Orthopaedic Focus

A Summa Health System Publication • Winter 2011

SUMMA
Health System

Summa Health System: An Overview

Summa Health System is an Integrated Healthcare Delivery System that provides coordinated, value-based care across the continuum for the people and populations we serve. We hold ourselves clinically and financially accountable for health outcomes in our communities.

We integrate the resources of seven owned, affiliated and joint venture hospitals; a regional network of ambulatory centers, a network of more than 1,000 physicians that includes a 250+ employed multi-specialty group, a 150,000+ member health plan, a System-level foundation and 10,000 employees, nurses and healthcare professionals to provide the right care at the right time in the right place for our patients.

As an Integrated Healthcare Delivery System, we are positioned to utilize the strengths of the organization to become a national model of excellence for other organizations to follow. ■

At Summa Health System today, you see the healthcare system of tomorrow.

Contents

Orthopaedic specialists at Crystal Clinic Orthopaedic Center, a partnership with Summa Health System, contributed to the articles in this publication. Many of these orthopaedic surgeons are active members of Summa's teaching and medical education staffs.

Letter from the Chair

Dear Colleagues and Friends,

Healthcare stands at the brink of substantial changes. While we're not yet sure how these changes will play out – or what the landscape will exactly look like – we do know that Summa Health System's department of orthopaedics is prepared to adapt to the system that eventually will take place.

Summa Health System is in the midst of transforming itself into an Accountable Care Organization (ACO), with the goal of providing better value and more innovative care to specific populations in the communities it serves. An ACO holds a provider accountable for the quality of care and cost of care, and this model will replace the traditional fee-for-service. How specialists fit into this future of healthcare remains to be seen.

The department of orthopaedics is studying ways to play an important role in the development of ACO measures; one being developed by the department of orthopaedics is participation in the American Orthopaedic Association's "Own The Bone" national quality improvement program. This will improve the care of our patients with fragility fractures.

We plan to convene a low back pain working group to develop clinical pathways to provide the best results for our patients. Literature suggests that significant, unwarranted interventions occur before patients are evaluated for discectomy.

Both are evidence-based treatment plans that will improve our patient outcomes. We will continue to explore additional value initiatives.

Collaboration also is playing a big part in the future of the department of orthopaedics.

Summa Health System's partnership with Crystal Clinic in forming the Crystal Clinic Orthopaedic Center brought together the experience and expertise of our two nationally recognized programs. The result: Northeast Ohio residents can receive the best orthopaedic care in a facility convenient for them.

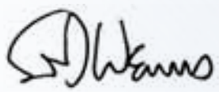
Our relationship with Austen BioInnovation Institute in Akron (ABIA) – www.abiakron.org – is growing. ABIA is focused on patient-centered innovation and commercialization at the intersection of biomaterials and medicine. Thom Olmstead and Brian Davis discuss the collaborative approach between Summa Health System and ABIA, how it will lead to better patient outcomes and help establish the Akron area as a beacon of biomedical innovation (see page 20).

Our surgeons are studying the use of platelet-rich plasma (PRP) in ACL reconstruction surgeries to improve outcomes (see page 8), and they have seen some encouraging results in the initial findings. Several of our other surgeons are actively involved in collaborative projects.

We have been very fortunate during the past several years to have had the opportunity to recruit young, energetic orthopaedic surgeons that are interested in research and teaching. One such physician is Matthew Dilisio, M.D., a fourth-year orthopaedic surgery resident.

Dr. Dilisio is the first recipient of The Robert F. Kepley, M.D. Orthopaedic Fellowship for his project, "Rubber City ArboCartilage: Bioengineered Human Hyaline Cartilage in an Arbomatrix Scaffold." The project involves the development of an improved method of cartilage restoration (see page 10).

Summa Health System's department of orthopaedics is staying of the forefront of developments – both in orthopaedics and in the overall landscape of healthcare. We don't know what the future will bring, but we know we will be ready for that future. I invite you to read this publication to learn more about the exciting work we're doing in finding the best possible treatment courses for our patients. ■



Scott D. Weiner, M.D.
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XLIF® is a New Method to Attain Lumbar Fusion

Richard Brower, M.D.
Chief of Orthopaedic Spine Service
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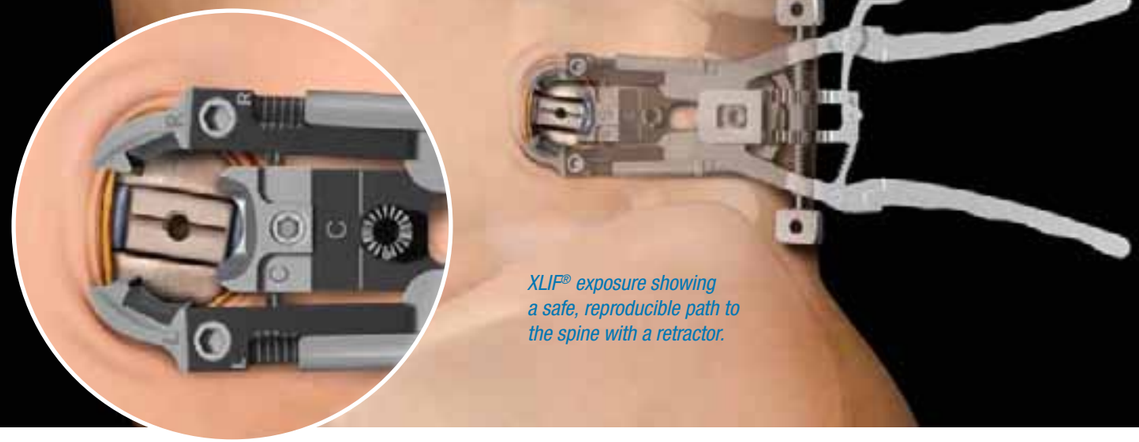

XLIF® exposure showing a safe, reproducible path to the spine with a retractor.

Surgical indications remain the most important factor in predicting outcomes of lumbar fusion. Degenerative or lytic spondylolisthesis remain the best documented reasons to perform lumbar fusion, with degenerative disc disease continuing to be a controversial indication for surgery.

The patient with repeated herniations (>2) at the same level also has a clear indication for surgical fusion. Patients with emotional disturbance and secondary gain issues (i.e., active workers' compensation claim) are patients in whom surgical intervention should be avoided if possible.

Methods of lumbar fusion have changed significantly, especially during the past 20 years. The development of pedicle screw systems has given surgeons a much more effective way to immobilize the lumbar spine after removal of the posterior elements in order to decompress lumbar spinal stenosis.

This technology has been partially responsible for the marked increase in the number of lumbar fusions performed per year. The use of instrumentation has opened opportunity to directly correct the alignment of the lumbar spine to:

- Reduce spondylolisthesis
- Correct scoliosis
- Realign fractures

The technology has also allowed surgeons to try to achieve lumbar fusion while making smaller incisions and, therefore, causing less collateral damage.

XLIF® stands for eXtreme Lateral Interbody Fusion. It represents a novel method for lumbar fusion. Rather than making an incision on the back, the surgeon can access the patient's retroperitoneal space through a small incision on the patient's side, remove the disc and place an implant with graft material to promote fusion of the lumbar disc space.

The surgical track is through the retroperitoneal space and then to dilate through the psoas muscle to access the disc space. The implant used for XLIF® reaches all the way across the disc space to the opposite side to have a wide footprint in order to decrease surface contact forces. The technique may be combined with pedicle screw instrumentation for additional fixation in some cases.

This technique is not appropriate for the L5-S1 level and should not be used in patients with osteoporosis, without additional fixation. High-grade spondylolisthesis, high-grade spinal stenosis and high-riding iliac crests are also contraindications.

XLIF® is a technique for a select group of patients. In appropriate cases, patients may experience relief of symptoms with minimal blood loss and an overnight stay in the hospital. ■

XLIF® is a technique for a select group of patients. In appropriate cases, patients may experience relief of symptoms with minimal blood loss and an overnight stay in the hospital.

