The LiveActive Fund for Orthopedic Research and Education
A Donor Stewardship Report

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In Gratitude

Patients are at the heart of Dr. Brian Cole's research. Philanthropy provides Dr. Cole with resources to catalyze research projects and infuse his scientific program with the necessary seed funding to make discoveries in previously unexplored areas of research. Dr. Cole's mission is to translate these findings into real-world clinical application and train the next generation of physician-scientists. In this regard, your support of Dr. Cole and the Department of Orthopedic Surgery at Rush has been an unqualified success.

We are proud to share this report that details the meaningful impact of your investment in the bone and joint research program at Rush.

About the LiveActive Fund for Orthopedic Research and Education

Founded and supported by Dr. Cole's grateful patients, the LiveActive Fund for Orthopedic Research and Education is focused on joint restoration research and education, furthering the comprehensive, multidisciplinary approach to the management of joint pain and cartilage disease — the kind of approach that is increasingly understood to restore quality of life for patients. **Developing novel minimally invasive solutions; promoting function and activity through advanced research; and educating the experts of the future is at the core of the LiveActive initiative.**

Under Dr. Cole's leadership, this program within the Cartilage Restoration Center at Rush has pioneered safer, faster, and more cost-effective ways to reclaim lost mobility and eliminate pain. Countless patients — including those at Rush and people around the country who benefit from orthopedic research discoveries at Rush — are leading active lives with their natural joints thanks to his team's research success that prevents or delays joint replacement surgery. Such treatments have changed the expectations of both physicians and patients regarding what is possible in the wake of orthopedic injury or debilitating joint disease.

Understanding and Combatting Osteoarthritis

A fundamental goal of the LiveActive initiative is improving the scientific understanding of osteoarthritis, or OA — the most prevalent form of arthritis — and translating these findings into better treatments. Due to the rising average life expectancy and increased prevalence of obesity, OA places a growing financial and physical burden on the U.S. population. **Today, more than 30 million Americans suffer from OA, impacting their quality of life and elevating their risk for heart disease, hypertension, type 2 diabetes, and a host of medical conditions associated with reduced mobility.**

As the body ages or experiences trauma, cartilage joint surfaces are gradually worn away, leading to OA. Dr. Cole and his collaborators are leading multiple studies to better understand the OA process and devise more effective therapies. Traditionally, treatment options have included lifestyle modifications, pain management, and corticosteroid injections — with joint replacement reserved for those who have

exhausted all nonsurgical measures. Dr. Cole, however, is imagining a future in which damaged tissue and cartilage can recover more quickly and injuries don't require repeat surgeries.

Research

Key Findings and Achievements

Through the support of your generous philanthropy, Dr. Cole's research team has been a powerhouse for clinical research in orthopedic surgery. In the last year, Dr. Cole published nearly two dozen studies on a variety of topics, including osteochondral allografts, the efficacy of various surgical techniques, and most prominently, the use of orthobiologics. With enhancing outcomes for patients at the center of Dr. Cole's research, his team has made significant strides in discovering ways of helping people preserve their joints so they might delay — or even avoid — joint replacement surgery down the road. Dr. Cole's team was recently recognized in the World Journal of Orthopedics as the number one most recognized leader in providing scientific information and education available the internet in orthopedics. Detailed below are highlights of the research team's scientific achievements.

Reducing Joint Pain with Orthobiologic Treatments

Health care professionals are just beginning to realize how stem cells can treat challenging conditions. But they are not magic cure-alls that can rewind time and eliminate disease in an instant. To fully deliver on the promise of stem cell treatments, Dr. Cole is joining forces with other scientists across Rush to create a regenerative medicine research hub and state-of-the-art cellular processing laboratory. Together, this research collaborative is studying and engineering new ways to delay, reverse, or even prevent some of the complications that most threaten our health and mobility. With continued research, Dr. Cole's team believes it is possible to dramatically decrease the financial burden associated with OA by utilizing early interventions, such as orthobiologic therapies that harness stem cells and reduce the need for total joint replacement surgery.

Dr. Cole and his team made significant progress over the past year in understanding the efficacy of platelet-rich plasma (PRP) injections to improve joint pain. Past research from Dr. Cole and others shows PRP to have both anti-inflammatory effects and stimulatory effects — recruiting mesenchymal stem cells and fibroblasts that produce collagen and other fibers necessary for joint health. Dr. Cole's research digs even deeper, suggesting that PRP is most beneficial in minimizing symptoms when OA is treated early or in younger patients. As a next step, Dr. Cole plans to recruit patients to conduct a larger study that evaluates the long-term benefits of PRP injection in early OA.

Improving the Effectiveness of Rotator Cuff Repair Surgery

Many patients report complications after having rotator cuff repair surgery. Even after the typical recovery period of 6 to 12 months, it is estimated that a staggering 50 percent of patients who receive rotator cuff surgery on their shoulders do not demonstrate sufficient tendon-to-bone healing. More troubling is the fact that as many as 1 in 5 patients with full-thickness tears experience re-tears that may require additional surgery.

In the past year, Dr. Cole's team completed a multi-year investigation into the use of bone marrow aspirate concentrate (BMAC) as a source of stem cells for patients undergoing arthroscopic rotator cuff repair. Injecting the patient's own BMAC into the shoulder at the time of surgery, the researchers hypothesized that BMAC would promote healing and prevent these common complications. Dr. Cole found that BMAC did just that. It improved the quality of the repair as evidenced in part by patients reporting significantly higher satisfaction with their outcomes. MRIs taken one year after surgery indicate patients who received BMAC had a significant improvement in the integrity of the rotator cuff repair site compared to patients who did not receive the BMAC injection at the time of surgery. This is the first study of its kind in the U.S.

