New Sports Medicine Facility Increases Capacity, Access

Patients experience integrated, multi-disciplinary clinical care in one location

The UC Health Division of Orthopaedic & Sports Medicine is proud to announce the new Sports Medicine Center of Excellence at Holmes Hospital. The new facility, which opened in January, is designed to increase clinical efficiency and improve the experience for patients, including athletes at the University of Cincinnati, area high schools and local professional sports teams, and athletes at all levels and ages. This Center is a major step forward in ensuring that the Division continues to meet its mission of providing the best clinical care possible for all patients in the Tri-state region through working as a comprehensive, multi-disciplinary team.

Division Director Dr. Angelo Colosimo along with partners Drs. Bart Branam, Christopher Utz and Brian Grawe see patients in the new site. Primary care physicians, Drs. Jon Divine and Michael Donaworth also see patients in the new space.

The new space allows the Sports Medicine Division to increase capacity by 20,000 patient visits a year. The Center consolidates patient exam rooms, ambulatory surgery suites and rehabilitation services in a single facility so that patients can benefit from a true multidisciplinary, integrated care environment.

The sports medicine space, which encompasses 6,643 square feet, includes 12 exams rooms, a large cast room and an X-ray unit. In addition there is a NovaCare Physical Therapy clinic onsite which encompasses 3,488 square feet.

“‘This new space is a major accomplishment and a major milestone in our planning timeline designed to have us reach our vision of being leaders in sports medicine research, medical education, and quality clinical care in the region,” states Dr. Colosimo. “The space is welcoming for athletes and their family members and allows for efficient and comprehensive care for the athletes as they prepare to return to play.”

“‘This Center has been a part of my dreams and visions for the Division. It is a crucial component for the growth and development of the sports medicine division from both a clinical perspective and our ongoing research program.”
As you are very likely aware, this publication represents the inaugural edition of the UC Department of Orthopaedic Surgery Journal which serves as the official journal of the Freiberg Society. As alumni and members of the Freiberg Society, I hope you are as excited as I am regarding this publication. The Department has come a long way from the early days of the Freiberg family orthopaedic legacy to its current status. In this first edition of the Journal, our focus piece details the history of Orthopaedic Surgery in Cincinnati and at UC. I am certain that you will be intrigued and entertained upon reading. Other sections of the Journal will highlight our current academic faculty. You may be surprised to learn that our academic family now has thirty-six members at several institutions and locations including UCMC and West Chester Hospital, Cincinnati Children’s Hospital Medical Center, the Cincinnati VA Medical Center, Good Samaritan Hospital and Mercy Anderson.

In addition to our local expansion of both clinical practice and educational opportunities, we are in our third year of an international rotation for the Chief Residents. Through a collaborative relationship with the University of Chile, the Chief residents have the opportunity to travel to Santiago and spend two weeks on several subspecialty services including oncology, trauma, hand, foot and ankle as well as spine and sports medicine. The residents and faculty who have visited Chile have offered overwhelmingly positive comments regarding their experience. As part of this reciprocal relationship, the department welcomed our first resident rotator from Chile in January of 2016. As you can imagine, this unique educational opportunity has proven very positive during residency recruitment.

As would be expected with the growth of a superb faculty, new career opportunities arise. After fourteen years, the Department was very sad to say goodbye to Keith Kenter, MD. Keith served as the residency Program Director for more than twelve years and has elevated the program to national prominence. His hard work and the recognition it garnered opened many doors for Keith. In 2015 Keith was elected to the Board of AOA, I hope that you sense the excitement that is palpable around the department as we continue to grow in the clinical, educational and research domains. . . As our alumni, we want you to be proud of your Orthopaedic heritage and help us continue the legacy that the Freiberg family started more than a century ago.

In addition, Dr. Kenter was offered the Orthopaedic Department Chair position at Western Michigan University, which he accepted this past November. Although a big loss for the Department, we are incredibly proud of Dr. Kenter and all of his accomplishments. On behalf of our faculty, residents and alumni, I offer a sincere “thank you” to Keith Kenter for his many years of outstanding leadership and tireless service.

In light of Dr. Kenter’s departure, I have asked Ferhan Asghar, MD, to take over as Program Director and Brian Grawe, MD, to assist him as Associate Program Director. Drs. Asghar and Grawe and our program coordinator, Kim Reising, have done an outstanding job with this transition. I have no doubts that the residency will continue its trajectory to the highest echelons nationally as Drs. Asghar and Grawe inject their enthusiasm and experience into the program.

