



Sports Medicine Foundation

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Patients in the News

Earl Graves: An Enterprising Touch

The following profile is based on an interview by Richard Needham. Mr. Needham is editor of *Skiing Heritage* magazine and the health newsletter *Arthritis Advisor*.

If ever there were a role model for the self-made entrepreneur—the kind of individual who business school students study to emulate when they finally step into the real world—it might be Earl Graves. The charismatic founder of “Black Enterprise” magazine, (cont. pg 15)



Earl Graves

Sports and Wellness

Weight Lifting for Legs

By Chuck Williams

Editor's Note: Chuck Williams, a physical therapist at Howard Head Sports Medicine Center in Vail, specializes in sports injury rehabilitation and prevention.

After a hip, knee, or ankle injury, it can be difficult to regain the strength and confidence needed to return to a healthy and active lifestyle. The following resistance exercises are helpful for regaining normal muscle strength, endurance, and power. Furthermore, having strong leg muscles decreases stress on joints and reduces the occurrence of reinjury.

Determining Appropriate Weight:

A therapist or personal trainer may be helpful in determining appropriate resistance or weight with the following strength-

(cont. pg 12)

Steadman-Hawkins Research Update

Arthritis Research Expanded

By Karen K. Briggs, M.B.A., M.P.H.

Editor's note: Karen Briggs is Director of Clinical Research at the Steadman♦Hawkins Sports Medicine Foundation.

According to the Centers for Disease Control, arthritis and chronic joint symptoms currently affect nearly 70 million Americans. This means one of three adults suffers from the disease, which makes it one of the most prevalent diseases in the U.S.

The costs of arthritis are enormous. Arthritis is the leading cause of disability and is the source of at least 44 million visits to health-care providers. The estimated medical cost for individuals with arthritis was \$15 billion in 1992 (*Healthy People 2010*).

(cont. pg 15)



Photo: John Kelly

In Your Honor

This year we are pleased to offer three distinct opportunities for recognizing and honoring your gift to Steadman♦Hawkins Sports Medicine Foundation. Your gift in any, or all, of these areas will help us enrich and enhance the lives of those who depend on our research and treatment to keep active.

We invite you to:

- ◆ Continue your annual support.
- ◆ Select a sponsorship opportunity to fund a research or education program.
- ◆ Name an important room in our beautiful new Foundation headquarters.

To continue your annual support, we would be pleased to receive your gift and apply it to the research or educational area with the greatest need. But this year, we have two new ways for you to specify where you want your gift to make a difference.

You can establish an annual fund in your, or another's, name through a sponsorship opportunity and underwrite some of the most promising initiatives in the fields of research and education. Or, a one-time opportunity,

you may elect to name a facility in the new Foundation headquarters in your honor or in honor of a friend or loved one.

As our lives continue to make insistent demands on our bodies, we must find ways to address the consequences of those demands and live quality active lives. We need to expand our knowledge of biomechanics and the factors that influence healing. Your support is how that happens. We thank all of you who share our vision with your gifts.

If you wish to discuss how your gift can fund a sponsorship opportunity in your name, feel free to contact John McMurtry at john.mcmurtry@shsmf.org, or call (970) 479-5781.

Education

Welcome 2003/2004 Fellows

Six new members of the incoming "class" of Steadman-Hawkins Fellows have had a busy schedule refining their skills as they make final preparations for a career as orthopaedic surgeons. Regarded as one of the most prominent and rigorous academic Fellowships in orthopaedic sports medicine, this year's program includes six new orthopaedic surgeons who were selected from a pool of more than 120 applicants.

Steadman-Hawkins Fellows spend their year polishing skills and learning new techniques from Drs. Steadman, Hawkins, and Sterett. The Fellowship program includes an opportunity to participate in research with Foundation scientists. Each Fellow will be actively involved in Clinical Research, Basic Science, and Biomechanics/Rehabilitation research. The Fellows will also experience hands-on medical coverage of major-league baseball's Colorado Rockies, the NFL's Denver Broncos, the U.S. Ski Team, and Eagle County High School sports teams.

The stream of knowledge and information flows both ways. The Fellows, having already completed their formal training in leading orthopaedic programs, share knowledge they have gained from years of training with physicians and scientists from the Foundation.

Timothy S. Bollom, M.D.

Dr. Bollom graduated summa cum laude from the University of Saint Thomas (St. Paul, Minn.) with a degree in biology. He then studied medicine at the University of Minnesota Medical School, where he was named to the Alpha Omega Alpha National Honor Medical Society. He completed his residency in orthopaedic surgery at the University of Florida at Gainesville. Dr. Bollom has been published in *The American Journal of Sports Medicine*, has authored several book chapters, and has received an award for outstanding resident/student research paper presentation.

An All-American track and cross-country runner, Dr. Bollom brings a well-rounded interest in many sports to his fellowship year in Vail.



Photo: John Kelly



Drs. William I. Sterett, J. Richard Steadman, and Richard J. Hawkins with 2003/2004 Fellows. Rear, left to right: Dr. Sterett, Douglas J. Lowery, M.D.; Andrew L. Chen, M.D.; Michael A. Terry, M.D.; and Dr. Steadman; front, left to right: Charles B. May, Jr., M.D.; Timothy S. Bollom, M.D.; Arun J. Ramappa, M.D.; and Dr. Hawkins.

Andrew L. Chen, M.D.

Dr. Chen earned an undergraduate degree in biology and a Master of Science degree in Materials Science and Engineering at Johns Hopkins University, continuing on to study medicine at Johns Hopkins School of Medicine. He completed his residency in orthopaedics at New York University's Hospital for Joint Diseases, where he also completed a research fellowship at the Musculoskeletal Research Center. Dr. Chen has received numerous awards for his work in basic science and clinical research, and has been published in *Arthroscopy*, *Journal of Arthroplasty*, *Journal of the American Academy of Orthopaedic Surgeons*, and *Journal of Trauma*.

Dr. Chen is joined in Vail by his wife Colleen.

Douglas J. Lowery, M.D.

Dr. Lowery graduated from DePauw University with a degree in biology. He then pursued a master's program in physiology and biophysics at Indiana University. He continued on at Indiana University to earn his medical degree and was named to the Alpha Omega Alpha National Honor Medical Society. Dr. Lowery performed his orthopaedic residency at the Summa Health System in Akron, Ohio.

An accomplished collegiate football player with a stint with the Indianapolis Colts, Dr.

Lowery comes to Vail with his wife Lori and son Maxwell.

Charles B. May, Jr., M.D.

Dr. May attended the University of Georgia at Athens as an undergraduate student of zoology. He then graduated cum laude from Emory University School of Medicine and completed his residency in orthopaedic surgery at the University of Texas Southwestern Medical Center. During medical school and his residency, Dr. May was published in *Foot and Ankle International* and *Biomechanics*, and was involved in researching supracondylar femoral osteotomies for lateral compartment degenerative arthritis.

Dr. May, who counts fly-fishing, skiing, hunting, and camping among his hobbies, will settle in Vail with his wife Lowery and daughter Cappie.

Arun J. Ramappa, M.D.

Dr. Ramappa graduated magna cum laude with a degree in chemistry from Harvard University. He studied articular cartilage regeneration and autologous chondrocyte transplantation as a research fellow during his studies at Harvard Medical School. He subsequently entered the Harvard Combined Orthopaedic Residency Program and continued his participation in basic science and clinical research projects, along with develop-

ing software to aid in reconstructive knee surgery. Dr. Ramappa has presented at various conferences and has been published in such journals as *Biomaterials* and the *Journal of Bone and Joint Surgery*.

Returning from a research project in Zurich, Switzerland, Dr. Ramappa is eager to get back into a clinical mode during his fellowship in Vail.

Michael A. Terry, M.D.

Dr. Terry studied mechanical engineering as an undergraduate at the University of Illinois at Urbana-Champaign. Upon graduating from the University of Chicago's Pritzker School of Medicine, he received awards for outstanding performance in general surgery and in clinical medicine and was named to the Alpha Omega Alpha National Honor Medical Society. Dr. Terry completed his residency at Hospital for Special Surgery in New York City, where his research projects included the study of thromboembolic disease, diagnostic shoulder arthroscopy, and an augmented rotator cuff repair model in sheep.

Dr. Terry is joined by his wife Lynne and son William.

Thank you

A special thank you to our sponsors who make the Fellowship program, one of the top orthopaedic sports medicine fellowship programs in the world, possible. We'd like to recognize those individuals and foundations that support the entire Fellowship class through the sponsorship of Academic Chairs.