The Osteochondral Allograft: A Tool to Delay or Prevent Joint Replacement

Dr. Cole is a pioneer and leading practitioner in the use of the cartilage-bone allografts – the transplantation of donor cartilage into a damaged or diseased joint to relieve the patient's pain and improve mobility. This technique aims to preserve a patient's native joints and delay, or perhaps prevent, the need for joint replacement. Although multiple studies conducted at Rush and elsewhere demonstrate the effectiveness of these osteochondral allografts, not every patient experience a therapeutic benefit. To better understand why, Dr. Cole's team studied a total of 235 patients who received this treatment at Rush. The team uncovered that even in older patients, those with healthy Body Mass Index (BMI) scores experienced clinically significant benefits when compared to patients struggling with obesity. This innovative discovery will further future research efforts in the area of joint preservation and replacement.

In 1998 Dr. Cole was the first sports medicine orthopedic surgeon in the region to perform an allograft transplantation using donor cartilage to restore knee and shoulder function. Even today, these procedures are only offered by a handful of experts around the country and Dr. Cole's team is studying methods to make it most effective.

Today, the Rush Cartilage Restoration Center is the most clinical and scientifically active program in the world offering novel treatments to patients who are otherwise young and healthy yet suffer from the effects of early OA.

Education

Training the Next Generation of Physician-Scientists

Surgeons, physicians, and researchers in the Division of Sports Medicine are dedicated to preparing outstanding medical students, residents, and aspiring researchers. Bridging the gap from the laboratory to the patient's bedside requires collaborative and cross-disciplinary teams of scientists and clinicians. Under Dr. Cole's direction, the Division of Sports Medicine Research Assistant Program provides a fully immersive experience into the field of academic orthopedics.

Ideally suited for third-year medical students, research assistants take a hiatus from the classroom for a full year to work with Rush faculty. They work on multiple projects involving a wide breadth of clinical, biomechanical, anatomic, and imaging studies. Three days per week are spent collecting and analyzing data, interacting with study subjects, and observing first-hand the life-changing impact of orthopedic care. The research assistants spend the other two days shadowing Dr. Cole in the clinic or in the operating room

fully showcasing the life of an orthopedic physician-scientist. Past research assistants have gone on to residency placement at some of the nation's most elite orthopedic programs. In addition to this full-year experience, Rush also offers a summer research internship to medical students. These competitive programs are highly coveted and fully funded for students applying for orthopedic surgery residency positions.

Each year, the Division of Sports Medicine Research Assistant Program supports three full-time annual research assistantships and several summer internships. **This academic year, Dr. Cole's research team welcomed Tracy Tauro, Eric Haunschild and Ron Gilat, MD.**

Tracy Tauro, BS, BA
2019 Research Assistant

Tracy Tauro, originally from Brick, New Jersey, graduated from Marymount Manhattan College in New York City with her Bachelor of Arts in Dance, Bachelor of Science in Biomedical Science, and a double minor in Chemistry and Neuroscience. She joined the team in June 2018 and about a year later added the role of Coordinating Producer on Dr. Cole's radio show, Sports Medicine Weekly.

Under Dr. Cole's mentorship, Tracy conducts clinical and basic science research through hands-on experiences in both the clinic and the operating room. She spends time working on cartilage restoration research, her favorite area of study, and builds Dr. Cole's case presentations, which help to foster strong clinical decision-making skills. Tracy is currently in the process of applying to medical school.

"The enthusiasm and support of Dr. Cole's team, from administrative assistants to sports medicine fellows, makes me excited to go to work each day. This position has given me the opportunity to learn something new every day – whether it's an operative technique, laboratory procedure, or beside mannerism."

- Tracy Tauro, BS, BA

Eric Haunschild, BS
2019 Research Assistant

Eric Haunschild is a fourth year medical student at the University of California, Los Angeles. Originally from the San Francisco Bay area, Eric received his undergraduate degree in Neuroscience at UC Davis before moving to Los Angeles.

Eric's interest in pursuing a surgical career stems from a significant knee injury that left him unable to play sports, an important part of his life. With Dr. Cole's expertise, Eric has been able to work closely alongside him to study cartilage and joint preservation surgeries.

Moving forward, Eric plans to complete meaningful research for publication in both shoulder and knee surgery prior to returning to school next summer.

"After having my sports-related injury corrected by an orthopedic surgeon, I came to appreciate not only the significant challenges of physical rehabilitation, but the reward of being able to get back to being active and doing what I loved. The ability to provide this to others resonated strongly with me and is why I decided to pursue research in sports medicine." – Eric Haunschild, BS

Ron Gilat, MD
2019 Research Assistant

Ron Gilat is an orthopedic surgery resident from Shamir Medical Center in Israel. Ron has traveled from afar with his father Ori, three-year-old daughter, and expecting wife Neta to spend a year of research under Dr. Cole's guidance. This year serves as a part of Ron's residency in Israel, allowing him to learn about the cutting-edge research that Dr. Cole and his team are performing at Midwest Orthopaedics.

Ron plans to return home to Israel with the new knowledge and experience he gained from Dr. Cole and Rush and use it to help serve his patients better.

"I want to say thank you to the people contributing to the Live Active fund. This incredible opportunity carried significant financial weight on me and my family, but with your generosity, participating in this program was indeed possible." – Ron Gilat, MD

Looking to the Future

The significant progress Dr. Cole and his team have made in the scientific study of joint pain and cartilage disease provide the basis for a new wave of research — studies that will take this work to the next level and eventually inform treatment options the world over. We are looking forward to continuing to help shepherd the next generation of orthopedic physician-scientists into the medical community, as well as advance translational research studies that help shape bone and joint treatments. **Thanks to your steadfast support of Rush and Midwest Orthopaedics, Dr. Cole's research team is poised for continued research success.**