A patient who underwent the XLIF® procedure, from preoperative to one year postoperative.

Figure 1: *Preoperative MRI.*

Figure 2:

Preoperative lateral extension view shows L4-5 spondylithesis.

Figure 3:

Preoperative lateral flexion view shows L4-5 spondylithesis.

Figure 4:

Six week postoperative lateral view showing reduction of L4-5 slip with good placement of graft.

Figure 5:

One year postoperative lateral view showing good reduction still of L4-5 slip and solid fusion.

Figure 6:

Six week postoperative AP view showing good placement of graft and some bone formation at L4-5.

Figure 7:

One year AP view showing solid fusion at L4-5.

Platelet–Rich Plasma Helps Patients Overcome ACL Reconstructions Sooner

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Sports Medicine Specialist
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With the increasing number of children and adolescents playing sports, there has been a corresponding increase in the number of anterior cruciate ligament (ACL) injuries. ACL reconstruction has undergone a significant evolution during the past several decades. Many of the initial changes focused on improved technique with more anatomic placement of the graft and better fixation.

However, there is still a percentage of patients who, in spite of all of this, have unsatisfactory outcomes. These patients still have inadequate bony ingrowth, ligamentization or vascularization of their graft.

Research needs to find a better answer for these patients.

Current research and development efforts focus on the biology of healing, stimulating the body's natural healing process and improving outcomes.

Platelet-rich plasma (PRP) is one of these developments. PRP is blood processed to contain high concentrations of platelets and growth factors. It is produced from a patient's own blood, which is spun down in a centrifuge to concentrate the platelets, which contain the growth factors.

These growth factors enhance bone and soft tissue healing, which include:

- Tendons
- Menisci
- Ligaments

They also have been shown to improve the ingrowth of blood vessels to injured or operated areas.

Surgeons began to look for a solution for patients who underwent an ACL reconstruction but had a suboptimal result. Initially, PRP was used with ACL reconstructions to try to improve outcomes, with the thought that bony ingrowth, ligamentization and vascularization could be improved.

The initial results were surprisingly good. Physical therapists noticed a significant difference between patients who were administered PRP and others under their care undergoing rehabilitation. Therapists began to inquire what was being done differently.

Repeatedly, patients reported that their knee felt so good that they just initiated their activities on their own. They were completing physical therapy within four months postoperatively on a regular basis with many of them returning to sports on their own prior to that time, though this is not encouraged.

Patients were not getting the typical atrophy of their quadriceps that usually occurs after surgery, and they regained neuromuscular control of their leg very quickly.

Twenty years ago, it was routine for the patient to be out of sports for a year after ACL reconstruction surgery. In the years since, with improvement in technique and rehabilitation, there has been a steady decline in the time required to return to sports.

Currently, most patients return to sports six to nine months after a reconstruction. Anything that can be done to safely return a patient to sports and/or work quicker is greatly appreciated by the patient, coaches and employers, as well as insurers.

The next step is to determine whether the effect of PRP can be extended by increasing the amount of time it stays in the surgical area and releases its growth factors. Currently, we are retrospectively reviewing the first group of patients and preparing to embark on a prospective study of ACL reconstructions using PRP and PRP with a carrier.

The field of orthopaedics is in its infancy and vast changes are ahead. Many of those changes will involve the biology of bone, cartilage and ligaments. This is an exciting and challenging time, and orthopaedics will have much to offer patients in the very near future. ■

Platelet-rich plasma is blood processed to contain high concentrations of platelets and growth factors.

Growth factors enhance bone and soft tissue healing, including tendons, menisci and ligaments.

Research Examines Whether Rubber-Derived Polymer Can Produce Mature Cartilage Tissue

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Director of Inpatient
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Crystal Clinic Orthopaedic Center

Matthew Dilisio, M.D.
Fourth-Year Summa Orthopaedic
Surgery Resident

Matthew Dilisio, M.D., a fourth-year Summa Orthopaedic Surgery resident, is the winner of the first Robert F. Kepley, M.D. Orthopaedic Fellowship.

The Robert F. Kepley, M.D. Orthopaedic Fellowship began as a $1 million philanthropic gift made by the Rice family in December 2009. The fellowship is intended to provide support for resident physicians in order to help them advance their knowledge of orthopaedics, support sound research initiatives investigating musculoskeletal problems, and contribute to the overall treatment of the region's orthopaedic patients.

In addition to the strength of their research, the fellowship guidelines stress that recipients should possess the capacity to learn and demonstrate compassionate skills in their dealings with patients. One additional goal of the fellowship is to encourage resident physicians to consider returning to the Akron area for their careers.

The Robert F. Kepley, M.D. Orthopaedic Fellowship Committee chose the first recipient of the award at the 2011 annual graduating senior resident recognition dinner held on June 11.

Three research projects were submitted for consideration. The winning project is titled "Rubber City ArboCartilage: Bioengineered Human Hyaline Cartilage in an Arbomatrix Scaffold," submitted by Matthew Dilisio, M.D., a fourth-year Summa Orthopaedic Surgery resident.

Research into the project is conducted in the Walter A. Hoyt, Jr. Musculoskeletal Research Laboratory and the Apatone Development Center at Summa St. Thomas Hospital in conjunction with Richard Mostardi, Ph.D., Deborah Neal and Leann Speering, M.S.

The goal is to develop an orthopaedic implant that replaces damaged joint cartilage. Articular cartilage – the tissue that lines joints – has a limited capacity to heal. Current surgical treatments have shown limited long-term results. This often leads to the development of premature joint degeneration, pain and disability. The current "Holy Grail" of orthopaedics is a cartilage tissue implant. Currently, one does not exist.

This implant could be used in the knee, ankle, shoulder and elbow, if not all joints in the human body. If successful, this device could prevent the pain and disability associated with post-traumatic arthritis.

The study proposes that embedding human cartilage cells (chondrocytes) in a polymer derived from rubber (a thermoplastic electrospun polyisobutylene elastomer – Arbomatrix) will produce mature cartilage tissue.

This polymer was developed at the University of Akron by a project co-author, Judit Puskas, Ph.D. The material is successfully being used in clinical practice as the drug-eluting polymeric coating on a coronary stent. While working with Walter Horton, Ph.D., at Northeast Ohio Medical University, this orthopaedic collaboration has demonstrated extensive cartilage tissue production by cow (bovine) cartilage cells in the Arbomatrix polymer.

The working name for this project is Rubber City ArboCartilage because it uses a rubber derived from polymer invented in Akron, a tissue engineering technique invented in Akron, and because the research is being conducted by Akron orthopaedic surgeons.

The Rice Family and the entire Fellowship Committee commend all three of the project submissions and, particularly, Dr. Dilisio and his co-investigators. ■

Research of the "Rubber City ArboCartilage" project is conducted in the Apatone Development Center at Summa St. Thomas Hospital.

Summa Adapts to New Resident Training Rules Without Sacrificing excellence

Jeffrey T. Junko, M.D.
Orthopaedic Residency Director
Summa Health System

Resident training in orthopaedic surgery has undergone momentous changes in recent years. The orthopaedic department at Summa Health System has met the challenges and continues to graduate highly trained physicians who are prepared to excel in their chosen field.

Rapid changes in technology, biologic sciences and diagnostic testing have challenged the ability of teaching programs to keep pace. In addition to meeting the challenges of an ever-expanding wealth of knowledge and treatment techniques, programs have also adjusted to new residency work-hour restrictions.

Ten years ago, the American College of Graduate Medical Education (ACGME), the federal department in charge of medical residency training, issued the first resident duty hour rules.

The new rules reduced the number of hours a resident physician could work to 80 hours per week. The rules also restricted the number of continuous work hours (hours of work without sleep) to 30 hours.