Chair sponsors of the 2003/2004 Steadman-Hawkins Fellowship Class are **Mr. and Mrs. Harold Anderson, Mr. and Mrs. Lawrence Flinn, Mr. and Mrs. Jay Jordan, Mr. and Mrs. Peter Kellogg, and Mr. and Mrs. Steven Read.**

Fellowship Benefactors fund the research of one Fellow for one year. Each benefactor is assigned a Fellow who provides written reports and updates of his or her work. We extend our gratitude to the following individuals for their generous support: **Mr. Milledge Hart, the Fred and Elli Iselin Foundation, Mr. and Mrs. John W. Jordan, Mr. S. Robert Levine, Mr. and Mrs. Kent Logan, Mr. Tim McAdam, Mr. and Mrs. Jay Precourt, Mr. Tom Quinn, and Mr. and Mrs. Stewart Turley.**

Foundation Hosts Webcast

On-Line Program Provides Continuing Education for Orthopaedic Surgeons Treating Degenerative Joint Disease

The pioneering work of the Foundation's cartilage research program was the topic for a webcast that is available online for one year, beginning Jan. 1, 2004. Entitled *Over-coming the Challenge of Degenerative Joint Disease: Innovative Surgical and Pain Management Techniques*, the program is hosted by the professionals and staff of the Steadman-Hawkins Sports Medicine Foundation.

Co-chairs are Dr. J. Richard Steadman, Steadman-Hawkins Clinic principal and founder of the Steadman-Hawkins Sports Medicine Foundation, and Dr. Richard J. Hawkins, also a principal of the Steadman-Hawkins Clinic.

The four-hour roundtable, funded by Pfizer, Inc., and sponsored by the Postgraduate Institute for Medicine, features a world-renowned, international faculty of orthopaedic surgeons, pain specialists, and researchers, each of whom has pioneered innovative treatments for treating articular cartilage injuries. The webcast, which offers continuing medical education credit, is designed to meet the educational needs of orthopaedic surgeons involved in the care of patients with degenerative joint disease.

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Topics include:

1. Review of the basic science of normal and injured articular cartilage.
2. Discussion of current concepts in pain response and their influence on surgical management decisions.
3. Explanation of treatment alternatives for knee and shoulder chondral defects, as discussed by a faculty of leading experts and pioneers in the field.
4. Description of anti-inflammatory use in the treatment of chronic degenerative joint disease.

The webcast is supported by an educational grant from Pfizer, Inc., a global, research-based company with a long-standing commitment to health education.

The faculty included:

◆ J. Richard Steadman, M.D., presented *Acute Chondral Defects in the Young, Active Patient*. His lecture featured a discussion of microfracture, a surgical procedure he has pioneered for the formation of reparative cartilage.

◆ Richard J. Hawkins, M.D., presented his experience on *Chondral Defects and Approach to the Arthritic Shoulder*.

◆ William G. Rodkey, D.V.M., director, Basic Science Research, Steadman-Hawkins Sports Medicine Foundation, presented *Biologic Differences in Normal and Injured Cartilage*.

◆ James P. Rathmell, M.D., professor, Department of Anesthesiology, Fletcher Allen Health Care, Burlington, Vt., presented *Emerging Concepts in the Pain Response and Influence on Perioperative Management Decisions*.

◆ Kenneth P. Glassman, M.D., Denver Arthritis Center, discussed *New Evidence in the Long-term Management of Degenerative Joint Disease*.

◆ Bruce S. Miller, M.D., University of Michigan Sports Medicine Program and former Steadman-Hawkins Fellow, lectured on *Osteotomy and Alignment Implications for the Arthritic Knee*, including a presentation on High Tibial Osteotomy as a surgical procedure to treat malalignment of the knee.

With growing worldwide interest and concern over the increase in degenerative arthritis, this webcast is timely and relevant to both the orthopaedic world and lay community.

The webcast is available at www.periopdjd.org. To order a CD ROM, please contact Rachel Sylvester at (215) 550-8159.

Meet Our Staff

Takashi Yanagawa, M.A.

Staff Scientist, Biomechanics Research Laboratory

Born in Osaka, Japan, Takashi joined the Foundation in August 2001 as Staff Scientist in the Biomechanics Research Laboratory. While playing basketball during his high school years, he became interested

in sports science. After watching the televising of a motion capture system, his interest in sports biomechanics grew. He then started thinking about the utilization of computers to study injury prevention and optimal motion in athletic activities. That led him to leave his native Japan in 1993 to study biomechanics in the U.S. After completing his bachelor's degree in Computer Science from the University of Texas at Tyler, he received his master's degree in Kinesiology specializing in Biomechanics from the University of Texas at Austin in 2001. Takashi's research is centered in computational modeling and simulation of the musculoskeletal system. He has published reports about the effects of hamstring co-contraction on knee joint stability during isokinetic exercises.

Currently, Takashi is involved in a project of upper-extremity computer modeling and simulation, through which muscle and joint contact forces are estimated in various exercises. The information gained from this research will aid in the design of more effective and safe rehabilitation protocols and help physicians develop a better understanding of beneficial and harmful joint forces that occur during movement. Ultimately, this new knowledge will aid in getting patients back from injury or surgery sooner and more effectively.

Takashi enjoys cycling and skiing, sports during which he continually develops his thinking about biomechanics.



Takashi Yanagawa, M.A.



Foundation Biomechanics Research Laboratory Appoints Giphart and Hummel

J. Erik Giphart, Ph.D., and Sarah Hummel, M.S., have been named staff scientists in the Foundation's Biomechanics Research Laboratory. Senior Staff Scientist Dr. Giphart's responsibility will be to facilitate the collection and processing of electromyographic (EMG) data, and to incorporate EMG information into the existing biomechanical models to create EMG-driven models. His interests are in biomechanical modeling, motor control, and perception. The goal of this research is to improve the quality of life for people suffering from injuries or disease by improving diagnosis, treatment, rehabilitation, and prevention. Ms. Hummel's research interests include applications of multibody dynamics to investigate sports performance and injury. Her primary research focus will be *in vivo* 3D measurement and analysis of clavicle, scapula, and humerus kinematics during active arm motions.

A native of Holland, Dr. Giphart received his master's degree in electrical engineering from Delft University of Technology, the Netherlands, in 1994. His thesis work was performed at the NeuroMuscular Research Center (NMRC) at Boston University. After graduation, Erik received the highly regarded Verenigde Spaar Bank Fund Scholarship, which he used to work at the NMRC for another year before entering his Ph.D. pro-

gram. Erik received his Ph.D. in biomedical engineering from Boston University in 2001. Following graduation, he accepted a position as a Research Assistant Professor at Boston University's Sargent College of Health and Rehabilitation Sciences. There he created a Virtual Reality laboratory to investigate the influence of visual information on balance and gait coordination. Erik has investigated and published several papers and abstracts dealing with postural control, gait coordination, and EMG analysis.

Ms. Hummel received her bachelor's degree in mechanical engineering from the University of Missouri (Rolla) in 1997 and joins the Foundation after recently receiving her M.S. from the University of California (Davis) in 2003. As a member of the UC Davis Ultimate Frisbee Team, her thesis research topic was Frisbee-related biomechanics applications. Investigating all aspects of frisbee-throw dynamics, she analyzed kinematics and kinetics of backhand frisbee throws. Sarah has published and presented several abstracts on frisbee sport sciences at the International Sports Engineering Association and the International Symposium on Computer Simulation in Biomechanics Conferences. Sarah is also an active member of the American Society of Mechanical Engineers.

Health Matters

Alternative Treatments for Arthritis

By Kenneth Paul Glassman, M.D.

Editors Note: Dr. Glassman is an associate clinical professor in the Department of Medicine at the University of Colorado Health Sciences Center and an assistant director of the Clinical Research Unit. He is in private practice at the Denver Arthritis Clinic in Denver.

Despite the current era of major medical breakthroughs in the treatment of many forms of arthritis, the use of alternative medicine to treat rheumatic conditions remains very popular. This may be attributed in part to the unknown etiology of many of these conditions, their unpredictable course, and the chronic pain that conventional therapies don't completely eliminate. In a study published in 1997 in the *Journal of the American Medical Association*, 42 percent of patients surveyed used alternative therapies within a 12-month period, and total annual out-of-pocket expenses for alternative therapies was equivalent to annual expenditures for all physician services in the U.S. In this same survey, 38 percent of patients didn't disclose their use of alternative therapies to their physician because they were never asked, while only 15 percent withheld disclosure for fear of disapproval by their treating doctor. The survey also showed that most patients used alternative therapies in conjunction with conventional therapies.

Following is a summary of commonly used alternative therapies. Mention of these therapies is not intended as an endorsement, but rather to highlight commonly used therapies by people with arthritis and rheumatic diseases.

Herbal remedies remain the fastest growing segment of alternative therapies. The common perception is that herbal therapies are natural and therefore safer; however, they may have harmful interactions with prescription medications and may contain contaminants, since herbal supplements aren't required to undergo strict government quality control.

(cont. pg 6)



Sarah Hummel, M.S., and Erik Giphart, Ph.D.

(Treatments cont. from pg. 5)

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As always, it is important for patients to inform their physician of all alternative therapies being taken to ensure there is no harmful interaction with any prescription drug.

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The most widely used nutritional supplements to treat musculoskeletal diseases are glucosamine and chondroitin sulphate. The former is derived from the shells of crustaceans. Chondroitin is derived from the trachea of cattle. European studies have showed that these agents ease the pain of osteoarthritis of the knee. It remains questionable whether chondroitin can repair cartilage. These supplements are generally well tolerated with few side effects and are in widespread use. The National Institutes of Health (NIH) is currently undertaking a large study on the effectiveness of these two supplements.

