tissues

-orthopaedic (bone, tendons, ligaments)

-Supervision of undergraduate student research

. **Visiting Assistant Professor, Department of Mechanical Engineering, Purdue University (Spring 1993)**

-Instructor for undergraduate mechanics course

. **Ph.D. Dissertation, *The Mechanical Properties of Pulmonary Arteries and Parenchyma* (1988 - 1992)**

-Soft tissue biomechanics and biomaterials

-Material testing using unique biaxial testing apparatus

-Design and development of torsion testing device for soft tissues

-Application of continuum mechanics and mathematics

-F.E.M. (NIKE/DYNA) for large deformation and complex geometries

-Application of software: LabTech Notebook, Kaleidagraph, Excel, StatWorks, MathCad, Microsoft Word

-FORTRAN programming for curve fitting of strain energy functions

-Machine shop experience fabricating custom fixtures to facilitate experiments

- Supervision of three undergraduate students

-Knowledge of physiology and anatomy to facilitate communication between Engineers and Medical Doctors

-Animal handling and surgery for experiments in biomechanics

. **Consultant, Advanced Tissue Sciences, Inc., La Jolla, CA (1990-1992)**

-Tissue Engineering of artificial skin substitute for burn patients

-Experimental design for material testing.

PROFESSIONAL EXPERIENCE (Cont.)

. **Research Assistant, University of California, San Diego, Scanning Cytometry Lab (1991-1992)**
- Design and development of prototype cell culture chamber
- Fluid mechanics coupled with strength of materials analysis

. **Research Assistant, University of California, San Diego, Burn Center (1990-1991)**
-Performed experiments, statistical analysis of data, technical report writing

EDUCATION

- **Ph.D.** University of California, San Diego, Bioengineering, 1992
- **M.S.** University of California, San Diego, Bioengineering, 1988
- **B.S.** University of California, San Diego, Bioengineering, 1987

CONTINUING EDUCATION

-**Aftermarket Components & the EDR / EDR Discrepancies, Stiffness Data Research & Calculations, Experts & Lawyers in the Courtroom,** Southwestern Association of Technical Accident Investigators, November 2009
-**Biomechanical Analysis of Rollover, Seat Belts in Rollover, MADYMO, Rollover Crash Test,** Southwestern Association of Technical Accident Investigators, July 2009
-**Critical Speed Yaws, Rotational Mech., Pole Impact, Airborne Vehicles,** Southwestern Association of Technical Accident Investigators, November 2008
-**Current Trends in Pedestrian Accident Reconstruction,** Southwestern Association of Technical Accident Investigators, July 2008
-**Applications of Momentum Analysis, Event Data Recorders, Rollover Collisions,** Southwestern Association of Technical Accident Investigators, November 2007
-**Heavy Trucks, Air Brakes, Low Speed Bumper Impacts,** Southwestern Association of Technical Accident Investigators, July 2007
-**Motorcycle Injuries & Biomechanics, Helmet Tests & Standards,** Southwestern Association of Technical Accident Investigators, July 2006
-**Pedestrian, Motorcycle and Bicycle Accident Reconstruction,** Southwestern Association of Technical Accident Investigators, November 2005
-**Automotive Crash Testing and Crush Analysis,** Southwestern Association of Technical Accident Investigators, July 2005
-**Pedestrian and Bicycle Collisions,** Southwestern Association of Technical Accident Investigators, March 2005

CONTINUING EDUCATION (CONT.)

-**Commercial Vehicle Post-Collision Mechanical Inspections / Commercial Vehicle Standards & Rules / Commercial Vehicle Event Data Recorders,**
Southwestern Association of Technical Accident Investigators, November 2004
- The Role of Human, Vehicle and Environmental Factors in Traffic Accident Cases, L&J Accident Reconstruction & Litigation Seminar, 2001
- Accidental Injury: Biomechanics & Prevention, UCSD School of Medicine, 1999

AWARDS AND CERTIFICATIONS

Accreditation Commission for Traffic Accident Reconstruction
National Institute of Health Trainee Fellowship
Engineer-in-Training, State of California

PUBLICATIONS

The Mechanical Properties of Pulmonary Parenchyma and Arteries, J.C. Debes. Ph.D. Dissertation, University of California, San Diego (Faculty Advisor Y.C. Fung) 1992.

Effect of Temperature on the Biaxial Mechanics of Excised Lung Parenchyma of the Dog, J.C. Debes and Y.C. Fung. *J. Appl. Physiol.* 73(3):1171-1180, 1992.