Prior to these regulations, residents could work 120 hours a week and continuously for upward of 40 hours. The new regulations were meant to alleviate resident fatigue. It was hoped this would prevent medical errors from occurring. In July 2011, ACGME updated its rules, which now allow for only 24 hours of continuous work and also limited the maximum amount that a first-year resident (an intern) can work to 16 hours.

These rules have improved residents' well being and have prevented resident fatigue. But the rules have decreased the amount of time a training program has to train the resident.

In light of the rule changes, the orthopaedic residency program at Summa Health System has worked to ensure resident training continues to be progressive, responsive to change and meets the orthopaedic needs of our community.

The program, led by Chair Scott D. Weiner, M.D., has made changes to resident work schedules, call schedules and to the training curriculum in order to maximize resident education.

Dr. Weiner has been fundamental in ensuring that resident education and excellence in patient care are the tenants by which the orthopaedic training program is conducted. Even with the work hour restrictions, the program's orthopaedic in-training examination scores (a yearly test taken by all orthopaedic residents in the United States) have consistently been above the 90th percentile. This means Summa Health System's orthopaedic residents score better than 90 percent of all residents tested nationwide.

In addition, Summa Health System residents have maintained a high board passage rate following graduation. By all measures the orthopaedic residents at Summa Health System have continued to excel in the new regulatory environment.

Orthopaedic advances in patient care will continue to occur. It is the goal of the orthopaedic training program at Summa Health System to ensure that our community continues to have access to well-trained physicians who first and foremost care about their patients' well-being and have the skills and confidence to heal those in need.

By maintaining a top-ranked residency program, Summa Health System will continue to meet all of the orthopaedic needs of our community. ■

Summa Health System's orthopaedic residents score better than 90 percent of all residents tested nationwide.

Arthrosurface Procedure Provides Tool to Treat Difficult Conditions

William A. Pakan, M.D.
Section Chief, Sports Medicine
Crystal Clinic Orthopaedic Center

Despite advancements in arthroplasty design and technology, there are still situations where current treatments fail us and our patients.

Relatively young patients with localized lesions from trauma, osteochondritis dissecans or chronic anterior cruciate ligament (ACL) injuries, and their subsequent degenerative changes, have proved challenging. Patients with normal, weight-bearing X-rays, but Grade IV changes to the patellofemoral joint, have also lacked a suitable solution for definitive treatment.

The current use of arthroscopic debridement, microfracture, cartilage implants and total joint arthroplasty have been met with some degree of disappointment for these conditions.

The development of an innovative resurfacing procedure has provided another tool for the treatment of some of these difficult conditions. Arthrosurface first received FDA approval in 2008. To date, about 20,000 (all joints) total devices have been implanted, with 98 percent of them surviving. This is very meaningful given the type of patient that typically receives this implant.

The procedure is arthroscopically assisted with the addition of a small arthrotomy for the final implant. Intraoperative mapping of the defect is performed and a patient-specific implant is chosen. Bone and cartilage removal is kept to a minimum. Precision reamers are used to create a bed for a low-profile implant.

These implants reconstruct a load-sharing surface without altering the normal biomechanics of the knee. This allows patients to pursue a much more active lifestyle than they had preoperatively, or than is recommended after a total knee replacement. It is also possible to combine a resurfacing procedure with a ligament reconstruction such as an ACL. This stabilizes the knee while also helping to relieve activity-related pain from the coexistent arthrosis.

An additional benefit of the arthrosurface resurfacing procedure comes from the limited bone resection. This allows for conversion to a primary total joint arthroplasty should further degenerative changes or an implant failure occur. The conversion is much easier than with traditional hemiarthroplasty. The use of revision implants with wedges or augments is usually unnecessary.

Proper patient selection and analysis of outcomes is very important.

The "ideal" candidate has unicompartmental arthrosis, good collateral ligament stability, minimal deformity, a reasonable (<30) BMI and limited medical comorbidities consistent with an elective surgical procedure.

A patient typically spends one night in the hospital postoperatively. This could eventually be reduced to an outpatient procedure in the future depending on the ability of the hospital to "carve out" the implant costs. Patients are encouraged to begin full weight bearing immediately and to start outpatient physical therapy to speed recovery.

The most difficult issue to discuss with patients relates to implant longevity and the significant cost. The short term results seem encouraging but we will need to await the long-term results until we know the true benefit. The implant materials are the same as standard total joint materials – cobalt chrome and high molecular weight polyethylene – and should wear well.

Most patients considering this procedure have generally failed other more traditional approaches and are trying to avoid a total joint. In this light, the less invasive nature of this procedure is appealing. Our preliminary results are encouraging and, in some cases, impressive. ■

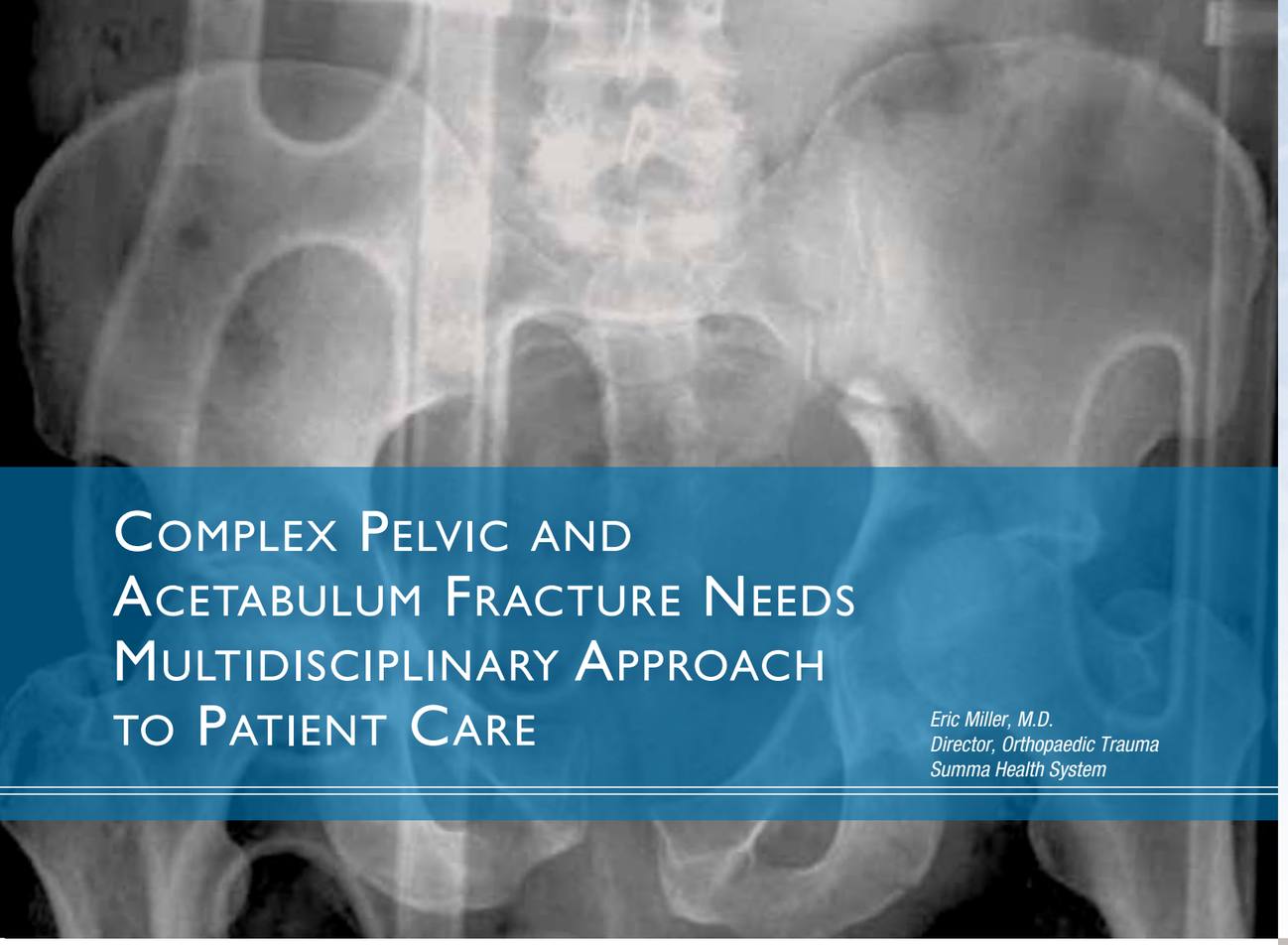
Most patients considering this procedure have generally failed other more traditional approaches and are trying to avoid a total joint. In this light, the less invasive nature of this procedure is appealing. Our preliminary results are encouraging and, in some cases, impressive.