Other nutritional supplements may be beneficial in treating inflammatory conditions. These include green tea, which contains antioxidants compounds, and omega-3 fatty acids, which are found in cold water fish (salmon, mackerel, and sardines in their own oil).

Many other nutritional supplements are commonly used to treat rheumatic diseases, but the evidence of their effectiveness is not convincing. These include MSM, a sulfur compound formed from the breakdown of DMSO and SAM-e, a naturally occurring substance that can be synthesized or made from fermented yeast.

The FDA and NIH have excellent websites that provide more information on dietary supplements as well as warnings on herbal products. As always, it is important for patients to inform their physician of all alternative therapies being taken to ensure there is no harmful interaction with any prescription drug. It is equally important that medical providers ask their patients about the use of alternative therapies.

Take Charge of Your Health

By Jack Eck, M.D.

Editor's Note: Dr. Eck has practiced internal medicine at Vail Valley Medical Center since 1971. His area of interest and specialty is sports medicine and wellness.

I have talked with many readers of this newsletter who are concerned about their health and are proactive in participating in their own care decisions. Their knowledge of preventative medicine can be made more relevant by an understanding of the many laboratory tests used by groups such as Dr. Kenneth Cooper's Clinic and Denver's Channel 9 Health Fair testing, which is so popular in Colorado.

The interpretation of laboratory results is unfamiliar to even the most informed readers, unless they have the medical background. These biochemical surveys include a variety of tests, which are nonspecifically diagnostic themselves but may require the correlation of several tests to make a specific diagnosis. The general awareness of one's health risk can be gleaned from understanding the meaning of the various laboratory results.

Different preventative medicine groups have their list of favorite tests and the laboratory health panels they provide. I'll attempt to use one of the panels in Vail's medical center as a prototype for this discussion.

Blood Sugar

First on the list is the blood sugar level, which is listed as glucose. Normal glucose ranges between 65 and 109 (in our laboratory). Higher values reflect a tendency toward diabetes. Values above 126, on a fasting blood sugar, are diagnostic for diabetes. The mid-range between 109 and 126 is considered to be glucose intolerance and usually portends the eventuality of diabetes. It also reflects the possibility that there is a metabolic disorder that requires attention. The unrelenting side effects associated with diabetes, as well as renal, cardiac, vascular, and neurological complications, can compromise one's quality of life.

Kidney Function

A measure of kidney function includes a BUN (blood urea nitrogen) and creatinine tests. A creatinine test is a more sensitive indicator of kidney function than the BUN, which can be distorted by dehydration for a variety

of reasons. Sodium, potassium, chloride, magnesium, phosphorus, and calcium are the principal electrolytes. They are the major elements of our body's chemistry, and are vitally important in the machinery of the chemical processes of the body. Disorders of the electrolytes are associated with a wide variety of illnesses and subtle changes reflective of malfunctioning of all the organ symptoms, such as the nerves, muscles, fluid balances, and heart functions.

Uric acid is often included in the testing as a byproduct of protein metabolism. The RNA and DNA of our genetic coding breaks down to uric acid when the materials are being rejuvenated. This uric acid byproduct is excreted through the kidneys. A type of arthritis called gout can develop when the material precipitates in the tissue instead of being excreted easily through the kidneys. In the joints, this produces a painful swelling, and in the collecting system of the kidneys, stones can form. Individuals with a propensity toward gout may develop a flare from consuming alcohol, which competes for the sites in the kidney that excrete uric acid.

Protein Nutrition

The state of protein nutrition in the body is reflected by the total serum protein levels. The "total protein" values are separated into the albumin and globulin components for testing purposes. Reduction in albumin can suggest a defect in the absorption of protein through the gut, eating disorders such as anorexia, or malnutrition for any cause. A deficit is often the result of dietary changes or illnesses such as liver dysfunction.

The globulin component is the protein that makes up our antibodies. Illnesses related to protein metabolism or defects in our immune system that are often identified with cancer, leukemia, AIDS, lupus, and other immune deficiencies, can be reflected here.

Cholesterol

An individual's total cholesterol, HDL (high-density lipoproteins), LDL (low-density lipoproteins), and triglycerides are measured by lipid metabolism. LDL is a calculated value derived from a mathematical equation. This information reflects the potential lipid disorders in the body. Over the course of a day, these values can change 10 to 20 percent. We therefore use the basal value, achieved



through an overnight fast, to determine the risk of cardiovascular disease.

HDL protein is similar to a garbage truck that scavenges the lipids from the vessels and takes them back to the liver for reprocessing. LDL is the “bad” cholesterol, the “garbage” that is deposited on the vessel walls, and can be affected by exercise, diet, genetics, and body-fat stores. Triglycerides are fats, which are immediately absorbed through the intestine after a meal. They become an independent risk factor of heart disease if they have exceeded the value of 150.

Optimally, the HDL value should be above 60, and the LDL value should be below 100, particularly in individuals who are diabetic, who have a history of heart disease, and who have had a prior history of stroke. All three of these populations already have a risk for vascular disease.

Liver Function

The next values are liver function studies. Because of the complexity of the liver, several studies are taken. These usually include total bilirubin, direct bilirubin, indirect bilirubin, alkaline phosphatase, GGTP, LDH, AST, and ALT. The ALT (alanine aminotransferase) is the most specific for cellular problems in the liver tissue. The alkaline phosphatase is the most specific for obstructive problems in the various small ducts of the liver. The bilirubin is one of the final breakdown products of the red blood cells when they age, and its metabolism by the liver is used as a reflection of the liver function.

Several of the liver test results can also be seen in association with other organ problems—bone disorders, muscle disorders, gallbladder disorders, lipid disorders—and this has to be taken into account when the information is interpreted. Subtle elevations of these enzymes may not have any consequence, while higher values can reflect something more serious.

Fortunately, lifestyle changes, such as reducing alcohol consumption and the use of certain medications such as Tylenol, can reverse some bad outcomes. More serious irreversible illnesses, however, such as hepatitis or cancer, may be prevented by appropriate immunization, safe sex behavior, avoiding intravenous recreational drug use, and initiating responsible blood product precautions. A serum iron level usually is included in the values, and this might be changed by inadequate absorption, increased blood loss,

or an iron overload disorder such as metachromatosis.

Blood Count

The CBC (complete blood count) measures the different blood components, specifically red blood cells, white blood cells, and platelets. Low red blood cell values suggest anemia or blood loss. High values can suggest certain cancers of the bone marrow, exposure to high altitude, and smoking. The mean corpuscular volume (MCV) refers to the size and contents of the red blood cells. Iron deficiency, or abnormal blood protein, such as thalassemia, will show a reduction of red blood cell MCV. Folic acid or vitamin B12 deficiency will produce an elevated MCV.

Platelets are elements in the blood stream that cause blood to clot. Abnormally low values can suggest disorders that can impair our ability to stop bleeding during injury.

Neutrophils, lymphocytes, monocytes, eosinophils, and basophils are the five different types of white blood cells. Their individual numbers may vary if infections are viral, bacterial, or parasitic. White blood cell types can indicate various cancers, leukemia, allergies, and metabolic disorders.

Thyroid Function

The sensitive TSH (thyroid stimulating hormone) test measures thyroid function. The neck’s thyroid gland regulates the speed of chemical reactions that occur in the tissue cells. The TSH is inversely related to the active thyroid hormone in the body. An elevated

TSH therefore means there is low thyroid, and a low TSH suggests there is too much thyroid hormone activity. A hyperthyroid condition can speed up the body’s metabolism, causing the heart to race, jitteriness, hyperactivity, cardiac failure, arrhythmias, elevated temperatures, and fatigue. Hypothyroid, or low thyroid, conditions can cause fatigue, sleepiness, weight gain, elevated cholesterol, swelling of the arms and legs, skin dryness, and hair loss.

Prostate Screening

The PSA (prostate specific antigen) is a screening test used to detect prostate cancer. An elevated PSA does not always indicate the existence of cancer. Elevations can be caused by an enlarging prostate gland in older men, infection of the prostate, recent ejaculations, or bicycle riding. It has been recommended that PSA testing be performed on a yearly basis after the age of 50. If the value from one year to the next is greater than 0.75 nanogram (1 billionth of a gram), it is considered abnormal, even if the value is within the normal range.

Cardiac Health

Some panels include more recent attempts to diagnose cardiac conditions early. These are the CRP (C-reactive protein) test, homocysteine levels, and myeloperoxidase (MPO) evaluations. In the case of elevated homocysteine levels, for instance, the use of folic acid can reduce cardiovascular risk.

Many other health panels, too numerous to address here, are used by major health clinics.

