

OCPM

RESEARCH UPDATE

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WELCOME FIRST YEAR STUDENTS!

Drs. Carroll and Yavuz would like to take this opportunity to welcome this year's incoming class. At OCPM, we encourage student participation in research conducted by the faculty. Proposals are submitted to companies for support in various areas of research. In addition, the Research Department is actively submitting applications for grant support. Dr. Carroll is seeking support to evaluate the biological fixation of pyrolytic carbon that has been textured by exposure to atomic oxygen. Dr. Yavuz is applying for federal support from the NIH for two different projects: 1) to investigate plantar shear stresses in diabetic patients, and their relevance to foot ulcers, and 2) to investigate plantar loading patterns in diabetic patients over time. Please refer to future editions of the OCPM Research Update for reports on the status of funding for these and other faculty projects that interested students may participate in.

EPIFLO WOUND HEALING STUDY TO BEGIN SHORTLY

A randomized controlled trial (RCT) to evaluate the effectiveness of the EpiFlo sustained delivery O₂ therapy on wound healing will begin shortly. OCPM has been approved by a central IRB to participate as a site in this multicenter study. In the next two weeks, the Site Initiation Visits will be conducted, after which enrollment of subjects can begin. Dr. Caldwell serves as the Principal Investigator (PI) on this study, while Dr. Carroll is the Study Coordinator (SC). The full-time clinical faculty members are all participating as Sub-Investigators.

OCPM ACFAS STUDENT CHAPTER CONDUCTS RESEARCH ON FIXATION STAPLE

Members of the OCPM ACFAS student chapter are conducting research on the BioPro Memory Compression Staple for the fixation of osteotomies. The staple is activated at body temperature, upon which the legs of the staple pull inward to secure the fixation. Student doctors Gina Baze, Tiffany DeLutis and Danielle Malin are completing research, funded by the APMSA, on the fixation of the Lapidus procedure using the memory staple. Dr. Chiunda is working with these students to test the following fixations: 1) one dorsal staple, 2) one dorsal staple and one medial staple, and 3) one dorsal staple and one medial-plantar staple. In addition, the ACFAS student chapter, under the guidance of Dr. DeMore, has received approval from the OCPM Research Committee to conduct research on the analysis of pressure and contact area between two bone segments with unicortical and bicortical staple fixation. The results from this research will be presented as a poster at the 2010 annual meeting of ACFAS. We are very proud of the research that has been, and continues to be, conducted by the ACFAS student chapter!

DRS. YAVUZ AND HETHERINGTON PUBLISH TWO ARTICLES

Drs. Yavuz and Hetherington, along with other investigators, have recently published two articles in the prominent biomechanics journals; Gait & Posture and Journal of Biomechanical Engineering. The paper that has appeared in the August 2009 issue of Gait & Posture discusses the potential benefits of plantar shear distribution in hallux valgus patients. The other paper reports on the use of artificial intelligence methods in predicting local plantar shear forces and it has appeared in the September issue of the Journal of Biomechanical Engineering. Plantar shear stresses are thought to play a major role in the pathology of diabetic ulcers and to date there is no commercial system that can assess these mechanical factors. Dr. Yavuz hopes that the use of artificial neural networks and fuzzy logic models along with a number of technological parameters will lead to accurate prediction of plantar shear stresses. If this mission is accomplished, we will better understand why diabetic ulcers occur and we may save a significant number of limbs through the use of better designed therapeutic footwear.

DR. YAVUZ AND RESEARCH TEAM PRESENT TWO POSTERS AT DIABETIC LIMB SALVAGE CONFERENCE

Dr. Yavuz and his research team have presented two posters at the Diabetic Limb Salvage Conference organized by the Georgetown University Hospital in Washington DC this September. The accepted abstracts are titled; "Do shear reducing diabetic insoles really reduce plantar shear forces?" and "Is there an association between temperature increase and tri-axial loading under the foot?" The significance of plantar shear stresses and their relevance to diabetic ulcer and callus formation have been demonstrated by Dr. Yavuz and others in earlier studies. Based on this evidence, a number of therapeutic insoles have been developed to reduce shear forces under the foot. However none of these insoles were tested in vivo to reveal their shear reducing efficacy. Dr. Yavuz has utilized spatio-temporal characteristics of gait in this randomized cross-sectional study to investigate whether these insoles in fact decrease plantar shear loading. The results indicated that the fore-aft ground reaction forces do not change while using such shear reducing insoles when compared to standard control insoles. Extensive in vivo and/or computational evaluation is crucial in ensuring the implicated clinical benefits of specially designed therapeutic footwear. It is thought that the shear reducing insoles need to be redesigned according to a comprehensive series of biomechanical guidelines.

FUNDING SOUGHT FOR RESEARCH COLLABORATION BETWEEN OCPM, CWRU, THE DIABETES ASSOCIATION OF GREATER CLEVELAND AND THE CLEVELAND SIGHT CENTER

Dr. Carroll is working with Dr. Ann Williams from the CWRU School of Nursing to obtain funding for a study to evaluate nonvisual foot care for people with diabetes and visual impairment. The role of OCPM in these proposed studies is to conduct a pilot study to investigate the effects of teaching a method for nonvisual foot inspection to people with diabetes and visual impairment, using the senses of touch and smell. OCPM will participate in evaluating whether or not doing nonvisual foot inspection helps these patients to discover foot problems in the early stages, when the problems are easier to treat. Dr. Caldwell is the designated Project Podiatrist, and if the proposal is funded, he will consult on the development of the recorded material on nonvisual foot care and assist with the focus groups that will test the foot care recordings. Dr. Carroll is the designated Study Coordinator for the pilot study. Proposals have been submitted to the International Diabetes Federation and the National Eye Institute for funding. In addition, a proposal is currently being prepared to submit to the NIH in February for funding through the Exploratory/Developmental Research Award (R21) funding mechanism.