Bone and cartilage removal is kept to a minimum in an arthrosurface procedure.

Another benefit of the procedure is limited bone resection.

Medial arthrosurface – before.

Medial arthrosurface – after.



Complex Pelvic and Acetabulum Fracture Needs Multidisciplinary Approach to Patient Care

Eric Miller, M.D.
Director, Orthopaedic Trauma
Summa Health System

High-level trauma care requires a customized approach delivered by a team of physicians committed to the care of the injured patient. At Summa Health System, a team of eight orthopaedic surgeons, with specialty training in areas such as traumatology, sports medicine, foot and ankle surgery, joint arthroplasty, and oncology, is committed to providing injured patients an integrated, well-rounded approach to the treatment of their injuries.

From the most minor sprain or strain to the most complex pelvic and acetabulum fractures, Summa Health System surgeons provide the care trauma patients need. Often these injuries require open, technically demanding techniques.

Figures 1 and 2 show a patient who required extensive reconstruction of a combined pelvis and acetabulum fracture. This necessitates a multidisciplinary approach among all involved with this patient's care to ensure appropriate preoperative, intra-operative and postoperative care and rehabilitation.

In addition to providing exceptional care with traditional, well-described fracture fixation techniques, Summa Health System's orthopaedic surgeons offer treatment options that are not available at many trauma centers. An example is an injury such as the one pictured in figures 3 and 4. This is an elderly female who suffered a fracture dislocation of her right acetabulum.

Traditionally, this injury requires a large open surgical approach with a significant amount of blood loss, operative time and potential for complications. In elderly, fragile patients this is not ideal.

For select patients with appropriate fracture patterns, Summa Health System surgeons use minimally invasive, percutaneous techniques to obtain fixation through small percutaneous incisions in order to minimize blood loss and the physiologic insult that a large surgery would bring with it. This helps minimize infection risk and maximize the patient's ability to rehab because of the minimal morbidity of this surgical technique. Many patients have received the benefits of this minimally invasive surgical approach.

Summa Health System serves as a referral center for acute injuries, as well as difficult problems that arise as late sequelae from otherwise simple fractures.

With knowledge, expertise and experience, Summa Health System surgeons create a customized approach to every patient's problem, whether acute or chronic. This often consists of developing new and imaginative ways to tackle unusual problems based on a solid foundation of traditional fracture fixation techniques, yet modified by frontline thinking and innovation.

Summa Health System's orthopaedic trauma takes great pride in providing a high level of care to trauma patients. Our surgeons review cases on a regular basis in order to discuss each injury, assess the surgical correction and educate residents about caring for the trauma patient. This ensures a consistent, high-quality approach to patient-focused care. ■

Figure 1

Figure 2

Figure 3

Figure 4

Reverse Total Shoulder Arthroplasty Requires Precision, Good Indications

Curtis R. Noel, M.D.
Co-Director
Cleveland Akron Shoulder & Elbow Fellowship

Although not as common as total knee and total hip replacement surgery, total shoulder replacement surgery is a very successful procedure for those individuals suffering from shoulder arthritis. However, there are certain shoulder conditions that traditional total shoulder arthroplasty cannot treat. In 2004, Food and Drug Administration approved the reverse total shoulder, giving orthopaedic surgeons a powerful tool to treat many of these conditions. But enthusiasm must be tempered with good indications and precise techniques.

Traditional Shoulder Arthroplasty (figure 1)

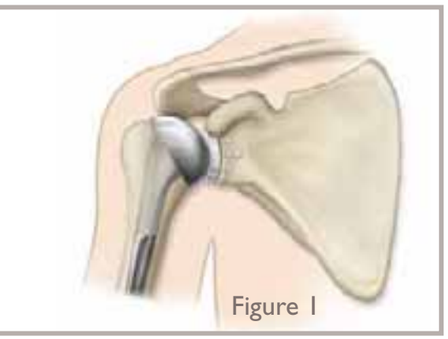


Figure 1

The traditional or unconstrained total shoulder arthroplasty was initially developed in the 1950s. Through the decades, its design has been refined so the current third generation of total shoulder replacements allows the surgeon multiple options to accurately recreate a patient's normal anatomy. This unconstrained shoulder arthroplasty has proven to be a reliable and durable treatment option for glenohumeral arthritis, rheumatoid arthritis and avascular necrosis. But it requires that the patient's rotator cuff be intact in order to give it stability and function. For patients who lack a functioning rotator cuff, a traditional total shoulder is contraindicated, and orthopaedic surgeons did not have a good treatment option for these patients prior to the advent of the reverse total shoulder.

Reverse Total Shoulder Arthroplasty (figure 2)

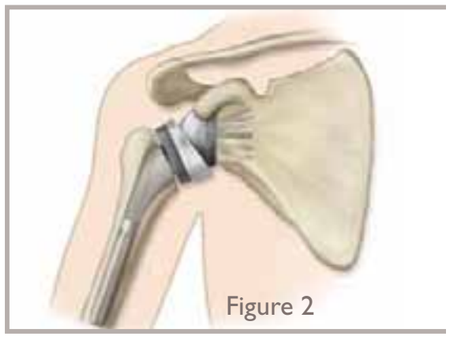


Figure 2

The current reverse or constrained total shoulder designs trace its roots back to Europe in the 1980s. Compared with traditional total shoulder arthroplasty, the reverse shoulder switches the ball from the humerus and places it onto the glenoid, where it becomes the glenosphere. The socket is then placed on the humeral side and becomes the humeral cup. When reduced, the humerus becomes constrained or locked underneath the glenosphere. This lowers and medializes the center of rotation of the shoulder improving the deltoid's mechanical advantage to raise and rotate the arm.

Indications

The reverse total shoulder was designed specifically to treat rotator cuff tear arthropathy (CTA). With CTA, the shoulder becomes unstable and arthritic because of the loss of rotator cuff function. Patients often present with pain and with loss of shoulder motion, especially active elevation, and when this loss is severe it is termed pseudoparalysis.

Radiographs will show arthritic changes in the joint along with superior migration of the humerus that narrows the normal distance between the acromion and the humeral head (figure 3). When conservative treatment fails, the reverse total shoulder can provide patients with reliable pain relief and improvement in shoulder function.

The reverse design brings the humerus down off the acromion and medializes the center of rotation allowing the deltoid to elevate and rotate the shoulder without the need for the rotator cuff (figure 4).

The indications for using the reverse total shoulder are expanding. Besides treating CTA, reverse total shoulder replacements are also helpful to treat shoulder fractures in the elderly, the third most common fracture in the elderly. Proximal humerus fractures can be difficult to treat and outcomes are not always that predictable with fixation or hemiarthroplasty.

The reverse provides us another option to help improve function in patients suffering from proximal humerus fractures, either initially or in revision situations. Similarly, for those who continue to have pain and loss of motion after unsuccessful shoulder surgeries, the reverse total shoulder may provide improved function and pain relief.

The reverse total shoulder is not without its complications, however. Some of these complications include dislocations, infections and scapular fractures. In addition, the longevity of the prosthesis is not fully known and, therefore, a reverse total shoulder is usually reserved for those over the age of 65.

