



Comparative Orthopaedic Lab

"Finding a joint solution"

<http://www.columc.com/>

Current Projects

- RIA 'waste water' is Osteoinductive *in vivo*
- Biomarkers Predict Response to Nutraceutical
- Sensory Function of the ACL
- Enhanced Subchondroplasty for PTOA
- BioCartilage versus Marrow Stimulation
- Return-to-Sport after ACL Reconstruction
- Novel Quad Tendon Allograft ACL
- BMC for Enhancing OCAs
- Meniscal Tissue Engineering
- Early Diagnosis of Hip Dysplasia
- Multi-Ligament Knee Reconstruction
- Quantitative Arthroscopic Imaging

Last quarter's "top 5"

1. COL Team has 23 abstracts accepted for 2016 ORS Annual Conference
2. The Mizzou BioJoint Center featured in Delta's *Sky Magazine*
3. Dr. Jimi Cook featured in *Mizzou Magazine* <http://mizzoumag.missouri.edu/2015/11/cooks-recipe/>
4. COL Team proves RIA 'waste water' can enhance bone formation in animal model
5. COL Team shows serum and urine biomarkers predict improvements in patients with OA

Mizzou BioJoint Center featured in Delta's Sky Magazine

IN-DEPTH HEALTH INNOVATIONS

Health Care's New Frontiers

Ever more inventive and innovative approaches—from technological tools to groundbreaking medicines and procedures—are pushing the boundaries of what's possible in health care.

Whether you've just received a breast cancer diagnosis or you're suffering from a bad knee, precision medicine, novel pharmaceuticals and advanced technology are offering patients more options than ever before—and in some cases, sparing them from potentially harmful treatments. Techniques have evolved in medicine to such a degree that physicians can practice surgery in virtual reality. Here, six health innovations that are redefining modern medicine.

THE SURGERY WAS ONE FOR THE RECORD BOOKS. AND SO WAS HER NEXT DIVE.

When high-level cartilage loss threatened diver Loren Figueroa's athletic career, the Mizzou BioJoint Team at Missouri Orthopaedic Institute dove right in. With their breakthrough BioJoint surgery, they utilize biological solutions developed and only available at Mizzou to get people like Loren on the road to recovery faster.

MIZZOU BIOJOINT CENTER
at Missouri Orthopaedic Institute
University of Missouri Health Care

Find out if BIOJOINT is right for you. Visit MizzouBioJoint.com or call (573) 884-3077.

5 | BIOLOGICAL KNEE REPLACEMENT

A veterinary student at Cornell University, Dusty Nagy was 22 years old when she blew out her knee playing basketball. Doctors told her she would recover over time without intervention, but eight months later she was still suffering. The pain not only kept her off the court, it also affected her ability to walk. Turns out, in addition to tearing her anterior cruciate ligament and injuring her meniscus (a fibrous cushion in the knee), Nagy was missing a huge chunk of cartilage.

"The doctor scoped my knee [a procedure in which a tiny camera is inserted through a keyhole incision in the knee], repaired the problem areas during a separate surgery and told me I would need an artificial joint by the time I was 40," says Nagy, who gave up basketball, skiing and other unnecessary activities to preserve the function of her knee and continue working as a large animal veterinarian.

Now 46, Nagy sidestepped doctors' predictions. When the pain began interfering with her veterinary practice a few years ago, instead of getting an artificial joint, she opted to undergo a biological replacement called Mizzou BioJoint. Unlike traditional artificial knee replacements, which rely on metal and plastic parts to repair the knee, Mizzou BioJoint uses donor bone and cartilage to provide patients with a more natural joint resurfacing option that also improves function.

"With a traditional metal and plastic knee replacement, the joint does not have normal motion, stability or feel," explains Dr. James L. Cook, Allen Distinguished Professor in Orthopaedic Surgery at the University of Missouri School of Medicine and director of the Mizzou BioJoint Center. "Patients cannot return to high-level activities because mechanical joints start wearing out from day one. This can be a serious problem for younger, more active patients because their quality of life is diminished by strict activity limitations and the knowledge that they will face many more knee replacement surgeries in the future."

Mizzou BioJoint, on the other hand, is a restorative strategy rather than a replacement surgery. Since the donor cartilage is normal, viable tissue, it integrates and functions like young healthy cartilage. "It gives us the best chance for restoring a joint to the way it was before injury," says Cook.

Cook and his colleagues also developed a new preservation method, the Missouri Osteochondral Allograft Preservation System, which extends the "shelf life" of donor tissues for up to 60 days, compared to the current 28-day maximum for traditional storage methods. The end result: Tissue banks have more time to match the graft with the patient, get the graft to the surgeon and allow patients and surgeons to plan and prepare for surgery.

Over the past six years, hundreds of patients have benefited from BioJoint technology. In some cases, biological joints take patients from limited ability—barely able to walk—to fully functional, even being able to participate in athletics. The rub: Recovery for biological joint replacements isn't easy.

"For someone who is used to being on their feet all day, the recovery process was extremely challenging," says Nagy, who nursed her knee with nonweight-bearing activities for two months after surgery. She didn't return to working in the field with large animals until three months after surgery, but even then, she wore a brace and limited her activities. "I've slowly grown to trust the new knee, and now three years postsurgery, I don't even think about it."

IT GIVES US THE BEST CHANCE FOR RESTORING A JOINT TO THE WAY IT WAS BEFORE INJURY.

—DR. JAMES L. COOK, ALLEN DISTINGUISHED PROFESSOR IN ORTHOPAEDIC SURGERY AT THE UNIVERSITY OF MISSOURI SCHOOL OF MEDICINE AND DIRECTOR OF THE MIZZOU BIOJOINT CENTER

Performing a Mizzou BioJoint biological knee replacement.

Recent Pubs

1. Crist BD, et al. Optimising femoral-head osteochondral allograft transplantation in a preclinical model. *J Orthop Translation* 2016
2. Stannard JT, et al. Development of a whole organ culture model for intervertebral disc disease. *J Orthop Translation* 2016
3. Roller BL, et al. Identification of novel synovial fluid biomarkers associated with meniscal pathology. *J Knee Surg* 2016
4. Cook JL, et al. Multiple injections of leukoreduced platelet rich plasma reduce pain and functional impairment. *J Knee Surg* 2015
5. Bozynski CC, et al. Acute management of ACL injuries using novel canine models. *J Knee Surg* 2015
6. Cook JL, et al. A canine hybrid double-bundle model for study of arthroscopic ACL reconstruction. *J Orthop Res* 2015
7. Smith MJ, et al. Investigation of rotator cuff healing using a DCB sponge in a canine model. *Int J Shoulder Surg* 2015
8. Tan AR, et al. Cytokine preconditioning of engineered cartilage provides protection against IL-1 insult. *Arthritis Res Ther* 2015
9. Capito NM, et al. Hyperosmolar irrigation compared with standard solution in a canine arthroscopy model. *J Shoulder Elbow Surg* 2015