Development of a Device for Measuring Adherence of Skin Grafts to the Wound Surface, C. Dong, E. Mead, R. Skalak, Y.C. Fung, J.C. Debes, R.L. Zapata-Sirvent, C. Andree, G. Greenleaf, J.F. Hansbrough. *Annals of Biomedical Engineering*, 21(1):51-55, 1993.

Effect of Chronic Thromboembolism on the Pulmonary Artery Pressure-Flow Relationship in Dogs, M.A. Olman, R.Z. Gan, R.T.Yen, I. Villespin, R. Maxwell, C. Pederson, R. Konopka, J. Debes, K.M. Moser. *J. Applied Physiol.* 76(2):875-81, 1994.

New Experiments on Shear Modulus of Elasticity of Arteries, S.X. Deng, J. Tomioka, J.C. Debes, Y.C. Fung. *American Journal of Physiology 266 (Heart and Circulatory Physiology 35):*H1-H10, 1994.

Biaxial Mechanics of Excised Canine Pulmonary Arteries, J.C. Debes, Y.C. Fung. *Amer. J. Physiol.* 269 (*Heart Circ. Physiol.* 38): H433-H442, 1995.

Structure-Function Relationships for a Coralline Hydroxyapatite Bone Substitute, S.M. Haddock, J.C. Debes, E.A. Nauman, K.E. Fong, Y.P. Arramon, T.M. Keaveny, *J. Biomed. Matls. Res.*, 47, 71-78, 1999.

PUBLICATIONS (Cont.)

A Restitution Constant, J. Debes, W. Walsh, K. Obenski, *Accident Investigation Quarterly*, Fall 2001, pp. 22-24.

Hydroxyapatite/Calcium Carbonate (HA/CC) Vs. Plaster of Paris: A Histomorphometric, Radiographic, and Biomechanical Comparison in a Rabbit Tibial Defect Model, A. Jamali, A. Hilpert, J. Debes, P. Afshar, R. Holmes. *Calcified Tissue International*, 71(2):172-8, 2002.

A Resorbable Porous Ceramic Composite Bone Graft Substitute in a Rabbit Metaphyseal Defect Model, W.R. Walsh, P.J. Chapman-Sheath, S. Cain, J. Debes, W.J.M. Bruce, M.J. Svehla, R.M. Gillies. *Journal of Orthopaedic Research*, 21(4): 655-661, 2003.

In Vivo Evaluation of Resorbable Bone Graft Substitutes in a Rabbit Tibial Defect Model, D. Stubbs, M. Deaken, P. Chapman-Sheath, W. Bruce, J. Debes, R.M. Gillies, and W.R. Walsh. *Biomaterials*, 25(20): 5037-44, 2004.

STRESS, J.C. Debes and L.L Wickham, *The Wiley Encyclopedia of Biomedical Engineering, 2006.*

Motorcycle Accident Reconstruction and Litigation, Fourth Edition, K.S. Obenski, P.F. Hill, E.S. Shapiro, J.C. Debes, Lawyers and Judges Publishing Co., 2007.

ABSTRACTS AND POSTERS

Tear Strength Properties of a Novel Cultured Dermal Tissue Model, R. Cohen, M. Zimber, J.F. Hansbrough, Y.C. Fung, J.C. Debes, R. Skalak. *Annals of Biomedical Engineering*, 19(5):600, 1991.

Mechanical Properties of Poly Vinyl Alcohol Hydrogel Tube, H. Morikawa, T. Hirai, J.C. Debes, M. Sakurai, M. Nakazawa. *Biorheology* 29(1):151, 1992.

In Vivo Method for Measuring Strain in Tendon Grafts, J.C. Debes, M.C. Hiles, K. Kokini, S.F. Badylak. *Keystone Conference on Tissue Engineering*, Keystone, CO, 1994.

Load Bearing and Motion in Anterior Plated Cervical Fusion Using Coralline Hydroxyapatite, A.F. Tencer, J.C. Debes. *Meeting of the Orthopaedic Trauma Assoc.*, Sept. 29-Oct. 1, 1995, Poster #61, Tampa, FL, also *Orth. Res. Soc.*, 1996 meeting.

ABSTRACTS AND POSTERS (Cont.)

New Method for Bone Loss Measurement Adjacent to Interpore Intramobile Cylinder (IMZ) Dental Implants, J.C. Debes, E.C. Shors, Q. Nguyen, C. Nguyen, J. Hernandez, C. Babbush. Abstract and Presentation, *International Dental Implant Symposium*, pp. 74-75, San Diego, CA, Nov. 17-18, 1995.

Bone Loss Adjacent to Interpore Intramobile Cylinder (IMZ) Implants - Patient Data, C. Babbush, J.C. Debes, E.C. Shors, Q. Nguyen, C. Nguyen, J. Hernandez. Abstract and Presentation, *International Dental Implant Symposium*, pp. 76-77, San Diego, CA, Nov. 17-18, 1995.