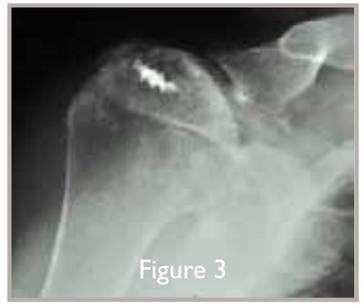


Figure 3

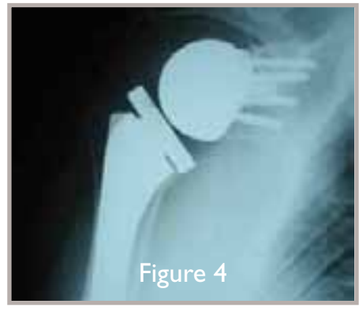


Figure 4

For these reasons, the reverse total shoulder should only be used by physicians with extensive training and experience in shoulder arthroplasty surgeries according to the fairly narrow guidelines.

The reverse total shoulder is an exciting and powerful addition to the orthopaedic armamentarium, but its use should be restricted to those physicians with appropriate training and understanding of its indications.

Patients who were told in the past that there was no treatment for their current shoulder condition should consult with an orthopaedic shoulder surgeon to discuss the potential risk and benefits of a reverse total shoulder replacement. ■

The reverse total shoulder is an exciting and powerful addition to the orthopaedic armamentarium, but its use should be restricted to those physicians with appropriate training and understanding of its indications.

ABIA and Summa Partner to Remove Friction Between Orthopaedics and Innovation

Thom Olmstead
Director of Business Development and Technology Assessment, Medical Device Development Center, ABIA

Brian Davis
Vice President, Medical Device Development Center, ABIA

ABIA Senior Engineer Samantha Stucke holds a rapid prototyped hip socket that was generated by a 3-D printer.

What an incredible journey. From amputation of the extremities and joint excision (both of which occurred during the pre-anesthesia era), to hip implant fixation in the late 1800s, to the early attempts at arthroplasty in the early to mid-1900s, and finally to modern total hip arthroplasty.

Having spent many years as a highly skilled surgeon and accomplished innovator in the field of orthopaedics, Sir John Charnley pioneered modern total hip arthroplasty (THA) in the late 1950s, which is considered one of the most important surgical advances of the 20th century.

While subsequent improvements in joint replacement surgical techniques and technology have increased the effectiveness of total hip replacement, Charnley's results are still seen as the gold standard. More than 193,000 total hip replacements are performed each year in the United States, according to the American Academy of Orthopaedic Surgeons.

Within the area of technology development, there are numerous similarities and differences between Charnley's work and current initiatives. As an innovator and a skilled orthopaedic surgeon, in many ways he practiced what is now commonly referred to as the bench-to-bedside approach to technology development.

A 3-D scan of a knee implant is examined at the ABIA Medical Device Development Center, Prototype Facility.

Interfacing biomedical and other engineering disciplines with potential clinical applications not only expedites the technology development process, but more importantly it improves the likelihood of successfully meeting unmet clinical needs. Thus it is important to develop alternative methods of marrying those two disciplines.

One of the primary tenets of the Austen BioInnovation Institute in Akron (ABIA) is collaboration.

ABIA is charged with identifying and developing opportunities for clinicians to utilize the resources that are available at ABIA, including biomedical engineering and identifying researchers throughout the partner institutions, in an effort to provide critical bench-to-bedside support.

The ABIA partnership is also positioned to provide regulatory affairs support to innovators hoping to commercialize their ideas.

It is well-known that the regulatory environment in which Charnley and others conducted their work was considerably less arduous than the current climate. Regulatory oversight is now much more scrutinized, and approval by Food and Drug Administration (FDA) can take a significant amount of time and expense.

Charnley was focused on low friction as a basis of THA design, according to his findings. As a result, and because of limited regulatory oversight, in 1956 he started using polytetrafluoroethelyne (PTFE) as a bearing surface. PTFE is often referred to as Teflon™ in the literature.

Two main disadvantages of PTFE were discovered only after implantation in 300 patients. The first was wear rates and the second was wear debris, which elicited a significant "foreign body reaction." It would be another eight years before FDA would ask for laboratory testing of toxicity related to low friction implants.

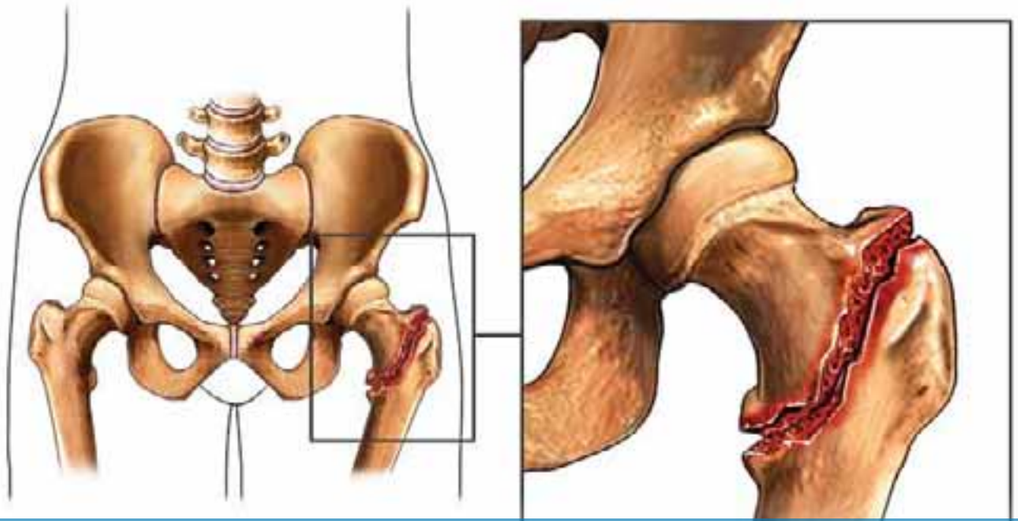
Adding to its bench-to-bedside resources and regulatory affairs support, ABIA is equipped to provide assistance with legal protection of new intellectual property.

When he developed his idea of a 22mm femoral head articulating with a polymer acetabular socket, Charnley neglected the importance of intellectual property. Because he had no patent protection, numerous individuals copied his procedure, which led to significant friction between Charnley and others in the field.

The collaborative approach being followed by Summa Health System and the ABIA partnership is based on the notion that ideas such as those put forward by Charnley need to be encouraged, assessed for engineering and clinical merit, prototyped and tested for clinical feasibility, protected through patent filings, and validated through clinical trials for FDA approval for eventual commercialization.

It is this unique model that is leading to better patient outcomes and helping to establish the Akron region as a beacon of biomedical innovation. ■

Engineering concepts are converted to prototypes using ABIA's 5-axis vertical milling machine. The machine can create complex shapes out of a multitude of materials ranging from steel to polypropylene.



Summa Works to Implement 'Evidence-Based Hip Fracture Protocol' Across the System

Jovan R. Laskovski, M.D.
Former Summa Health System Resident
Current Fellow, University of Chicago

Among adults age 65 and older, fragility fractures are the primary cause of hospitalization or death. Nationally, hip fractures account for 350,000 hospital admissions each year and 60,000 nursing home admissions. Hip fractures are the most ubiquitous type of fragility fracture; 44 percent of nursing home admissions due to fracture are hip fractures. More than 4 percent of hip fracture patients die during their initial hospitalization, 24 percent die within a year of the injury and 50 percent lose the ability to walk.

In light of these facts, the department of orthopaedics at Summa Health System developed a literature-based protocol to help expedite the care of hip fracture patients.

The protocol combined several factors that have been shown to improve outcomes:

- A comprehensive team approach
- Frequent communication between all medical disciplines
- Aggressive, preemptive management of medical comorbid conditions
- The goal of operative care within 24 hours
- Expedited discharge planning, beginning at admission, to decrease the incidence of complications and avoid iatrogenic illness

The protocol is in place at Crystal Clinic Orthopaedic Center, a partnership with Summa Health System, and unlike most hospitals, patients obtained medical clearance for surgery immediately or within the first 12 hours of admission.