The knowledge derived from these panels must be correlated with an individual’s personal health risk. This may be assessed by gleaned information from an individual’s family history of premature heart disease, diabetes, stroke, and cancer. An individual should be honest when assessing his or her own personal lifestyle and health, particularly hypertension, obesity, smoking, alcohol consumption, physical fitness, appearance, psychological and emotional stability, and risky behaviors. This collective insight may be helpful in getting the motivated, action-oriented individual to appreciate the value of preventative medicine, and take charge of his or her own health.



Photo: John Kelly

Steadman-Hawkins Update

Publications, Presentations, and Research

American Academy of Orthopaedic Surgeons Annual Meeting Highlights (AAOS)

The Foundation once again had a significant presence at the annual meeting of the American Academy of Orthopaedic Surgeons, March 10-14 in San Francisco, during which a number of presentations and publications were accepted by this prestigious medical and scientific organization. The Academy provides education and practice management services for orthopaedic surgeons and allied health professionals. It also serves as an advocate for improved patient care and informs the public about the science of orthopaedics. Founded as a not-for-profit organization in 1933, the Academy has grown from a small organization serving fewer than 500 members to the world's largest medical association of musculoskeletal specialists, serving nearly 24,000 members throughout the world.

As in past years, the Foundation was well represented at the AAOS Annual Meeting, with four podium presentations, six poster exhibits, and one poster presentation for the American Orthopaedic Society for Sports Medicine Specialty Day. In addition, Foundation principals were involved as course instructors.

The first podium presentation was *Determinants of Patient Satisfaction and Outcome after Medial Opening Wedge High Tibial* by Bruce Miller, M.D.; Tom Joseph, M.D.; Liz Berry; Valerie Rich; and William I. Sterett, M.D. This paper measured satisfaction and functional outcome of patients with medial opening wedge high tibial osteotomy (HTO) for the degenerative varus knee (inward-turning).

The second presentation was *Functional Bracing in Preventing Injury in the ACL Reconstructed Professional Skier* by Tim Farley, M.D.; William I. Sterett, M.D.; Karen Briggs, M.B.A., M.P.H.; and J. Richard Steadman, M.D. This study identified non-bracing as a significant independent, multivariate risk factor for subsequent knee injury in the ACL-reconstructed professional skier. This presentation was also

accepted by the AAOS Sports Medicine Specialty Day.

The third podium presentation was *The Use of MRI to Assess Knee Cartilage Repair Tissue after Microfracture of Chondral Defects* by Arun J. Ramappa, M.D.; Tom Gill, M.D.; Karen Briggs, M.B.A., M.P.H.; Kathleen Buckley, M.D.; Charles Ho, M.D., Ph.D.; and J. Richard Steadman, M.D.

This paper evaluated the sensitivity, specificity, and predictive value of MRI in predicting repair tissue of knee articular cartilage defects treated by microfracture.

Poster presentations accepted by the Academy included the following:

The Healing Response Technique to Treat Proximal ACL Injuries in the Skeletally Immature Patient by Michelle Cameron, M.D.; J. Richard Steadman, M.D.; Karen Briggs, M.B.A., M.P.H.; and William G. Rodkey, D.V.M. This study concluded that skeletally immature (adolescent) patients treated with healing response for proximally torn anterior cruciate ligaments regained restored stability and function and were highly satisfied.

Determining Composite Likelihood Ratios in the Prediction of Meniscal Tears Based on Patient Exam by Tim Farley, M.D.; Douglas J. Lowery, M.D.; Dave Wing; William I. Sterett, M.D.; and J. Richard Steadman, M.D. This study determined the predictive value of a composite examination of five tests in the diagnosis of meniscal tears.

Factors Associated with Disability and Activity in Patients Seeking Care for Osteoarthritis by Karen K. Briggs, M.B.A., M.P.H.; J. Richard Steadman, M.D.; Tim O'Brien, M.D.; and Dave Wing. This award-winning study identified decreased range of motion and patient-reported stiffness as determinants of decreased activity and function in patients with osteoarthritis.

Predictors of Satisfaction with Outcome after Anterior Shoulder Surgery by James D. O'Holleran, M.D.; Mininder S. Kocher, M.D.; M.P.H.; Marilee P. Horan; David Zurakowski, Ph.D.; Karen K. Briggs, M.B.A., M.P.H.; and Richard J. Hawkins, M.D. This project correlates patient satisfaction with pain and functional outcomes after surgical treatment for anterior shoulder instability.

Chondral Lesions in Patients Treated with Microfracture and Medial Opening Wedge HTO (High Tibial Osteotomy) by William I. Sterett, M.D.; Dave Wing; J. Richard Steadman, M.D.; and Tim O'Brien, M.D. This study describes the percentage coverage on second-look arthroscopy of chondral lesions treated with microfracture combined with a medial opening wedge HTO in patients with varus malalignment.

During the Academy, Dr. Steadman participated in the continuing medical education (CME) satellite symposium "New Techniques and Controversies in Orthopaedic Surgery and Pain Management." There were two satellite broadcasts of the symposium on March 31 and April 1. A CD-Rom containing presentations, case studies, and interviews from this symposium will be available in May.

Instructional courses

During the Academy, Dr. Hawkins participated in a scientific program entitled, *Up-Close and Personal: The Complex Shoulder*, during which he discussed a variety of challenging shoulder cases with other faculty in an informal setting.

Dr. Hawkins also was an instructor for a CME course entitled *The Athlete's Shoulder*. The course, on DVD-ROM, is the Academy's first large-scale interactive production. Tutorials and quizzes on anatomy, arthroscopic knot-tying, the biomechanics of pitching, and the physical examination of the shoulder are included in the program.

Dr. William G. Rodkey, the Foundation's director of Basic Science Research, was an instructor for a three-hour course, *The Surgical Treatment of Articular Defects of the Knee*. The course covered surgical techniques available to treat articular cartilage defects of the knee.

During the Arthroscopy Association of North America 2004 Specialty Day, Dr. Steadman participated in *Point-Counter Point: Microfracture for Defects of the Articular Cartilage As a Safe and Effective Treatment Alternative*

Dr. Steadman was also an instructor for the course *Articular Cartilage Injury in the Athlete*. He presented current diagnosis and surgical techniques for chondral injuries, including demonstration of the microfracture technique.



Other Presentation News

Kevin Shelburne, Ph.D., presented *Model Predictions of Tibiofemoral Compartmental Loading in Normal Gait* to the Orthopedic Research Society, which met in San Francisco prior to the AAOS meeting. **Dr. Michael Torry, Ph.D.**, director of the Biomechanics Research Laboratory, also presented *Biomechanical Evaluation of Quadriceps Weakness on Lower-Extremity Function During Gait* to the Department of Physical Therapy at the University of San Francisco and San Jose Technical College.

Publications:

Clinical Research reports the following papers have been accepted for publication:

American Journal of Sports Medicine
 “Relationships between Objective Assessment of Ligament Stability and Subjective Assessment of Symptoms and Function After ACL Reconstruction.” By **Mininder S. Kocher, M.D.**; **J. Richard Steadman, M.D.**; **Karen Briggs, M.B.A., M.P.H.**; **William I. Sterett, M.D.**; and **Richard J. Hawkins, M.D.** (In Press)

Journal of Shoulder and Elbow Surgeons. “Volumetric Change in the Shoulder Capsule After Open Inferior Capsular Shift Vs. Arthroscopic Thermal

Capsular Shrinkage: A Cadaveric Model.” By T.A. Luke, M.D.; A.D. Rovner, M.D.; Kevin D. Plancher, M.D.; Spero G. Karas, M.D.; and **Richard J. Hawkins, M.D.** (2004)

American Journal of Sports Medicine.
 “Chondral Resurfacing and High Tibial Osteotomy in the Varus Knee.” By **William I. Sterett, M.D.**; and **J. Richard Steadman, M.D.** (In Press)

Journal of Shoulder and Elbow Surgeons.
 “Can the Impingement Test Predict Outcome After Arthroscopic Subacromial Decompression?” By Scott D. Mair, M.D.; **Randy W. Viola, M.D.**; Tom J. Gill, M.D.; **Karen K. Briggs, M.B.A., M.P.H.**; and **Richard J. Hawkins, M.D.** (2004)

American Journal of Knee Surgery.
 “Patient Satisfaction and Functional Outcome After Microfracture of the Degenerative Knee.” By Bruce S. Miller, M.D.; **J. Richard Steadman, M.D.**; **Karen K. Briggs, M.B.A., M.P.H.**; **Jasen W. Folk, M.D.**; and **J. J. Rodrigo, M.D.** (2004)

American Journal of Sports Medicine.
 “Triceps Tendon Ruptures in Professional Football Players.” By Scott D. Mair, M.D.; W. M. Isbell, M.D.; **Theodore F. Schlegel, M.D.**; Tom J. Gill, M.D.; and **Richard J. Hawkins, M.D.** (2004)

Journal of Bone and Joint Surgery.
 “Validation of Lysholm Score for Cartilage Defects.” By **Mininder S. Kocher, M.D.**; **Karen K. Briggs, M.B.A., M.P.H.**; and **J. Richard Steadman, M.D.** (In Press)