I hope that you sense the excitement that is palpable around the department as we continue to grow in the clinical, educational and research domains. I am incredibly proud of the vast accomplishments of our faculty and residents, which are highlighted in this journal. As our alumni, we want you to be proud of your Orthopaedic heritage and help us continue the legacy that the Freiberg family started more than a century ago.

Sincerely,

Michael T. Archdeacon, MD, MSE
Peter J. Stern Professor and Chair
Department of Orthopaedic Surgery
Kenter Leadership Developed Nationally Prominent Residency Program

As Keith Kenter, MD, departs Cincinnati for Kalamazoo, Michigan, to serve as Chair and Professor of Orthopedic Surgery at the Western Michigan University Homer Stryker M.D. School of Medicine, the Department of Orthopaedic Surgery would like to publicly thank him for over 13 years of service to UC and share some of his back story. However, those of you who know Dr. Kenter know that he’s not one to divulge too much personal information, but we managed to get him talking, just a little:

AS A YOUNG MAN, Keith Kenter thought he had his future pretty well figured out. He says he was going to be an academic—more specifically an academic scientist, a bearded PhD who smoked a pipe and wore tweed jackets with suede elbow patches.

“I loved the college concept, and I always envisioned myself as a teacher, a professor, sitting behind a large wooden desk,” Kenter said of his youthful musings.

This preamble to becoming an academic, however, started in Kenter’s hometown of Hillsboro, Missouri, population 3000. He says Hillsboro was “the best of both worlds because he could bale hay with his farm buddies in the morning or meet his father in the nearby city of St. Louis for lunch. The hay baling came in handy to get in shape for high school football and travel hockey.

He said he found his love of science and analytic thinking (and the love of his life, his wife, Patty) while attending DePauw University in Greencastle, Indiana, where he also played tight end for the DePauw Tigers.

“Med school wasn’t even in the picture at all. I just loved the quest of the biological sciences,” he said of then choosing to attend graduate school at St. Louis University, where he earned his master’s in biochemistry.

“I was pretty geeky. My plan was to get my PhD in biochemistry, but it was suggested that I look into medical school and I thought medical school would be a great way to learn more about science.”

And learn more he did: attending the University of Missouri Columbia School of Medicine (’90), conducting a residency at Duke University Medical Center (1991-96) and fellowship at the Hospital for Special Surgery in New York (1996-97).

Choosing orthopaedics as a specialty, he says, just made sense: “As a young athlete of hockey and football I’ve had eight broken bones and non-unions in my hands and wrists, and the overall athlete just fascinates me.”

And coming to UC to teach, and also serve as residency director, turned out to be part of the plan after all—albeit sans beard, he says, because “Patty nixed it.”

“Over the last decade I took great pride in watching Dr. Kenter climb the academic ladder as well as seeing him serve as a role model for orthopaedic program directors and educators. His passion for education led to his selection as the first chair of the AOA-Council of Orthopaedic Residency Directors (CORD) and in short order made it the ‘go to’ organization for orthopaedic program directors across the country. When I was department chair, I could always count on Dr. Kenter to do the right thing—doing what was best for our residents and medical center rather than his own interests. Finally, I will miss our many philosophical discussions as well as his wonderful stories of late night hockey games where he frequently pummeled his opponents. A true orthopaedic surgeon!”

PETER STERN, MD
Former Chair, Department
of Orthopaedic Surgery

Choosing orthopaedics as a specialty just made sense:
“As a young athlete of hockey and football I’ve had eight broken bones and non-unions in my hands and wrists, and the overall athlete just fascinates me.”
Department Welcomes Spine Expert Anthony Guanciale, MD

The Department of Orthopaedic Surgery is proud to announce the return of Anthony F. Guanciale, MD, to its orthopaedic family. Guanciale, an associate professor at the College of Medicine and an orthopaedic surgeon with UC Health Orthopaedic & Sports Medicine, brings over 25 years of surgical spine experience. He is fellowship-trained in orthopaedic spine surgery and provides surgical and non-surgical care for patients with spinal ailments. Specific interests focus on cervical spondylosis, minimally invasive surgery, adult scoliosis deformity and revision/corrective lumbar surgery.

Guanciale is a national expert on sports-related spine injuries and has been the long-time consultant for the Cincinnati Bengals and UC Bearcat Athletics.

Guanciale is a diplomate of the American Board of Orthopaedic Surgery. He is a member of a number of professional associations including the Cincinnati Academy of Medicine, Ohio State Medical Association, Ohio State Orthopaedic Society, Mid-America Orthopaedic Society (2016 Program and Scientific Committee member), North American Spine Society (Scientific Committee member and Spine Line Publication Committee member), and the American Academy of Orthopaedic Surgeons.