This intervention included a physical therapist planning the duration and intensity of physical therapy in both inpatient and outpatient settings, a social worker who helped coordinate the patient's social support system and outpatient planning, an orthopaedic surgeon who provided timely and appropriate care of the hip fracture, and a medical specialist who managed the patient's medical problems, as well as support care from subspecialists as needed.

This comprehensive approach, combined with a standardized protocol, decreased unwarranted variability and improved outcomes for these patients.

According to orthopaedic and medical literature, aggressive, preemptive medical management of medical comorbidities and operative clearance within 24 hours showed improved outcomes for complications and mortality in the short term, one-year and five-year follow up points, as well as readmission rates.

Patients were stratified into low- and high-risk groups based on the incidence of comorbidities and operative risk related to these comorbid conditions.

Patients in the higher-risk groups were admitted directly to a medical service to be aggressively managed, while the lower-risk groups were admitted to the orthopaedic service with daily visits from a medical specialist. This approach was shown to improve outcomes for these high-risk patients.

From an orthopaedic standpoint, the timing of surgery was shown to affect patient outcomes. Using the time points of 72, 48 and 24 hours to surgery, a positive correlation was shown to improve outcomes in patients with faster operative intervention.

Conversely, greater than 72 hours to OR increased both mortality and complication rates for patients regardless of preoperative comorbid conditions, while less than 24 hours to the OR decreased mortality and complication rates regardless of preoperative status. Because of these factors, the goal for operative timing of surgery for the protocol was 24 hours or less to the OR.

From an economic standpoint, recent literature showed this is not only the best care for this group of patients, but also a cost-effective approach on a system-wide and hospital-wide basis.

This model, in several variations, was adopted by hospitals in London, Rome, Sydney, Melbourne, Tel Aviv, New York City and Rochester. In adopting this protocol, Summa Health System joins an international group of hospitals and continues its tradition of being at the leading edge of medicine, as well as providing outstanding care for its patients. ■

Summa Health System continues its tradition of being at the leading edge of medicine, as well as providing outstanding care for its patients.

Recent Resident Publications and Presentations

Publications and Oral Presentations

1. **Schaaf AC, Morscher MA, Weiner DS.** The Use of the Reconstruction Plate in Multiplanar Tibial Osteotomies in Children. *J Child Orthop* 5.127-133, 2011.

2. **Cremeans-Smith JK, Greene K, Delahanty, DL**. Symptoms of Post-Surgical Distress Following Total Knee Replacement and Their Relationship to Recovery Outcomes. *Journal of Psychosomatic Research*; 71, 55-7, 2011.

3. **Laskovski JR, Bell RH.** Rotator Cuff Repair Should be Done Arthroscopically: Body of Evidence-Affirms. *Seminars in Arthroplasty*; 2(1):144-147, September 2010.

4. **Myer D, Bell RH.** Instability After Total Shoulder Arthroplasty. *Seminars in Arthroplasty*; 21(3):191-194, September 2010.

5. **Weiner DS, Jonah D, Kopits S**. The 3-Dimensional Configuration of the Typical Hip and Knee in Diastrophic Dysplasia. *J Pediatr Orthop;* 30(4):403-410, June 2010.

6. **Ricchiuti DJ, Cerone JS, Shie SD, Jetley AV, Noe DA, Kovacik MW**. Diminished Suture Strength Following Robotic Needle Driver Manipulation. *J Endourology*; 24(9):1509-1513, Sept. 2010. DOI:10.1089/end.2009.0573.

7. **Johnson, J.** Primary Dedifferentiated Parosteal Osteosarcoma in a 21-Year-Old Male. *The American Journal of Orthopedics*; accepted for publication.

8. **Miller E, Tank J**. Combined Olecranon Osteotomy with Triceps Reflecting Approach for Complex Humerus Fractures. *Injury Extra*; accepted for publication.

9. **Bries AD, Weiner DS, Jacquet R, Adamczyk MJ, Morscher MA, Lowder E, Askew MJ, Steiner RP, Horne WI, Landis WJ**. A Study in Vivo of the Effects of a Static Compressive Load on the Proximal Tibial Physis in Rabbits. *The Journal of Bone and Joint Surgery*; submitted for publication.

10. **Smith LA, Ganios AM, McBurney DL, Dilisio MD, Weiner SD, Horton Jr WE, Becker ML**. Increased Proteoglycan Syntheses in Primary Human ad Bovine Chondrocytes in Biomimetic PEG Hydrogensl Containing Type I Collagen and Hyaluronic Acid. *Journal of Biomaterials*; submitted for publication.

11. **Prewitt E, Miller E**. Case Report. Cervical Epidural Hematoma Presenting with Transient Complete Tetraplegia Following Fracture of the Ankle. *Journal of Orthopaedic Trauma*; submitted for publication.

12. **Prewitt E, Junko J, Alexander I, Perrine D**. Case Report: Bimalleolar Osteotomies in the Treatment of Talar Body Fractures. *Foot and Ankle International*; submitted for publication.

13. **Cremeans-Smith JK, Krupko TA, Greene K, Delahanty, DL**. Cardiovascular Functioning Predicts Later Symptoms of Post-Traumatic Stress Among Patients Undergoing Orthopaedic Surgery. *Foot and Ankle International*; submitted for publication.

14. **Jason Tank, M.D., Michael Vignos, Tyson Schrickel, M.D., Scott D. Weiner, M.D.** Allograft Cortical Strut Reconstruction of Space Occupying Bone Lesions. Cleveland Orthopaedic Society, Cleveland, Ohio. January 22, 2011.

15. **Daniel Myer.** A Biomechanical Analysis of Plate Osteosynthesis and Cortical Contact Percentages in a Humerus Pathologic Fracture Model. Cleveland Orthopaedic Society, Cleveland, Ohio. January 22, 2011.

16. **Jovan Laskovski.** Clinical Effects of Platelet Rich Plasma on Hemoglobin Loss in Female Unilateral Total Knee Arthroplasty. A Retrospective Analysis. Cleveland Orthopaedic Society, Cleveland, Ohio. January 22, 2011.

17. **Kemppainen J, Adamczyk M, Ritzman T.** Comparison Between Two Pedicle Screw Constructs in Adolescent Idiopathic Scoliosis Posterior Fusions. Cleveland Orthopaedic Society, Cleveland, Ohio. January 22, 2011. **First Place**

18. **Prewitt E, Kay DB, Marks T, Askew MJ, Speering LM.** 3-D Computer Image Modeling in the Determination of at-Risk Structures for Calcaneal Osteotomies. 2011 AAOS Meeting, San Diego, Calif., February 15-19, 2011.

19. **Tank J, Jacquet R, Lowder E, Childs D, Ritzman T, Horne W, Morscher M, Weiner D.** The Effects of Hypothyroidism on the Proximal Femoral Physis in Miniature Swine. 2011 AAP National Conference. **Second Place**

20. **Jason Bryan, M.S., Travis Smith, D.O., Erika Schneider, Ph.D., Wael Barsoum, M.D., Ian Gradisar, M.D.** Computer Models for Testing Impingement-Free ROM in Hip Resurfacing. Mid America Orthopaedic Association Meeting, Tucson, Ariz., April 6-10, 2011.

21. **Tank J, Jacquet R, Lowder E, Childs D, Landis W, Ritzman T, Horne W, Morscher M, Weiner D.** The Effects of Hypothyroidism on the Proximal Femoral Physis in Miniature Swine. Mid America Orthopaedic Association Meeting, Tucson, Ariz., April 6-10, 2011.