Journal of Bone and Joint Surgery.
 “Determinants of Patient Satisfaction with Outcome after Rotator Cuff Surgery.” By James D. O’Halleran, M.D.; **Mininder S. Kocher, M.D.**; **Merilee P. Horan; Karen K. Briggs, M.B.A., M.P.H.**; and **Richard J. Hawkins, M.D.** (Accepted with revisions)

American Journal of Sports Medicine.
 “Incidence and Location of Bone Bruises After Acute PCL Injuries.” By Scott Mair, M.D.; **Theodore Schlegel, M.D.**; Tom J. Gill, M.D.; **J. Richard Steadman, M.D.**; and **Richard J. Hawkins, M.D.** (Accepted with revisions)

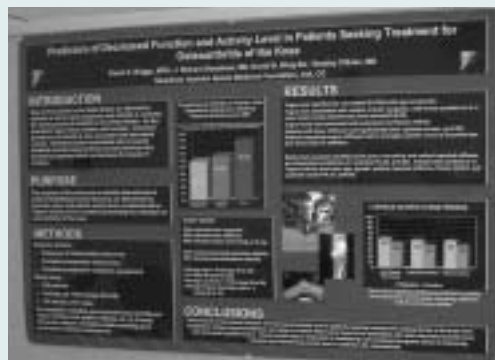
American Journal of Knee Surgery.
 “Reconstruction in Combined ACL-MCL Injuries.” By A.T. Pennock, M.D.; Peter J. Millett, M.D.; **J. Richard Steadman, M.D.**; **William I. Sterett, M.D.**; and **Richard J. Hawkins, M.D.** (In Press)

Journal of Shoulder & Elbow Surgery

“The Rotator Interval and Defect: Quantification of Its Dimension in a Dynamic Model with Correlation to Underlying Glenohumeral Joint Pathology.” By Kevin P. Plancher, M.D.; J.C. Johnston, M.D.; R.K. Peterson, M.D.; and **Richard J. Hawkins, M.D.** (In Press)

AWARDS

Academy Recognizes Award-Winning Poster



Award-winning poster on display in San Francisco

After months of reviewing 3,300 poster abstracts, the American Academy of Orthopaedic Surgeons selected the poster presentation *Factors Associated with Disability and Activity in Patients Seeking Care for Osteoarthritis* as one of 12 award winners. The poster’s authors were Karen K. Briggs, M.B.A., M.P.H.; J. Richard Steadman, M.D.; Tim O’Brien, M.D.; and Dave Wing. This study identified decreased range of motion and patient-reported stiffness as determinants of decreased activity and function in patients with osteoarthritis.

“Karen came to me and presented the data from our database” said Dr. Steadman, of Karen Briggs, lead author of the study. “She did this all on her own.”

“The criteria for scientific posters have become much more stringent through the years,” said Jon J.P. Warner, M.D., chair of AAOS’s Central Program Committee. Posters are judged on several criteria, including originality, soundness of scientific reasoning, whether the conclusions are supported by data, and whether the poster presents any new information that makes a difference in the quality of care.

Education

Where Are They Now?

Steadman-Hawkins 2002/2003 Fellows
Establish New Careers in Orthopaedics:

Michael J. Milne, M.D., started a solo practice with the help of another sports medicine surgeon in St. Louis, Mo., where he grew up.

Scott A. Hacker, M.D., and his wife, Mona, and son, Jake, moved to El Cajon, Calif. Dr. Hacker is working with the Alvarado Orthopaedic Medical Group in San Diego.

Timothy D. Farley, M.D., and his wife and son, moved to Ladue, Mo. Dr. Farley is working with the Missouri Bone and Joint Center in St. Louis.

Timothy O'Brien, M.D., moved with his fiancée, Kristen, to Bozeman, Mont. They will marry in June 2004. Dr. O'Brien has joined Alpine Orthopaedics in Bozeman, which specializes in knee and shoulder surgery.

James Van den Bogaerde, M.D., returned to California with his wife and two children. He is working with The Permanente Medical Group in Roseville.

Reed L. Bartz, M.D., remains in Colorado with his wife and three children. He is Assistant Professor at the University of Colorado Sports Medicine Clinic, Department of Orthopaedics, at the University of Colorado Health Sciences Center. He is also Team Physician for the University of Colorado and University of Denver.

Board of Directors in the News

Congratulations to **Earl Graves**, who was inducted February 27 into the Central Intercollegiate Athletic Association Hall of Fame. Graves ran track in the CIAA as a member of the Morgan State University Bears.

Earl Graves (see "Patients in the News"), was also featured in the September 2003 issue of *Fortune Small Business*. Graves founded *Black Enterprise* magazine in 1970, the first publication ever devoted to African-American entrepreneurs and corporate executives.

Drs. Steadman, Hawkins, and Jack Kemp, co-director and co-founder of Empower America, were featured in *The Denver Post* columnist Adam Scheffter's column "Know Them from Adam." The Steadman-Hawkins article appeared August 7 and the Kemp article appeared November 9.

Dr. Steadman was featured in the February issue of *Ski Magazine*. In the article, "King of Pain: Steadman's Secrets," Dr.

Steadman gives insights into making an effective comeback from major knee surgery:

1. Be very careful immediately after the injury. Use braces or crutches to keep from inflicting further damage.
2. See an experienced practitioner and request an MRI, which can provide information about the whole joint. "Frequently with an ACL tear, there's also damage to bone or cartilage," Dr. Steadman says. "An MRI will make that clear."
3. Find a therapist and a

doctor who can work together as a team. 4. Schedule the surgery carefully. "The environment of the joint at the time of surgery is very important," Dr. Steadman says. "If the knee is tender and swollen, it's probably better to wait." 5. Work with your therapist to gain stability and mobility before starting strength exercises. "If you work on strength before mobility, you're more likely to have degeneration later," Dr. Steadman says.

The **Montreal Canadiens** clinched an NHL playoff berth, and *The Denver Post* hockey writer Terry Frei reported in March that the players are giving some of the credit to the ownership of Foundation Board member **George Gillett, Jr.**, who purchased the team in 2001. Team captain Saku Koivu brightened when Gillett's name was mentioned, and the reason goes beyond hockey. Koivu cited Gillett's support during the Finnish center's bout with stomach cancer in late 2001 and early 2002.

Dr. William I. Sterett was quoted in *The New York Times* on March 18. The article by Bill Pennington, "My Knee, My Ski Season: Modern Medical Miracle," reported on the importance of mobilization, a concept validated by the Foundation many years ago. As Dr. Bill Sterett of the Steadman-Hawkins Clinic in Vail, Colo., said, it was only 10 years ago that patients with anterior cruciate ligament injuries had their knees placed in a cast for several weeks after surgery, which bred scar tissue that took another several weeks to get out of the knee once the cast was removed. "Now, we understand that moving the joint after surgery is good for it, and with better surgical techniques it's possible to do it and keep the swelling down," said Sterett, the head physician of the United States Women's Alpine team. "Starting therapy sooner has meant normalizing the knee sooner."



Photo: John Kelly



Photo: AP/Wide World Photos

Bruce Smith (right) of the Washington Redskins, enjoys a tribute to his career sack record (200) with Foundation Board Member Jack Kemp (left) during half-time of the NFL match Philadelphia Eagles vs. Washington Redskins in Landover, Md., Saturday, Dec. 27, 2003. The Eagles won 31-7.

Media

Future Pro Football Hall of Famer Bruce Smith Sets Career Sack Record, Credits Dr. Steadman

The long awaited moment came for the Washington Redskins' Bruce Smith in a game against the New York Giants on December 7 last season, when he sacked quarterback Jesse Palmer for a record-setting 199th career sack. Reggie White of the Green Bay Packers held the old mark of 198.

"I've been playing this game a long time," said the 40-year-old athlete. "I've had a lot of surgeries, and a lot of very important people were instrumental in prolonging my career."

From the locker room, immediately following the game, Smith called Dr. Steadman at home to express his appreciation. Voted the National Football League's 1996 Defensive Player of the Year, Smith knew back in 1992, when he was playing for the Buffalo Bills, that his 29-year-old knees were quickly deteriorating from his years on the college and pro gridiron. He had one surgery, on his left knee, but tried to come back too early. His knee started giving way again, this time with major fragments breaking away.

"Then," says Smith, "I decided to pay Dr. Steadman a visit." Smith had heard, from his agent and from the Bills' staff, about Dr. Steadman's work. "I decided to go to Dr. Steadman because he was operating on people—skiers mostly—with knees far worse than mine. The first time I met him, and saw the way he was built—like me, he's a little knock-kneed and, from the waist down, we're pretty much similar—I knew he was my man."

After that day in March 1992, and his microfracture surgery that same month, Smith was back at his peak. Said former Buffalo Bills quarterback and Foundation board member Jack Kemp, "That surgery added at least five years to Bruce's football career."

Smith has now undergone two microfractures. The first, in March 1992, was followed by another, on his right knee, in February 1996. He most assuredly agrees with Jack Kemp. "If I hadn't met Dr. Steadman, there's a good chance my career would have come to an end."

