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11/2010

**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**

- Monte Carlo Analysis in Crash Reconstruction, Vehicle Off-Tracking, Advanced Digital Photography, Garmin GPS in Heavy Trucks**, Southwestern Association of Technical Accident Investigators, November 2010
- Safety in Mass Production Vehicles, Pedestrian Safety, EDR Data from Non-CDR Supported Vehicles, Crash Test**, Southwestern Association of Technical Accident Investigators, July 2010
- 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

## CONTINUING EDUCATION (CONT.)

- 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
- 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.

## **PUBLICATIONS (Cont.)**

**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. Mats. Res.*, 47, 71-78, 1999.

**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. Zimmer, 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., Svehla, M., Russel, J. 48<sup>th</sup> 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**, 19<sup>th</sup> 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  
American Society of Mechanical Engineers  
Biomedical Engineering Society  
American Physiological Society  
Orthopaedic Research Society  
Southwestern Association of Technical Accident Investigators  
Society of Automotive Engineers