22. **Schrickel T, Jacquet R, Landis W, Agamanolis D, Klonk C, Adamcyzk M, Morscher M, Weiner D.** Fibrous Tissue of Idiopathic Clubfeet. Analyses by Gene Expression, Histology and Immunohistochemistry. Mid America Orthopaedic Association Meeting, Tucson, Ariz., April 6-10, 2011.

23. **Myer D.** Shortening and Plating of Critical Bone Defects of the Humerus Results in Better Torsional Strength in Pathological Humeral Fractures. Mid America Orthopaedic Association Meeting, Tucson, Ariz., April 6-10, 2011. **Winner, Senior Resident Travel Grant – $2,500**

24. **Vignos M, Tank J, Weiner S, Schrickel T.** Allograft Cortical Strut for Reconstruction of Space Occupying Bone Lesions. Denman Undergraduate Research Forum, The Ohio State University, May 11, 2011.

25. **Jason C. Tank, M.D., Robin Jacquet, M.S., Elizabeth Lowder, B.S., Dylan Childs, M.D., William J. Landis, Ph.D., Todd F. Ritzman, M.D., Walter I. Horne, DVM, Melanie A. Morscher, B.S., Dennis S. Weiner, M.D.** The Effects of Hypothyroidism on the Proximal Femoral Physis in Miniature Swine. Mt. Sinai Barry Friedman Orthopaedic Resident Research Competition. **Second Place**

26. **Jason Tank, M.D., Michael Vignos, Tyson Schrickel, M.D., Scott D. Weiner, M.D.** Allograft Cortical Strut Reconstruction of Space Occupying Bone Lesions. 2011 Ohio Orthopaedic Society Resident Contest, Columbus, Ohio, May 13, 2011.

27. **J.P. Flanagan, T.F. Bear, I.M. Gradisar, M.W. Kovacik, J.M Jamison, D.R. Neal**. A New Joint Replacement Therapy. Reductions in the Cytotoxic Effects Caused by Micro-Metallic Debris. 2011 Ohio Orthopaedic Society Resident Contest, Columbus, Ohio, May 13, 2011.

28. **Christopher Myer, M.D., Scott D. Weiner, M.D., Joaquin Castaneda, M.D., Ericka Glass, M.D., Vanessa Voytko, B.S., Leann M. Speering, M.S.** CCRP. A Cumulative Report of Fractures of the Posterior Wall of the Acetabulum. 2011 Ohio Orthopaedic Society Resident Contest, Columbus, Ohio, May 13, 2011.

29. **Patrick Riley Jr., M.D., Patrick Riley, M.D., Melanie Morscher, B.S., M. David Gothard, M.S.** The Incidence of Femoral Head Osteonecrosis in Pediatric Femoral Neck Fractures. A 25 Year Study. Ohio Orthopaedic Society Resident Contest, Columbus, Ohio, May 13, 2011. **Second Place**

30. **Kovacik, MW.** Spectroscopy in Orthopaedics. Role of Surface Chemistry with Cellular Viability. SAS/ACS/AVS 55th Annual Conference, John Carroll University, June 1, 2011.

31. **Schrickel, T.** Fibrous Tissue of Idiopathic Clubfeet. Analysis by Gene Expression, Histology and Immunohistochemistry. Summa Health System Post Graduate Day, June 2011. **Winner, James T. Tan MD Award For Basic Science Research Category**

32. **Riley P Jr, Morscher M, Gothard M, Riley P.** The Incidence of Femoral Head Osteonecrosis in Pediatric Femoral Neck Fractures. A 25 Year Study. Summa Health System Post Graduate Day, June 2011.

33. **Christopher Myer, Scott D. Weiner, Joaquin Castaneda, Ericka Glass, Vanessa Voytko, Leann M. Speering.** A Cumulative Report of Fractures of the Posterior Wall of the Acetabulum. Summa Health System Post Graduate Day, June 2011.

34. **Matthew F. Dilisio, Laura A. Smith, Walter Horton Jr., Scott D. Weiner, Matthew L. Becker.** Establishing Chondrocyte Culture on a Self-Assembled Monolayer. Summa Health System Post Graduate Day, June 2011. **Winner, Walter A. Hoyt Sr., M.D. Award For Basic Science Research Category**

35. **Daniel Myer, Scott Weiner, Donald Noe, Leann Speering, Sammy Kotran, Michael Askew.** A Biomechanical Analysis of Plate Osteosynthesis and Cortical Contact Percentages in a Humeral Pathologic Fracture Model. Summa Health System Post Graduate Day, June 2011.

36. **Schrickel, T.** Fibrous Tissue of Idiopathic Clubfeet. Analysis by Gene Expression, Histology and Immunohistochemistry. Akron Children's Hospital Medical Center Postgraduate Day, June 10, 2011.

37. **Jeffrey Johnson, M.D.** Microarray analysis of slipped capital femoral epiphysis growth plates. Akron Combined Research Day, September 9, 2011.

38. **Jeffrey Johnson, M.D.** Functional Outcomes of Distal Biceps Ruptures Using a Cortical Button Technique. Akron Combined Research Day, September 9, 2011.

39. **Jason Tank, M.D.** Operative management of the severe genu valgum deformity in the Ellis-van Creveld Syndrome. Akron Combined Research Day, September 9, 2011.

40. **Steven Widmer, M.D.** Physeal gene expression and structure from different anatomic regions in two species. Akron Combined Research Day, September 9, 2011.

41. **Seung Jin Yi, M.D.** Long-term review of clubfoot patients treated with early posteromedial release. Akron Combined Research Day, September 9, 2011.

42. **Matthew F. Dilisio, M.D., Laura A. Smith, Ph.D., Walter Horton Jr., Ph.D., Scott D. Weiner, M.D., Matthew L. Becker, Ph.D.** Establishing Chondrocyte Culture on a Self-Assembled Monolayer. Akron Combined Research Day, September 9, 2011.

43. **Christopher Myer, M.D.** A Cumulative Report of Fractures of the Posterior Wall of the Acetabulum. Akron Combined Research Day, September 9, 2011.

44. **Seung Jin Yi, M.D.** Earlier Weight Bearing of Surgically Treated Intra-Articular Calcaneus Fractures. Radiographic and Clinical Outcomes. Akron Combined Research Day, September 9, 2011.

45. **Childs D, Jacquet R, Landis W, Tank J, Morscher M, Weiner D.** Gene Expression in the Hypothyroid-Affected Growth Plate in Miniature Swine. American Academy of Pediatrics, Boston, Mass., October 15-18, 2011.

46. **Kemppainen J, Adamczyk M, Ritzman T.** Comparison Between Two Pedicle Screw Constructs in Adolescent Idiopathic Scoliosis Posterior Fusions. American Academy of Pediatrics, Boston, Mass., October 15-18, 2011.

Poster Presentations

1. **Prewitt E, Kay D, Marks T, Speering L, Askew M.** Cost-Effective Three-Dimensional CT or MRI DICOM Image Analysis. Applications to Foot and Ankle Surgery. ORS Annual Meeting, Long Beach Calif., January 2011.

2. **Tank J, Jacquet R, Lowder E, Childs D, Landis W, Ritzman T, Horne W, Morscher M, Weiner D.** The Effects of Hypothyroidism on the Proximal Femoral Physis in Miniature Swine. 2011 AAOS Meeting, San Diego, Calif., February 15-19, 2011.

3. **Mark M. Kovacik, B.S., Thomas F. Bear, M.D., Richard A. Mostardi, Ph.D., Ivan A. Gradisar, M.D., Rex D. Ramsier, Ph.D., James M. Jamison, Ph.D., Edward T Bender, Ph.D., Deborah R. Neal, B.S.(MT), A. Seth Greenwald, D.Phil.** Oxon. Tissue Reactions to Prosthetic Metal Wear Debris. Studies of Osteolysis, Pseudotumor and ALVAL. Scientific Exhibit. 2011 AAOS Meeting, San Diego, Calif., February 15-19, 2011.