NEW INSTRUMENT FOR THE DR. JOHN M. DAILEY RESEARCH LAB

The OCPM Research Department has purchased a PointScan Pressurex Measurement system. The PointScan is a portable Windows-based measurement system that enables rapid evaluation of pressure magnitude at any given point on Pressurex surface pressure-indicating film. Any pressure placed on the film will produce a red pattern of various intensities, depending on the applied pressure. By placing the PointScan over the area that is to be analyzed, the pressure data is instantly displayed in the Windows software. In the past, research was conducted at OCPM using pressure-sensitive film to evaluate the pressure distribution on the posterior facet of the subtalar joint with conical versus cylindrical subtalar implants. The pressure distribution on the implants was evaluated as well. However, the color intensities could only be converted to pressure by comparing the image to a color chart. The PointScan scanner will be used in the previously-mentioned unicortical versus bicortical staple fixation study. In addition, Dr. Carroll will re-visit the pressure-sensitive films from the subtalar implant study. If you would like to conduct any research using this instrument, please see Dr. Carroll for the development of a research proposal!

DEADLINES-AT-A-GLANCE: UPCOMING GRANT APPLICATION DEADLINES

American College of Foot and Ankle Surgeons (ACFAS)

Clinical and Scientific Research Grant Program

This program provides financial assistance to researchers within the podiatric surgical arena. The purpose of this grant is to fund research with either direct or indirect impact on issues of interest to podiatric foot and ankle surgeons. This research may be clinical or laboratory based, with clearly defined research goals. NOTE: At least one of the investigators must be a member of ACFAS in good standing. Funding is available for a maximum of \$20,000 for one year.

More information can be found at:

http://www.acfas.org/pubresearch/Research_Grant/default.htm

Deadline for application: October 15, 2009

American Diabetes Association

Basic Science Award

The ADA Research Awards provide grant support to new and established investigators. Applications will be considered in any area that is relevant to the etiology or pathophysiology of diabetes and its complications. Funding is available for up to \$115,000 per year for up to three years. Up to 20% of total costs for PI salary support and up to 15% for indirect costs may be requested.

Clinical/Translational Award

The ADA Clinical/Translational Awards are designed to support patient-oriented research in diabetes. For the purpose of this award, clinical research is defined as research directly involving humans, and includes education, psychosocial, behavioral, epidemiologic, and health services research as well as studies of normal physiology and mechanisms of disease. Funding is available for up to \$200,000 per year for up to three years. Up to 20% of total costs for PI salary support and up to 15% for indirect costs may be requested.

Innovation Award

The ADA Innovation Awards are pilot or feasibility grants designed to support novel hypotheses that may lack preliminary data, but offer considerable promise for the cure, prevention or treatment of diabetes. Funding is available for a maximum of \$50,000 per year for two years. No indirect costs may be requested.

Henry Becton Innovation Award

The ADA Henry Becton Innovation Awards are pilot or feasibility grants designed to support hypotheses in the following areas: medical informatics in direct patient therapy, advanced methods of insulin delivery, community-based care, and the role of allied health professionals care of children with Type 2 diabetes. Funding is available for a maximum of \$50,000 per year for up to two years. No indirect costs may be requested.

Website for all ADA grant opportunities:

http://professional.diabetes.org/Diabetes_Research.aspx?typ=18&cid=64381

Deadlines for all applications: January 15 and July 15, 2010

National Institutes of Health (NIH)

Public Health Service Research Grants (R01)

The NIH is accepting proposals for research in a wide variety of fields, including arthritis, musculoskeletal disorders, diabetes and skin diseases. Funding is available for three to five years, with no restrictions on amount of support. More information on this grant is available at <http://grants.nih.gov/grants/guide/pa-files/PA-07-070.html>

Deadlines for application: February 5, June 5

Academic Research Enhancement Award (R15)

The NIH AREA program has three objectives: 1) to develop the research environment a "smaller, less prominent, four-year, public and private colleges and universities which provide baccalaureate or advanced training for a significant number of our nation's research scientists but which have not shared adequately in the growth of the NIH extramural program", 2) to expose students at such institutions to the research experience, and 3) to support meritorious research. The AREA program supports small-scale research projects, including feasibility or pilot studies, in health-related topics. More information is available at <http://grants.nih.gov/grants/guide/pa-files/PA-06-042.html>

Deadlines for application: February 25, June 25

Exploratory/Developmental Research Award (R21)

The NIH R21 program is intended to encourage exploratory and/or developmental research by providing support for the early and conceptual stages of project development. These studies may involve considerable risk but may lead to a breakthrough in a particular area, or to the development of novel techniques, agents, methodologies, models, or applications that could have a major impact on a field of biomedical, behavioral, or clinical research. Applicants may request a maximum of \$150,000 total direct costs plus applicable Facilities & Administrative (F&A)/indirect costs for the entire project period of up to three years. More information is available at <http://grants.nih.gov/grants/guide/pa-files/PA-09-164.html>

Deadlines for application: February 16, June 16