During halftime of the Redskins final home game, December 27, Smith was honored. He was introduced by Jack Kemp, and

then presented with a life-size plaque designed in his 6-foot-4, 262-pound form. In front of 76,000 fans, he expressed appreciation to Dr. Steadman for saving his career.

"This is a very humbling experience," said Smith, surrounded by a dozen or so family members. "Thank you from the bottom of my heart."

Source: David Elfia, *The Washington Times*; Adam Shefter, *The Denver Post*.

Editors Note: Ten years ago, less than 1 percent of the world's orthopaedic surgeons performed microfracture, a procedure that encourages cartilage regeneration in the knee joint. Today, this technique is the one most often used by surgeons as the first treatment for articular cartilage defects. Microfracture, an arthroscopic technique used to repair cartilage tissue through small incisions, was pioneered by the Steadman-Hawkins Sports Medicine Foundation's Basic Science and Clinical Research Departments.

These and other procedures developed by the Foundation can postpone the need for joint replacement surgery.

(Weight Lifting cont. from pg. 1)

ening exercises. When starting a weight program, begin with light resistance, and adjust up or down so that moderate fatigue is experienced at the completion of the prescribed repetitions. Allow approximately 1-2 minutes between sets to allow muscles to recover.

Squat: A total body strengthening exercise that primarily strengthens the gluts, quads, and hamstrings. Place weighted bar across the back of the shoulders, resting on the deltoids and traps. Starting position: Place feet shoulder-width apart or slightly wider. A squat is performed by simultaneously bending at the hips and knees while keeping the eyes focused forward, chest up and out, and a flat back throughout the movement. Lower initially to 30- to 45-degree knee bend and progress as tolerated (maximum 70 degrees). During the upward movement, extend knees

and hips at the same rate. This will ensure that the torso remains upright during the upward movement. Keep knees slightly bent at the top—never lock them straight.

Recommended: 8-12 reps, 2-3 sets, 2-3 times/week.

Leg Press: A multi-joint movement comprised of hip and knee extension. This exercise is beneficial for knee rehabilitation because it involves co-contraction of the quads and hamstrings around the knee joint. It also strengthens the gluts, hip abductors, hip adductors, and gastrocnemius.

1. Single Leg Press: Used to increase post-surgical leg strength until it is equal to the uninvolved extremity. Starting position: Place foot on platform and adjust sled until knee is resting at 90 degrees of flexion. Press against platform and extend knee until almost straight. Don't lock knees. Return to the starting position with control.

2. Double Leg Press: Used to bilaterally increase leg strength. Be careful not to dominate exercises with the non-surgical or uninvolved leg. Starting position: Place feet on platform, shoulder-width apart, toes slightly turned out, and adjust sled until knee is resting at 90 degrees of flexion. Press against platform equally with both legs and extend knee until almost straight. Don't lock knees. Return to starting position with control.

Recommended: 10-15 reps, 2-3 sets, 2-3 times/week or sets of 1 minute, 2 minutes, and 3 minutes, 3-4 times/week.

Reverse Lunge: A lower-extremity strengthening exercise. Starting position: Stand with feet shoulder-width apart and knees slightly bent. Movement is performed by stepping backward with one foot and bending the other knee, lowering your body into a lunge position with front knee flexed between 70 and 90 degrees. Contract your front leg, lifting your body back to the start



Squat 1



Squat 2



Single Leg Press



Double Leg Press 1



Double Leg Press 2



position. Keep knees slightly bent at the top, never lock knees straight.

Recommended: 10-15 reps, 2-3 sets, 2-3 times/week. Add weight to exercise (dumbbells or barbell across posterior shoulders) when able to perform exercise 15 reps, 3 sets slow, controlled and balanced.

Hamstring Curl: An isolated hamstring strengthening exercise performed by bending knees with focus on contracting the back of the thigh.

1. Seated machine. Starting position: Sit on the machine. Adjust seat back so that knee joint is in line with rotation point on the machine.

2. Prone Lying machine. Starting position: Lie on stomach. Adjust lower leg pad so that it is in line with ankles.

Recommended: 10-15 reps, 2-3 sets, 3-4 times/week.

Calf Press:

1. Calf press on leg press machine: Strengthens high calf muscle called the gastrocnemius. Starting positions: Arrange feet with heels off bottom edge of foot platform. Extend your knees until they are almost straight. Don't lock knees. This exercise is performed with ankle movement. Lower heels to stretch calves, then contract your calves to point your toes.

2. Seated: Focuses more on the deep calf muscle called the soleus because the knee is bent. Starting position: Seated at the machine, place feet on foot plate and adjust thigh pad to appropriate height. Again, the exercise is performed with ankle movement. Lower heels to stretch calves, then contract your calves and point your toes.

Recommended: 10-15 reps, 2-3 sets, 3-4 times/week.

(cont. pg 14)



When beginning a weight program, begin with light resistance and adjust up or down so that moderate fatigue is experienced at the completion of the prescribed repetitions. Allow approximately 1-2 minutes between sets to allow muscles to recover.



Reverse Lunge 1



Reverse Lunge 2



Hamstring Curl 1



Hamstring Curl 2



Calf Press 1



Calf Press 2



Calf Press 3

(Weight Lifting cont. from pg. 13)

Hip Abduction and Adduction

Machines: Beneficial for promoting hip strength and stability.

Hip Abduction: Strengthens the buttocks and outer thighs. Primary active muscles are glut medius, glut minimus, and tensor fasciae latae. Starting position: Sit with legs together and resistance arms resting against outer legs. Perform exercise by separating knees while contracting outer thigh and gluts. Be careful to return to the starting position with control.

Recommended: 10-15 reps, 2-3 sets, 3-4 times/week.

Hip Adduction: Strengthens the inner thighs. Primary active muscles are gracilis, adductor magnus, adductor longus, adductor brevis, and pectineus. Starting position: Sit with resistance arms resting against your

inner legs. Separate resistance arms to a comfortable distance. Exercise is performed by squeezing the inner thighs to bring legs together. Return to the starting position with control.

Recommended: 10-15 reps, 2-3 sets, 3-4 times/week.

Balance Squat: A lower-extremity strength, endurance, and balance exercise. Starting position: Balancing on one foot, bend knee to 30 degrees and rest other foot behind on a bench or chair. This exercise is performed by bending your front leg until the knee is flexed 70 to 90 degrees. Lowering motion should be slow and controlled. Contract and return to starting position, at the top maintaining 30 degrees knee flexion.

Recommended: 20-30 reps, 2 sets, 2-3 times/week. Add weight to exercise (dumbbells) when able to perform exercise 30 reps, 2 sets slow, controlled and balanced.

Setting a Workout Schedule: Ideally, perform weight training 3-4 times a week. First, warm up with light-to-moderate cardio exercise on the bike or treadmill for 10-15 minutes. Organize your training session by performing multi-joint lifts first (squat, leg press, reverse lunge), then single-joint lifts (hamstring curl, calf press, hip abduction, hip adduction), and finally complete your workout by performing balance squats for muscle endurance. It is best to perform all of the above exercises in one training session. When fatigued or pressed for time, however, shorten the program to include one multi-joint exercise, all single-joint exercises, and exclude balance squats.

As always, it is important that you consult with your physician before starting any exercise program, if you are experiencing any joint or muscle pain, or rehabilitating from injury or surgery.



Seated Calf Press, 1



Seated Calf Press, 2



Hip Abduction, 1



Hip Abduction, 2



Balance Squat, 1



Balance Squat, 2



(Graves cont. from pg. 1)

Graves is an African American who started his spiraling success story by selling Christmas cards door-to-door at age seven. “I was not in a community where you could cut grass,” stated the Brooklyn, N.Y. resident. Twenty-seven years later, in 1970, he launched the nation’s first publication devoted to black entrepreneurs and business executives. Last year, Graves’ *Black Enterprise* driven media empire generated \$53 million in revenues.

Years before launching his magazine, Graves—like many of the 60s’ brightest—served in the political arena, as aide to the late Sen. Robert Kennedy. Graves was with the Presidential candidate, in fact, on June 5, 1968—the night Kennedy was assassinated in Los Angeles.

It was a dark moment for Graves, but it was also a turning point. Offered a high-paying job with IBM, he turned that down to sign on for a Ford Foundation Fellowship. It was an opportunity to study entrepreneurship and economic development, studies that would serve him well in pursuit of his goal—to advise American businesses on tapping into the emerging African-American market and, his ultimate goal, to put “black” and “capitalism” in the same sentence. After 33 years of publishing, and with the help of his three sons, the *Black Enterprise* empire, based in New York City, shows no signs of slowing.