4. **Dilisio MF, Horton Jr W, Weiner SD, McBurney D, Wong S-C, Nugent A.** Production of Bovine Hyaline Cartilage in an Electrospun Polycaprolactone Polymer Scaffold. Mid America Orthopaedic Association Meeting, Tucson, Ariz., April 6-10, 2011.

5. **Weiner D, Tank J, Jonah D, Kopits S (deceased), Schrader W.** Operative Management of the Severe Genu Valgum Deformity in the Ellis-van Creveld Syndrome. Pediatric Orthopaedic Society of North America, Montreal, Quebec, Canada, May 11-14, 2011. e-poster. **First Place**

6. **Tank J, Jacquet R, Lowder E, Childs D, Landis W, Ritzman T, Horne W, Morscher M, Weiner D.** Effects of Hypothyroidism on the Proximal Femoral Physis in Miniature Swine (e-poster). Pediatric Orthopaedic Society of North America, Montreal, Quebec, Canada, May 11-14, 2011.

7. **Dilisio M, Smith L, Horton WE, Weiner SD, Becker ML**. Establishing Chondrocyte Culture of a Self-Assembled Monolayer. Summa Health System Research Forum, September 23, 2011.

8. **Speering L, Boyd J, Noe D.** Reduction of Post-operative Blood Loss and Transfusion Rate In Total Knee Arthroplasty. Comparing Effectiveness of Platelet Gel and Topical Thrombin. Summa Health System Research Forum, September 23, 2011.

9. **Rusilko P, McMahon D, Kovacik M, Noe D.** Bridging the Gap in Pediatric Kidney Stone Treatment. Summa Health System Research Forum, September 23, 2011.

10. **Kovacik M, Noe D, Kovacik B, DeAngelis A, Berkovitz K.** The Effect of Field-EKGs on STEMI Treatment. Summa Health System Research Forum, September 23, 2011.

11. **Gangel M, Ricchiuti D, Shie S, Cerone J, Booth C, Benson P, Noe D, Kovacik M.** Comparative Evaluation of Suture Strength Following Robotic Instrumented and Laparoscopic Needle Driver Manipulation. Summa Health System Research Forum, September 23, 2011.

12. **Speering, Boyd, Laskovski, Kepley, Lewandowski.** Reduction of Post-operative Blood Loss and Transfusion Rate In Female Total Knee Arthroplasty Patients. Comparing Effectiveness of Platelet Gel and Topical Thrombin. SoCRA Conference, San Diego, Calif., September 23-25, 2011. **Poster Recognition Award – Clinical Research Category**

13. **Paul Rusilko, Michael Gangel, Daniel McMahon, Donald Noe, Mark Kovacik. Extracorporeal Shockwave Lithotripsy (ESWL).** Bridging the Gap for Effective Treatment in Our Pediatric Population. Summa Health System Post Graduate Day, June 2011.

14. **Tank J, Vignos M, Schrickel T, Weiner S.** Allograft Cortical Strut Reconstruction of Space Occupying Bone Lesions. Summa Health System Post Graduate Day, June 2011. **Winner, Walter A. Keitzer, M.D. Award For Best Poster Category**

15. **Prewitt E, Miller E.** Cervical Epidural Hematoma Presenting with Transient Complete Tetraplegia Following Fracture of the Ankle. Summa Health System Post Graduate Day, June 2011.

16. **Dilisio MF, Horton W, Weiner SD, McBurney D, Wong S-C, Nugent A.** A Production of Bovine Hyaline Cartilage in an Electrospun Polycaprolactone Polymer Scaffold. Mid-American Orthopaedic Association Meeting. April 6-10, 2011.

A Final Word

Department Hosts Annual Oncology Review

Summa Orthopaedics had another successful orthopaedic oncology review. For the 11th year, visiting orthopaedic oncologists from Ohio and surrounding areas joined Dr. Scott Weiner in the annual Summa Orthopaedic-in-Training Review.

This year, about 200 orthopaedic residents throughout the region attended the daylong program. The overall feedback was extremely positive. In addition, this educational experience was provided at no cost through the department's Koufas Orthopaedic Oncology Research and Education Fund, as well as the generosity of the speakers, who accepted only a small honorarium.

Special thanks to Joel Mayerson, M.D., and Thomas Scharschmidt, M.D., from The Ohio State University; Patrick Getty from University Hospitals in Cleveland; and Joel Sorger, M.D., from Cincinnati in helping to make these programs a success over the years. ■

Developing an Overseas Program in Kenya

The department is actively developing an orthopaedic surgery learning opportunity in Western Kenya. Dr. Tobias Otieno of Kijabe, Kenya, visited Akron recently and will be the Kenyan host surgeon when he moves to Kisumu. Akron has a strong tradition of sending medical personnel to this region, sending more than 100 professionals a year to the rural area surrounding Kisumu.

The program will focus initially on trauma, and the department will participate as a SIGN (Surgical Implant Generation Network) site (sign-post.org).

Dr. Scott Weiner will travel to Kenya to meet with local administrators to help Dr. Otieno achieve his goal of improving the care of orthopaedic trauma patients in his country.

This will be a great opportunity for teams of surgeons, nurses, etc. to "live" orthopaedics in a developing country, which fits into Summa's residency vision of providing well-rounded, compassionate orthopaedic surgeons. Some funding was obtained to support residents' travel through the Robertson-Hoyt Fund. Additional funds will be raised to offset some of the expenses associated with the program. ■

One of Ohio's Largest, Most Experienced Orthopaedic Teams

All listed physicians are active members of Summa's teaching staff.
Visit summahealth.org for a complete and detailed physician directory.

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General Orthopaedics

Matthew Kay, M.D.*

Kurt Stemple, M.D.

Mark Musgrave, M.D.

Hand

John Biondi, M.D.*

John Dietrich, M.D.*

Drew Engles, M.D.*

R. William McCue Jr., M.D.*

Nina Njus, M.D.*

Thomas J. Reilly, M.D.*

All listed physicians are active members of Summa's teaching staff.

*Denotes fellowship trained

Orthopaedic Oncology

Scott D. Weiner, M.D.*

Orthopaedic Trauma

Eric Miller, M.D.*

Pediatric Orthopaedics (Akron Children's Hospital)

Mark Adamcyzk, M.D.*

Paul Fleissner Jr., M.D.*

Kerwyn Jones, M.D.*

William Schrader, M.D.*

Patrick Riley, M.D.*

Todd Ritzman, M.D.*

Kenneth Bono, M.D.*

Dennis Weiner, M.D., Chair

Shoulder and Elbow

Robert Bell, M.D.*

Jeffrey Noble, M.D.*

Curt Noel, M.D.*

Spine

Richard Brower, M.D.*

Douglas Ehrler, M.D.*

Scot Miller, D.O.*

Rajiv Taliwal, M.D.*

All listed physicians are active members of Summa's teaching staff.

*Denotes fellowship trained

Total Joints

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Ian Gradisar, M.D.*

Robert Kepley, M.D.*

Phillip Lewandowski, M.D.*

Sports Medicine

Raymond Acus III, M.D.*

Joseph Blanda, M.D.*

Michael Magoline, M.D.*

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Tom Bartsokas, M.D.

Visit summahealth.org for a complete and detailed physician directory.

All listed physicians are active members of Summa's teaching staff.

*Denotes fellowship trained

Summa Health System serves more than one million patients each year in comprehensive emergency, acute, critical outpatient and long-term home-care settings and represents more than 2,000 licensed, inpatient beds on the campuses of Summa Akron City Hospital, Summa Barberton Hospital, Summa St. Thomas Hospital, Summa Wadsworth-Rittman Hospital, Summa Western Reserve Hospital, Robinson Memorial Hospital, an affiliate of Summa Health System, and Crystal Clinic Orthopaedic Center, a joint partnership with Summa Health System. In addition, outpatient care is extended throughout a five county region in more than 20 community health centers. For more information, visit our website: summahealth.org

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