By Beth Miller

Many of us take the ability to walk barefoot along the beach, or the simplicity of slipping on a pair of flip-flops, for granted.

But walking causes an annoyance or even severe pain for individuals with discrepancies in lower limb length.

John Wyrick, MD, orthopaedic surgeon at University of Cincinnati Medical Center, director of orthopaedic trauma for UC Health and professor of orthopaedic surgery at UC College of Medicine, is performing a less-invasive method of limb lengthening that uses new technology. It’s called the PRECICE® system, using an intramedullary nail and an external remote controller. The nail is typically surgically placed inside the femur or tibia, which are relatively hollow bones.

“This advance in technology allows us to insert these nails inside the bone once it’s cut, then it’s slowly pulled apart one millimeter a day,” says Wyrick. “So over time, the bone lengthens and fills in.”

Limb lengthening uses the body’s natural ability to heal itself. The patient is in control of lengthening the bone at home, with the use of the magnetic controller, which communicates with the magnetic motor located inside the nail.

Prior to this technology, limb lengthening procedures were performed using pins attached to bulky external devices. “This process is much less painful for patients, and reports indicate fewer complications resulting from infection,” says Wyrick. “The new procedure is also better equipped at guiding the bone into alignment as it grows.”

Wyrick explains that limb length discrepancies occur from a variety of circumstances, “It could be of traumatic origin, fractures that healed in a shortened position, or a young person could have injured a growth plate which causes shortening. Additionally, some patients are born with congenital limb deficiencies.”

Each patient differs in terms of the amount of shortening required, and limbs are precisely measured using X-rays. Wyrick notes most patients use shoe lifts to relieve the back and hip pain resulting from limb length discrepancy, but that is a temporary solution.

The future of this technology will eventually include arm lengthening as well—a rod for the arm is currently going through FDA approval.

Wyrick leads a five-year orthopaedic surgery residency program at the University of Cincinnati, training five residents each year. He has received several awards and is published in many medical publications while conducting research in his fields of expertise.
Radiographic and Clinical Outcomes Following Total Shoulder Arthroplasty
A Micro-stem Humeral Component

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AAOS Annual Meeting
Poster Presentation | March 24-28, 2015

**RESULTS:** Through our clinical outcomes measures, more than 90% of patients reported good or excellent clinical outcomes. Postoperative shoulder function as assessed by UCLA shoulder score averaged 29.0 (range 9-35), Constant score averaged 79.2 (range 34-100), DASH averaged 18.7 (0-55) and SANE averaged 83.3 (range 15-100). For UCLA score, 35 is the best possible score and greater than 27 is considered good/excellent. 100 is the best possible score for SANE and Constant scores. DASH score is from 0 to 100, where 0 is the best possible score.

Radiographic analysis showed low suspicion for radiographic loosening with only 1/13 patients having 2mm or greater lucent lines in at least 3/8 radiographic zones of the implant-bone interface of the humerus (pictured below on the right). On the left are the 8 humeral stem zones that were analyzed by our radiologists for lucency as defined by Sperling et al.1 No shoulder radiographs were interpreted by 2 or more of the 3 radiologists as demonstrating significant humeral subsidence or tilt.

We reported complications in 3/13 shoulders – one radial nerve palsy, one case of adhesive capsulitis and stiffness and one medial cortex fracture perioperatively (pictured below). On the left immediate postop radiographs show the fracture (white arrow). The image on the right is 2 years postop showing complete healing of the fracture without additional operative intervention. Only 1/3, the adhesive capsulitis patient required repeat operation for the complication.

**CONCLUSION:** This is one of the early reports on clinical and radiographic outcomes of a micro-stem humeral TSA implant. The micro-stem study group shows good to excellent clinical outcomes and low suspicion of radiographic loosening at 2 years. The results presented here, though limited by follow-up percentage and number, are comparable to those in the literature for conventional and mini-stem implants. The micro-stem humeral implant appears to be a safe and effective option for TSA.

**BACKGROUND:** Total shoulder arthroplasty (TSA) as a treatment of degenerative joint disease of the glenohumeral joint has provided predictable pain relief and shoulder function. There has been an overall trend in arthroplasty to using less invasive implants, like hip resurfacing, in order to minimize bone removal. Many traditional TSA implants have a long stem humeral implant that requires extensive reaming and broaching to remove humeral shaft bone for implant insertion. Theoretically, a shorter stemmed implant could reduce some complications of TSA by reducing the amount of humeral bone removed during primary TSA. Thus, the micro-stem humeral stem was developed and has the potential theoretical advantages of reducing fat emboli, perioperative humerus fracture and postoperative pain due to less humeral canal violation to insert the micro-stem implant. Pictured below are the preop and postop radiographs of the micro-stem implant used above a prior humeral fracture with retained hardware.