Resorption of Calcium Carbonate Implants in the Rabbit Tibia: A Comparison of Calcite and Aragonite, A.P. Hilpert, R.W. Curran, J.C. Debes, C.J. Calhoun, E.C. Shors, R.E. Holmes. Abstract and Poster, 1197 Meeting of the *Biomedical Engineering Society,* San Diego, CA, Oct. 1997.

Comparison of Bone Ingrowth, Resorption, and Biomechanics of Porous Resorbable Ceramic and Plaster of Paris Pellets in a Rabbit Tibia Model, J.C. Debes, A. Jamali, P. Afshar, R. Curran, E. Shors, A. Hilpert, R. Holmes, 45th Orthopaedic Research Society Meeting, Feb. 1-4, 1999, Anaheim, CA.

Tissue Engineering of Bone Grafts, Debes, J.C. BED-Vol. 42, pp. 263-64, Bioengineering Conference, ASME, 1999.

Effect of a Hydroxyapatite Layer Thickness on Bone Ingrowth in Resorbable Porous Ceramics, Chapman-Sheath, P., Russel, J., Cain, S., Debes, J., Svehla, M., and Walsh, W. 47th Orthopaedic Research Society Meeting, Feb. 25-28, 2001, 0186, San Francisco, CA.

Bone Ingrowth and Resorption in a Calcium Sulfate/Resorbable Porous Ceramic Composite, Walsh, W., Chapman-Sheath, P., Russel, J., Cain, S., and Debes, J. 47th Orthopaedic Research Society Meeting, Feb. 25-28, 2001, 1039, San Francisco, CA.

Film is Cheap. Claims can be Expensive! Debes, J.C., The Adjuster, Vol. 2, Nov. 2001, pp.13-14, San Diego Insurance Adjusters Association, also published in Forensic Expert Witness Association Newsletter, p.3, Winter 2004, also published in the San Diego Daily Transcript, Forensic Consultants Association Newsletter, December 14, 2005.

Calcium Sulfate Bone Graft Substitutes: Slurry Vs. Pellet Form, Chapman-Sheath, P., Walsh, W., Debes, J., Svhela, M., Russel, J. 48th Orthopaedic Research Society Meeting, Feb. 10-13, 2002, 0732, Dallas, TX.

ABSTRACTS AND POSTERS (Cont.)

Letter to the Editor: Comment on Article by Batterman & Batterman, *Delta-V, Spinal Trauma, and the Myth of the Minimal Damage Accident*, Jack C. Debes, Journal of Whiplash & Related Disorders, Vol. 2, No.1, pp. 77-80, 2003.

Letter to the Editor: Watch Your Engines, Jack C. Debes and Lori L. Wickham, Mechanical Engineering, Vol. 126, No. 5, p. 8, June 2004.

Letter to the Editor: Vehicle Mass Revisited, Jack C. Debes, Mechanical Engineering, Vol. 131, No. 8, p.10, August 2009.

PRESENTATIONS

Advanced DBM-Based and Synthetic Biomaterials for Composite Bone Grafting, Isotis Orthobiologics, Grand Rounds, Riverside Regional Medical Center, January 2006.

History of Bone Grafting, Isotis Orthobiologics, National Sales Meeting, Las Vegas, NV, October 2005.

Whiplash! San Diego Forensic Consultants Association, September 2001.

Bone Grafting Options and Substitutes, 19th International Symposium on Bone Growth Factors and Substitutes, Educational Design / Interpore-Cross, June 2001.

DOCTORAL THESIS REVIEW COMMITTEE

University of New South Wales, Australia
Orthopaedic Research Laboratory
Outside Reviewer for students of Professor William Walsh, Ph.D.:

The Effects of Polyethylene Wear Debris and Oestrogen Deficiency on Fracture Healing in a Rodent Model, R. E. Rajaratnam, 2005.

Testing Composites of Hydroxyapatite and Poly(L-Lactic Acid) for a Potential Role as a Bone Substitute, R. Stanford, 2001.

PATENTS

Porous Biomaterials and Methods for their Manufacture
(US Patent No. 6,376,573), E.W. White, J.C. Debes, C.J. Harris, E.C. Shors.

PROFESSIONAL SOCIETY MEMBERSHIPS

Forensic Consultants Association, San Diego County, CA (Vice President, 2004-2006)
Forensic Expert Witness Association, Orange County, CA
American Society of Mechanical Engineers
Biomedical Engineering Society
American Physiological Society
Orthopaedic Research Society
Southwestern Association of Technical Accident Investigators
Society of Automotive Engineers