Through it all, Graves also took his lumps. Jumping out of airplanes as a member of the U.S. Army Special Forces after college took its toll on his back. Recently diagnosed with stenosis of the spine, he underwent spinal fusion in July at New York City’s Hospital for Special Surgery. The operation was recommended by Steadman-Hawkins Fellow Dr. David Johnson, who had interned at the hospital. The rehab is proceeding well, although, as Graves puts it, “Sitting around the house isn’t me.” So he cheats a bit by pushing his recovery regimen, taking longer walks than he should, trimming back on medications sooner than he should. “What really bothers me,” he says, “is that it’s going to knock out skiing this winter, and for me that’s tragic.” An active outdoorsman—

hiking, swimming, golf, in addition to skiing—Graves bought a home in Beaver Creek, Colo., 20 years ago where he and his family spend most of their winters. It was in Beaver Creek in 1997 that he found himself riding a chairlift with former HUD secretary and 1996 Vice Presidential candidate Jack Kemp. Graves asked Kemp what brought him to Beaver Creek. When Kemp told him he was attending a Steadman-Hawkins Foundation meeting, Graves said, incredulously, “Let me understand this. You mean you came all the way out here just for a meeting?”

Fast forward. Earl Graves, six years later, is now the Foundation’s Development Committee chairman, a key position in which he has been able to attract much needed funding for the Foundation’s work, including \$150,000 for the Foundation’s 15th anniversary event held last summer.

Why does he do it? “The reason I volunteered for the Steadman-Hawkins Foundation is because of Dr. Steadman and Dr. Hawkins. These are two unique individuals. They, and their staff, really care—and not during just pre-care and operative care. Most significant is the concern and interest that the Steadman-Hawkins staff have in how well and quickly you recover. And the board is a totally committed group of people who very much care about what the Foundation is doing and what it’s capable of doing.” Graves should know. An expert skier (“When you’ve spent as much money as I have on lessons, you’re bound to get good.”), he’s suffered his share of knee problems during his 68 years. Dr. Steadman has scoped his knee twice, advising Graves to think of it as getting a tune-up on his legs every two to three years. “Eventually,” Graves says, “I’ll have to have a knee replacement. Nonetheless, I consider any of my infirmities incidental to the times I’ve enjoyed skiing—you gotta pay to play.” And *Black Enterprise* Graves grins broadly. “My sons have pretty much taken over the business. I’m honest enough to admit that I’m working for them these days.”

(Arthritis cont. from pg. 1)

Osteoarthritis recently has been listed as one of the top 10 most costly diseases in the U.S. It is characterized by a breakdown of cartilage in the joints. The progressive loss of articular cartilage results in remodeling and the development of diseased subchondral bone. It is among the most frequent and symptomatic medical problems for middle-aged and older people.

Pain is the most common symptom of osteoarthritis, which consists of a generally reduced range of motion, swelling, and deformity. Osteoarthritis may slowly progress for many years, improve briefly or, in an occasional patient, progress rapidly to the point of disability.

Since the Foundation’s founding almost 16 years ago, much of our time and resources has been devoted to tackling this disease head-on. Recently, we have expanded our focus on the prevention, early management, and treatment of osteoarthritis. Our most recent efforts are described below.

Osteoarthritis of the Knee

Microfracture of the Degenerative Knee: Full-thickness chondral defects are common after traumatic injury to the knee. They rarely heal spontaneously. Most patients eventually develop degenerative changes that can be debilitating—osteoarthritis.

Surgical management of the arthritic knee in an active patient presents a challenge to the orthopaedic surgeon. Many surgical procedures have been developed to treat articular cartilage lesions of the knee, but few have been shown to be successful in the degenerative knee. Total knee replacement has produced favorable results in the treatment of the arthritic knee, but many patients wish to put off a knee replacement in order to maintain a high level of athletic activity.

To treat full-thickness chondral defects, the ideal technique is relatively simple to perform, has few complications, is cost-effective, and has a high long-term clinical success rate without jeopardizing the ability to perform future procedures. More than 20 years ago,

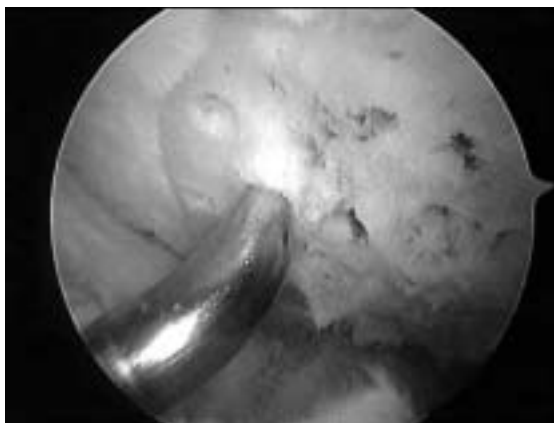
(cont. pg 16)

(Arthritis cont. from pg. 15)

Dr. Steadman began performing the microfracture technique for the treatment of cartilage defects. The technique was developed to enhance chondral resurfacing by providing a suitable environment for new tissue formation and taking advantage of the body's own healing potential.

Microfracture involves making small punctures in the bone that underlies the damaged cartilage. These small punctures, or "microfractures," provide access to stem cells and healing factors contained in the bone marrow. These marrow elements are released and form a "superclot," which supports formation of new reparative cartilage. Our research has demonstrated that these various growth factors and other healing modulators significantly enhance the repair process.

Recently, we completed a study that investigated the outcome of the microfracture technique when applied to degenerative articular cartilage lesions of the knee. Our study included patients over the age of 40 who had severe degenerative lesions of the knee and underwent microfracture. The study showed



Microfracture technique to repair full-thickness chondral defects.

that in these patients, averaging 2.6 years following surgery, the symptoms and function had improved, patient-activity level had increased, and the patients were highly satisfied. We hope our findings will help establish guidelines and expectations in the treatment of patients with osteoarthritis of the knee.

Microfracture to Treat Traumatic Chondral Defects

Over the past eight years, several studies have been published on the functional outcomes of microfracture. Recently, a study was published in *Arthroscopy*, which examined patients during long-term follow-up after microfracture to treat traumatic chondral defects. The average follow-up was 11 years, with the longest being 17 years. The study found that microfracture for isolated full-thickness chondral defects in patients under 45 years of age led to *significant* improvement in function and symptoms. The study showed that if chondral defects are treated early, before they become degenerative, patients can also experience marked improvement.

Physical-Activity Goals for Osteoarthritis of the Knee

Studies have shown that the presence of arthritis can predict functional limitations in older individuals. This increase in disability leads to decreased physical activity and loss of muscle strength. The role of exercise in the treatment of osteoarthritis has been well

established. Lack of physical activity, on the other hand, has been shown to be a predictor of disability in older adults.

We recently completed a project that examined factors associated with activity in patients with osteoarthritis. Current physical activity level, patient-activity level goal, and patient function/disability were assessed in patients older than age 40 who were seeking treatment for osteoarthritis of the knee.

Patient-activity goal was related to pain, disability, and current activity level. This study demonstrated

the importance pain plays in activity and disability in individuals with osteoarthritis of the knee. The amount of improvement in activity level these individuals desired was influenced by current activity and pain. However, the initial activity level was associated with disability. This reinforces the idea of a vicious cycle: Increased pain leads to increased disability, which leads to decreased activity level, which leads to increased pain.

Early management programs should be developed that address factors associated with decreased activity. Individuals with osteoarthritis should be encouraged to seek treatment prior to developing severe knee pain.

Factors Associated with Disability and Activity in Patients Seeking Care for Osteoarthritis of the Knee

We are currently completing a study to determine the factors that are associated with disability and activity level in patients with osteoarthritis of the knee. Initial results show that activity level is associated with age, gender, stiffness, flexion deficit, and Lysholm score (a functional outcome score). We also identified joint-space narrowing, an indicator of osteoarthritis, and stiffness as predictors of Lysholm.

Osteoarthritis of the Shoulder

Osteoarthritis of the glenohumeral joint is a common cause of shoulder pain. It can result in restricted range of motion and loss of function. In an osteoarthritic shoulder, the articular surface anatomy may be damaged,



Photo: John Kelly



leading to pain and loss of function. Arthritis in the shoulder can develop following trauma, shoulder surgery, or an inflammatory joint condition.

The Risk of Glenohumeral Arthritis in Patients with Shoulder Instability

One study demonstrated that the prevalence of osteoarthritis is low in patients with shoulder instability. We did, however, find a significant association between age and arthritis between the time of injury and the onset of arthritis. In this study, the longer the patient was unstable, the higher was the prevalence of arthritis.

Recently, a study was completed to estimate the risk of osteoarthritis in patients with shoulder instability compared to a control group to determine what other factors may contribute to this risk. The overall prevalence of arthritis in the instability group (15 percent) was significantly higher than the prevalence in the control group (5 percent).

Compared to the control group, patients with instability had a three times greater risk of arthritis. In patients over 35 years of age, this risk increased 4.6 times.

Association Between Glenohumeral Arthritis and the Degree of Long-standing Anterior Instability of the Shoulder

The purpose of this study was to determine factors associated with anterior shoulder instability and the development of glenohumeral (shoulder joint) osteoarthritis. We hypothesized that patients with longer-standing symptoms and more instability would show increased prevalence of arthritis. We found an association between increasing grades of anterior instability and the development of arthritis. Patients with greater instability were at highest risk for the development of arthritis. This risk increased with age. This study also found an association between the amount of humeral head instability and the presence of arthritis in joints of patients with documented anterior shoulder instability. Shoulder instability may be a potential contributor to the development of shoulder osteoarthritis in patients with chronic anterior instability.