**METHODS:** This was a retrospective review of the first 25 micro-stem TSA done by a single surgeon (KK). We were able to get 13/25 to follow-up and obtained clinical outcomes data, ROM and X-rays at least 2 years from initial surgery. The minimum follow-up time was two years postoperative and average follow-up was 31.4 months (range 24-40 months). There were 7 male and 6 females in our follow-up group. Radiographs were interpreted by 3 musculoskeletal fellowship-trained radiologists at two time points two months apart. Complications data was obtained from medical records, operative reports and patient interviews.

Humeral stems of the 3rd generation mini-stems range from 70mm-83mm in length while the micro-stem is 55mm in length.
**Accuracy of Femoral and Tibial Resection Thickness Using Patient-Specific Instruments for Total Knee Arthroplasty**

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**AAOS Annual Meeting**
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**RESULTS:** Intra-operatively, the surgeon deviated from the pre-operative plan and made deliberate changes 17 out of 139 knees (12.2%). The mean difference between planned and intra-operative resection for the PMFC, PLFC, DMFC, DLFC was 0.9 mm +/- 1.6 mm, 1.4 +/- 1.6 mm, 1.5 +/- 1.0 mm, and 1.6 +/- 1.2 mm respectively. On the tibial side, the mean difference between planned and intra-operative resection for the MT and LT thickness was 0.8 +/- 1.3 mm and 0.8 +/- 1.6 mm respectively.

Less than 2 mm difference between planned and intra-operative resections was found for 77% of PMFC resections, 70% of PLFC resections, 71% of DMFC resections, 73% of DLFC resections, 86% of MT resections, and 71% of LT resections.

Seventy-seven percent of posterior femoral resections, 90% of distal femoral condyle resections, and 74% of tibial resections were symmetric (less than 2 mm difference between the medial and lateral side) with the preoperative plan. Fifty-two percent of patient specific guides were symmetric in all three resection planes.

**CONCLUSION:** Patient-specific guides demonstrated a low mean difference between each individual planned and intra-operative resection measurement, and a majority of these resections were within 2 mm. However, surgeons must be aware that absolute value differences between medial and lateral planned vs. intra-operative resection thickness may not be symmetric and may lead to component malpositioning when performing TKAs using patient-specific guides.

**INTRODUCTION:** Patient-specific instruments for total knee arthroplasty are created using data from preoperative computed tomography (CT) or magnetic resonance imaging (MRI). Surgeons can then examine the preoperative plan and make changes to each resection level if desired. The accuracy of each femoral resection and tibial resection is critical to placing the components according to the proposed plan. We hypothesized that each mean intra-operative resection would be within 2 millimeters of the planned resection.

Since the patient-specific guides are designed to make resections for ideal positioning of the implants, if there is a difference noted intra-operatively compared to the plan, surgeons would look for a symmetric difference between the medial and lateral side of the resection plane. The symmetry of the differences in intra-operative versus planned medial and lateral resections is therefore just as important as the accuracy of each individual resection to avoid mal-alignment of the implant.

**METHODS:** One hundred thirty-nine patients underwent total knee arthroplasty by a single surgeon using CT generated patient-specific instruments between 2009 and 2012. Intra-operatively, each resection from the posterior medial femoral condyle (PMFC), posterior lateral femoral condyle (PLFC), distal medial femoral condyle (DMFC), distal lateral femoral condyle (DLFC), medial tibia (MT) and lateral tibia (LT) was measured with a caliper and recorded. These measurements were retrospectively compared to pre-operative planned resections.

The absolute value of the difference between planned and intra-operative resection for each distal femoral cut, posterior femoral cut, and tibial cut was also evaluated for symmetry of the medial and lateral resection.
An Exploratory Study of the Potential Effects of Vision Training on Concussion Incidence in Football

Michael Donaworth, MD; Joseph Clark, PhD, ATC; Pat Graman, MA, ATC; James Ellis, OD; Robert Mangine, MEd, PT, ATC; Joseph Rauch, PT, ATC; Ben Bixenmann, MD; Kimberly Hasselfeld, MS; Angelo Colosimo, MD; Gregory Myer PhD; Jon Divine, MD

University of Cincinnati Medical Center

American Medical Society for Sports Medicine (AMSSM)
Podium Presentation - April 17, 2015
Harry Galanty Young Investigator Award

BACKGROUND: Vision training has become a component of sports enhancement training; however, quantifiable and validated improvement in visual performance has not been clearly demonstrated. In addition, there is minimal literature related to the effects of vision training on sports performance and injury risk reduction. The purpose of the current investigation was to determine the effects of vision training on peripheral vision and concussion incidence.

METHODS: Vision training was initiated among the University of Cincinnati football team at the beginning of the 2010 season and continued for four years (2010 to 2013). The sports vision enhancement was conducted during the two weeks of preseason camp. Typical vision training consisted of Dynavision D2 light board training, Nike strobe glasses, and tracking drills. Nike Strobe glasses and tracking drills were done with pairs of pitch-and-catch drills using footballs and tennis balls, with instructions to vary arc, speed, and trajectory. For skilled players, “high ball” drills were the focus, whereas for linemen, bounce passes and low pitch drills were stressed. Reaction time data was recorded for each athlete during every Dynavision D2 training session. We monitored the incidence of concussion during the four consecutive seasons of vision training, as well as the previous four consecutive seasons, and compared incidence of concussions (2006 to 2009 referent seasons v. 2010 to 2013 vision training seasons).

RESULTS: During the 2006-2013 pre- and regular football seasons, there were 41 sustained concussion events reported. The overall concussion incidence rate for the entire cohort was 5.1 cases per 100 player seasons. When the data were evaluated relative to vision trained versus referent untrained player seasons, a statistically significant lower rate of concussion was noted in player season in the vision training cohort (1.4 concussions per 100 player seasons) compared to players who did not receive the vision training (9.2 concussions per 100 player seasons; p<0.001). The decrease in injury frequency in competitive seasons with vision training was also associated with a concomitant decrease in missed play time.

DISCUSSION: The current data indicates an association of a decreased incidence of concussion among football players during the competitive seasons where vision training was performed as part of the preseason training. We suggest that better field awareness gained from vision training may assist in preparatory awareness to avoid concussion-causing injuries. Future large scale clinical trials are warranted to confirm the effects noted in this preliminary report.
Prophylactic Intravenous Fluid Therapy to Division I Intercollegiate Football Players Prior to Intense Practice

Abigail DeBusk, DO; Joseph Rauch, PT, ATC; Joseph Clark, PhD, ATC; Robert Mangine, Med, PT, ATC; Angelo Colosimo, MD; Kimberly Hasselfeld, MS; Jon Divine, MD

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AMSSM
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OBJECTIVE: To examine if the administration of prophylactic intravenous fluid therapy (PIFT) prior to activity exertion is a safe and effective method of preventing heat illness and muscle cramping and improve performance in at-risk football athletes performing intense exercise in extreme weather conditions.

DESIGN: Prospective evaluation of a select cohort of at-risk NCAA Division 1 football players.
Setting: 2013-2015 pre-season football camps.
Participants: Twenty-four, at-risk, players were randomized to receive PIFTs before practice and 12 players did not receive PIFTs.

INTERVENTION: Each athlete received one liter of standard solution of 0.9% sodium chloride. PIFTs were administered within 30 minutes of beginning practice. At-risk were randomized to receive PIFT on two of three days, serving as self-control on non-PIFT days.

MAIN OUTCOME MEASURES: After practice athletes who had a PIFT participated in a brief survey. All athletes provided post-practice urine samples. Pre and post-practice weights were recorded. A subjective evaluation of each subjects’ performance in the practice was completed by each players’ respective position coach, who was blinded to who received pre-practice PIFTs.

RESULTS: Subjective performance parameters were more favorable for players receiving pre-practice PIFT. All safety parameters were unchanged between groups. The PIFT group lost 1.474 ± 1.26 kg and the non-PIFT group lost 1.52 ± 1.17 kg (not statistically different).

CONCLUSIONS: PIFT was safe in the at-risk cohort of football athletes studied. No adverse effects were noted. Performance surveys showed improvement in subjects on the days the PIFTs were administered as reported by athletes and coaches.
20-year-old Hockey Player Status Post ACL Reconstruction Presents with Arm Pain

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AMSSM
Poster Presentation | April 16, 2015

HISTORY: 20-year-old hockey player presents to the sports medicine clinic status post ACL reconstruction one week prior with a complaint of left shoulder pain. Patient has no other pertinent past medical history. He complained that 2-3 days after his ACL repaired that he started to have nausea and vomiting, and upper body pain. Patient stopped taking the Celebrex and Vicodin and the vomiting stopped. The pain then subsequently started to localize around the left shoulder region. Patient denies any trauma to this area. Patient denies any fevers or chills or prior shoulder or neck problems. Patient denies having numbness or weakness of the extremity.