In summary, patients with shoulder instability are at increased risk for the development of shoulder arthritis, and the risk increases as the patient ages



Gender Differences in Non-Contact ACL Injuries

By Michael R. Torry, Ph.D.

Editor's note: Dr. Torry is Director of the Biomechanics Research Laboratory at the Steadman•Hawkins Sports Medicine Foundation.

Women are two to 10 times more likely to tear their anterior cruciate ligaments (ACLs) than men, even in similar sports such as soccer or basketball. Contact ACL injuries are common and are a result of someone or something hitting an athlete in a fashion that tears the ACL. The non-contact ACL injury, however, occurs much more frequently (70 percent of the time). This type of injury consists of the athlete performing a motion that causes the ACL to rupture. Through the review of game and practice films, it has been noted that most of these injuries are caused by sudden deceleration, such as landing from a jump or a cut-and-pivot motion.

The Biomechanics Research Laboratory is heading up an ambitious project to determine why females are more prone to ACL injuries. By observing, in our lab, how females and males land differently from a jump, we have identified specific and consistent differences in how females land, some of which may make them more prone to ACL injury. Most obvious is the fact that females land less flexed at the knee joint. This puts the ACL in a position where it must withstand considerably more load than if they were to land in a more flexed knee position. With this information, Foundation Senior Staff Scientist Dr. Kevin Shelburne and Dr. Marcus Pandy of the University of Texas are working to develop a computer simulation of this motion. The hope is to understand just why the ACL ruptures in



Three-dimensional model of the knee.

females and not in males, while identifying mechanisms that predispose females to the injury more than males. Our preliminary results suggest that muscle weakness, often associated with this type of injury, might not be the prevailing reason why females tear their ACLs more than men. On the contrary, it might be more related to the size and physical dimensions of the tibia. More specifically, a tibia with a more posterior slope can predispose the ACL to higher loads. If this is true, then knowing the tibial geometry of a person's knee could help identify who is at risk of an ACL rupture. We are currently working with physicians from Germany to compare the tibial slope of individuals who have torn their ACLs with those who have not. It is hoped this research will identify who is at greater risk for injury.

Did You Know. . .

- Arthritis and chronic joint problems plague about one of every three adults, making it one of the most prevalent diseases in the United States.
- The painful effects of arthritis limit physical activity more frequently than heart disease, cancer, or diabetes.
- The economic consequences of arthritis are enormous, making the disease the most frequent cause of lost wages in the country.
- The costs that our nation bears for treating arthritis, its complications, and the disability that it causes is almost \$65 billion. This includes the indirect costs associated with wage losses and an estimated medical bill of \$15 billion each year for physician visits and hospitalizations.

In recognition of these alarming statistics, physicians and scientists at the Steadman♦Hawkins Sports Medicine Foundation are developing new surgical procedures and data to combat degenerative arthritis.

Microfracture, an arthroscopic technique used to repair cartilage tissue through small incisions, was pioneered by the Steadman♦Hawkins Sports Medicine Foundation's Basic Science and Clinical Research departments. Ten years ago, less than 1 percent of the world's orthopaedic surgeons performed microfracture. Today, this technique, which makes it possible to postpone the need for knee-replacement surgery, is most often used by surgeons as the first treatment for articular cartilage defects.

Arthritis in the shoulder is often caused by shoulder injury. To this end, Foundation researchers are designing an arthroscopic technique to simplify rotator cuff repair while aiming to match the outcomes of more invasive procedures. Thanks to a series of important biomedical innovations, this arthroscopic procedure shows great promise as a treatment for shoulder injuries.

Foundation scientists are also investigating the role of growth factors in enhancing rotator cuff repair in the shoulder. The results of this research may lead to stronger and more stable shoulder repair.

The Foundation's Biomechanics Research Laboratory has shown that quadriceps weakness can cause increased loading on the knee, a problem that can lead to osteoarthritis. This study scientifically supports physical therapy as a conservative treatment to help prevent knee osteoarthritis.

In addition, this arm of the Foundation is pioneering the development of three-dimensional, computer-generated images of shoulders, knees, and other joints. This new technology will allow future physicians, therapists, and researchers to test treatments using virtual reality, leading to more effective, less expensive procedures for patient treatment.

The Foundation is also laying the groundwork for further investigation into the role that genetic medicine might play in the treatment of cartilage disease.

The Foundation's Clinical Research database has been in place since 1993. We believe it is unique in orthopaedic research. It includes details on 11,900 knee surgeries and 2,282 shoulder surgeries, as well as information on every Steadman-Hawkins patient's post-surgical symptoms, function, and satisfaction since the database was established. This valuable research tool allows our scientists to accurately evaluate the long-term outcomes of new treatments.



Photo: John Kelly

The Steadman♦Hawkins Sport Medicine Foundation's work extends far beyond the greater Vail Valley. We host international conferences and medical meetings for orthopaedists from all over the world. Philanthropic gifts support scientific research, and the Foundation's Fellowship program has trained 130 Fellows and associates worldwide. These orthopaedic surgeons have gone on to share with others the advanced techniques in surgery and rehabilitation that they learned in Vail.

As one of the largest independent orthopaedic research institutions in the world, the Foundation spends \$2.5 - \$3 million annually—\$30 million over the past 15 years—on research, education, and support programs. Procedures that were developed over many years by Foundation researchers are routinely used today by orthopaedic surgeons throughout the world. These new treatments reduce recovery time and ultimately lower health care costs.

Save the Date

Steadman-Hawkins On the Links

Steadman-Hawkins Sanctuary Golf Tournament Set for June 21

The Steadman♦Hawkins Sports Medicine Foundation has been selected by RE/MAX International, a global real-estate firm, to hold the first Steadman-Hawkins Golf Classic at the Sanctuary, a premier golf resort located south of Denver near Sedalia. Proceeds from the tournament will support the development of new procedures and methodology to battle degenerative arthritis. The team event will include a shotgun start with a modified scramble. The tournament is open to the public and includes invitees from the Denver Broncos, local celebrities, and Colorado golf pros.

Sanctuary organizes and hosts charitable events to support organizations devoted to the arts, children, health care, and crisis manage-

ment. To date, more than 75 charities have raised more than \$10 million to benefit the constituents they serve.

Renowned course architect Jim Engh, *Golf Digest's* first-ever "Architect of the Year" in 2003, designed the course that protects a private oasis of 220 acres, effectively complementing the 40,000 surrounding acres of dedicated open space.

Golf Digest listed Sanctuary as the best new private course in 1997. Gary McCord, CBS golf analyst and senior PGA tour professional, has said, "Sanctuary is simply the most spectacular golf course I have ever seen."

The Steadman♦Hawkins Sports Medicine Foundation is grateful to Dave and Gail Linigars, owners and co-founders of RE/MAX International, who created this unique opportunity for the Foundation to develop and enhance relationships with those who support our mission.

Foundation Celebrates "Colorado Classic"

A lifetime of excellence will be on display August 14-16 in Vail, Colo., as the Steadman♦Hawkins Sports Medicine Foundation hosts the "Colorado Classic," a two-day athletic, cultural, and culinary extravaganza. Proceeds from the Classic will support the research and educational programs of the Foundation

The "Colorado Classic" will feature superb cuisine, courtesy of some of the Vail Valley's finest restaurants; award-winning wines from Shafer Vineyards and Chappellet Winery; Colorado outdoor sporting activities; and opportunities to bid on the dreams of a lifetime, including the Colorado Classic Golf Tournament at the Sonnenalp Golf Club at Singletree.

An array of participation levels and lodging specials at the Ritz-Carleton, Bachelor Gulch, are available during the "Colorado Classic" weekend. To request an invitation, or for more information, contact Rachele Palmer at the Steadman♦Hawkins Sports Medicine Foundation at (970) 479-5809 or visit www.coloradoclassic.org.



Spectacular Sanctuary!



"Steadman-Hawkins Colorado Classic" will feature superb cuisine, courtesy of some of the Vail Valley's finest restaurants.

The Steadman♦Hawkins Sports Medicine Foundation is dedicated to keeping people of all ages physically active through orthopaedic research and education in the areas of arthritis, healing, rehabilitation and injury prevention.

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Mark Your Calendar

June 21, 2004

Steadman-Hawkins 2004 Golf Classic presented by RE/MAX International at Sanctuary in Sedalia, Colo. For more information, contact Rachele Palmer at (970) 479-5809, rachele.palmer@shsmf.org or coloradoclassic.org

August 14-16, 2004

Steadman-Hawkins Colorado Classic, Celebrating a Lifetime of Excellence. An evening of Vail Valley cuisine, music, golf, and the opportunity to bid on the dreams of a lifetime. For more information, contact Rachele Palmer at (970) 479-5809, rachele.palmer@shsmf.org or coloradoclassic.org

Your Legacy, Our Future.

Please remember Steadman♦Hawkins Sports Medicine Foundation in your will, trust or other estate plan.



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