PHYSICAL EXAM:
• General: Patient is alert and oriented x3 in no apparent distress.
• HEENT: Normal
• Cardiovascular: Regular rate and rhythm no murmurs. Equal pulses in all extremities.
• Lungs: clear to auscultation bilateral.
• Abdomen: Soft, non-tender, no masses.
• Neuro: Cranial nerves II through XII intact. No focal deficits. Muscle strength 5 out of 5 in all extremities. Sensation grossly intact.
• Musculoskeletal: No pain to palpation over the cervical spine. Full range of motion of his neck without pain. No paraspinal tenderness. Left shoulder is without any deformity or swelling. Mild tenderness to palpation along the anterior deltoid and scapular region on the left. Shows full range of motion in the shoulder but with pain at end of range of motion in abduction, forward flexion and internal rotation. No significant weakness of the rotator cuff tested, although irritation is noted. Right knee shows mild to moderate effusion with a clean,dry incision over the anterior knee.

DIFFERENTIAL DIAGNOSIS:
1. Myofascial irritation
2. Cervical radiculopathy
3. Rotator cuff tendinopathy
4. Iatrogenic intraoperative injury
5. Neuropathy
6. Brachial plexus injury
7. Parsonage-Turner syndrome
8. Brachial plexus mass

TEST/RESULTS:
• Chest x-ray: Normal
• Left shoulder x-ray: Normal
• CBC and complete metabolic panel: Normal
• Lyme titer: Negative
• VDRL: Negative
• Cytomegalovirus PCR: Negative
• MRI cervical spine: C6-7, a small right paracentral disc protrusion observed, no evidence of cord compression or nerve root displacement
• MRI left brachial plexus: Intramuscular edema involving the supraspinatus and infraspinatus muscles on left. Mild left shoulder girdle muscle atrophy identified involving the supraspinatus and infraspinatus muscles. Suggestion of early denervation change. No evidence of brachial plexus region mass
• Cerebral spinal fluid analysis: Within normal limits
• EMG left upper extremity: Irritability and no motor unit function seen at the infraspinatus and supraspinatus muscles only, and marked decreased number of motor units seen in the deltoid muscle with attempted full muscle contraction. Normal nerve studies of the left median and ulnar nerves.

FINAL DIAGNOSIS:
Parsonage-Turner Syndrome.

TREATMENT:
• Initial treatment regimen was started with a 10 day prednisone taper as well as gabapentin 300 mg 3 times a day for 10 days.
• After consultation with a neurologist from the Mayo Clinic it was recommended that the patient receive 1000 mg of IV Solu-Medrol 5 times a week for 4 weeks.

OUTCOME AND FOLLOW-UP:
• Patient still remains symptomatic with marked atrophy and weakness of the deltoid and supraspinatus region.
• The patient has not yet returned to play and is undergoing physical therapy, working on strengthening and range of motion exercises for the left shoulder.
Abdominal Pain and Exertional Nausea in a Collegiate Football Player

Abigail DeBusk, DO; Jessica Mann, ATC; Susan Braley, MD; Jon Divine, MD

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University of Cincinnati Medical Center, Cincinnati OH

AMSSM
Poster Presentation | April 18, 2015

HISTORY: 22-yr old football player presents with abdominal pain that has been going on for 4-5 months. Initially described as “crampy” abdominal pain in the “center” of his stomach with associated bloating and was initially managed as IBS with symptomatic treatment and dietary restrictions. Despite treatment progressed to having worse pain and nausea with activity. Continued to have pain, nausea, anorexia and weight loss of 12 lbs over two months. More extensive diagnostic tests (endoscopy and abdominal MRI) were done prior to beginning the fall football season and mild osteitis pubis was seen, otherwise all tests were negative and he was placed on a PPI and naproxen 500mg BID. Due to poor tolerance for solid food he began drinking 8 protein shakes (2000 kcal) a day. When football camp began he continued to have pain, exertional nausea and vomited daily in mid practice without hematemesis, diarrhea or melena.

PHYSICAL EXAM:
• Gen: Well appearing male, WD/WN, alert cooperative
• CV: RRR, no murmurs, radial pulses 2+
• Lungs: CTAB; no wheezing; non labored breathing
• Abd: soft; mild lower quadrant tenderness superior to pubic rami on left worsens with trunk flexion; non distended; BS present in all four quadrants; no TTP epigastric area
• GU: no inguinal hernia palpated; normal testicular exam
• Skin: warm, dry; no rashes or lesions noted

DIFFERENTIAL DIAGNOSIS:
1. Irritable bowel syndrome (IBS)
2. Irritable bowel disease (IBD)
3. Gastroesophageal esophageal reflux disease (GERD)
4. Peptic ulcer disease (PUD)
5. “Sports Hernia”
6. Chronic gastritis
7. Mesenteric or bowel ischemia

TESTS/RESULTS:
• 5/2014 MRI: no evidence of athletic pubalgia or abdominal hernia.
• 6/2014 EGD: normal no evidence of ulcer disease or gastritis.
• 8/2014 2nd MRI: no evidence of sports hernia. New L5-S1 disc protrusion causing mild anterior thecal sac impression. Osteitis pubis.
• 8/2014 CT: Bulbous configuration of celiac axis with no definitive findings of median arcuate ligament compression. Recommend CTA of celiac axis with inspirationexpiration to exclude possibility of median arcuate ligament compression syndrome.
• 8/2014 CT Angio: Mild indentation of proximal celiac artery at expected location of median arcuate ligament narrowing the lumen from 6mm (inspiratory) to 4mm (expiratory).

FINAL DIAGNOSIS:
Celiac Artery Compression Syndrome (Median Arcuate Ligament Syndrome, Dunbar Syndrome)

TREATMENT/OUTCOME:
No treatment has been prescribed and he has not returned to play as he decided not to play this year. His symptoms are no longer present since he is not doing any activity.
Negative Pressure Therapy Dressings versus Standard Dressings for Closed Calcaneus Fractures: Preliminary Results of a Prospective Randomized Study of Wound Complications

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**DJ Frank Conference**
Podium Presentation | University of Cincinnati College of Medicine, May 8, 2015

**OBJECTIVES:**
To compare early wound complications obtained with incisional negative pressure wound therapy (NPWT) versus standard wound dressings after open reduction internal fixation of calcaneus fractures.

**DESIGN:**
Randomized prospective study

**SETTING:**
Academic Level I Trauma Center

**PATIENTS:**
Thirty-three skeletally mature patients with 38 operative closed calcaneus fractures presenting consecutively to our level 1 trauma center between February 2011 and February 2015.

**INTERVENTION:**
Patients were randomized to the incisional NPWT or standard dressing groups. All surgeries utilized the standard lateral extensile approach to the calcaneus. Patients randomized to the standard wound care group received standard absorptive dressings (small hemovac wound drain, bacitracin / polysporin ointment, non-adherent dressing and gauze). Patients randomized to the incisional NPWT group received an incisional vacuum dressing (non-adherent dressing, NPWT sponge, single use pump and a small hemovac wound drain). All fractures were splinted postoperatively. NPWT dressings were maintained for 2-4 days.

**MAIN OUTCOME MEASURES:**
Initial surgical wound healing (first 4-6 weeks postoperatively) with specific attention directed toward epidermolysis/skin edge necrosis, superficial infection [prolonged wound drainage (more than 8 days), wound erythema, oral antibiotic prescription] and deep infection [hospital re-admission, parenteral antibiotics, surgical intervention]. Secondary outcomes compared Visual Analogue Scores (VAS) through 6 weeks and functional outcome scores at 12 months (SF-36, SF-MFAS, AOFAS).

**RESULTS:**
Thirty-three patients with 38 closed calcaneus fractures were prospectively enrolled and randomized to the treatment groups. All patients were available for primary outcome evaluation (surgical wound healing) and VAS evaluations through 6 weeks postoperatively. Twenty-six of 33 patients were available for follow-up at least 6 months (12 ± 10.8, range 2-45 months). Twenty patients had associated injuries and 13 presented with isolated calcaneus fractures. Comparison of incisional NPWT and standard dressings showed the following: 4 acute complications requiring intervention, including one superficial infection in the NPWT group (6%) and 3 deep infections in the standard dressing group (15%), P = 0.2319. Late complications included 2 deep infections in the NPWT group presenting at 7 and 8 weeks postoperatively. Visual analagogue scores in NPWT and standard groups were 7.4 ± 2.6 and 7.5 ± 2.6 at hospital discharge (P = 0.9644) and 2.4 ± 1.9 and 3.5 ± 2.9 at 6 weeks (P= 0.2673).

**CONCLUSION:**
Preliminary results have shown no significant difference in pain, functional outcome scores and overall wound complications in incisions treated with incisional NPWT versus standard gauze dressings. There is a trend toward lower acute deep infection rates in the incisional NPWT dressing group, however, continued enrollment to reach statistical power is needed.
Predictors of Recurrent Patellar Instability in Children and Adolescents after First-time Dislocation

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DJ Frank Conference
Podium Presentation | University of Cincinnati College of Medicine, May 8, 2015

BACKGROUND: Patellar dislocations are one of the most common knee injuries in children and adolescents and are challenging to treat. Recurrence rates are relatively high and many patients have functional limitations, even in absence of a recurrent instability episode. The purpose of the study was to examine risk factors in patients with first-time patellofemoral dislocations to develop a prediction model of recurrence.

METHODS: A single institution retrospective review of all patients with a first-time patellofemoral dislocation from 2002 – 2013 was performed. Demographic risk factors (age, gender, laterality, mechanism of injury, and history of contralateral patellar dislocation) and radiographic risk factors (increased patella height, trochlear dysplasia, and skeletal immaturity) were examined. Patella height was measured using Caton-Deschamps index (CDI). Trochlear dysplasia was assessed using the two-grade Dejour classification and skeletal immaturity was assessed based on the distal femur and proximal tibia physis (open, closing, or closed).

RESULTS: 266 knees in 250 patients were included in the study. Of these 222 (83.5%) were treated nonoperatively and 44 (16.5%) were treated surgically. Of the knees treated nonoperatively, 77 (34.7%) had a recurrence. Significant risk factors for recurrence on univariate analysis were age ≤ 14 years, history of contralateral patellar dislocation, trochlear dysplasia, skeletal immaturity, and a Caton-Deschamps index > 1.45. Multivariate analysis was performed and trochlear dysplasia and skeletal immaturity were the most significant factors with odds ratios of 3.56 and 2.23 respectively. The presence of all four multivariate risk factors (CDI > 1.45, history of contralateral patellar dislocation, trochlear dysplasia, and skeletal immaturity) had a predicted risk of recurrence of 88%. The presence of any three risk factors had a predicted risk of about 75% and the presence of any two risk factors had a predicted risk of about 55%.

CONCLUSION: Trochlear dysplasia, skeletal immaturity, Caton-Deschamps index > 1.45, and a history of contralateral patellar dislocation were all significant risk factors for recurrence in patients with first-time patellar dislocations. A predictive model for calculation of recurrence risk was developed for any combination of the different risk factors. This information is useful when counseling patients and their families following first-time patellar dislocation about prognosis and potential outcomes.
Can Early Radiographs Predict Which Stable Juvenile OCD Knee Lesions Will Heal With Non-operative Treatment?

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DJ Frank Conference
Podium Presentation | University of Cincinnati College of Medicine, May 8, 2015

BACKGROUND: Stable juvenile osteochondritis dissecans (OCD) knee lesions heal with non-operative treatment in 50%-67% of patients. However, the long duration of sports restriction can be frustrating for patients, families, and physicians. The purpose of this study was to determine if early re-ossification predicts healing at 6 months.

METHODS: We retrospectively reviewed charts of 22 children (6 female, 16 male) between 6 and 13 years of age (average: 11±2) with a stable OCD lesion of the knee femoral condyles who were treated non-operatively for six months between January 2001 and March 2011. MRI confirmed the presence and stability of the lesion. To be included, patients had to have radiographs pre-treatment, after 7±2 weeks, and after 24±4 weeks. Anteroposterior, lateral, and notch radiographs at pre-treatment and 7 weeks were combined into one sequence, and pre-treatment, 7 week, and 6 month radiographs were combined into another sequence. Two raters reviewed the sequences at two time points over a month apart and classified the lesions as worse, unchanged, healing, or healed. Inter- and intra-rater reliability were assessed with Cohen's kappa. A chi-square test determined the likelihood the lesions would be healed at 6 months if healing at 7 weeks.

RESULTS: Healing was classified for 25 knee OCD lesions (13 right, 12 left). Healing classifications had inter-rater reliability of κ=0.38 at 7 weeks and κ=0.57 at 6 months and intra-rater reliability of κ=0.58 at 7 weeks and κ=0.66 at 6 months. Cases were only included in further analyses if raters agreed on at least 3 of 4 ratings for each case (n=19). All six patients who showed radiographic signs of healing at 7 weeks were healing/healed at 6 months. Of the thirteen patients who did not show radiographic signs of healing at 7 weeks, nine (69%) were healing/healed at 6 months. This difference in percent healing was not significant (p=0.26).

CONCLUSIONS: Healing is difficult to assess on early radiographs and is currently not of prognostic value secondary to low rater reliability and poor correlation with eventual need for surgical intervention.

Level of Evidence: Prognostic, Level IV
Outcome of Glenoid Labral Repairs in Competitive Swimmers
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DJ Frank Conference
Poster Presentation | University of Cincinnati College of Medicine, May 8, 2015

PURPOSE: Glenoid labral tears are not an uncommon cause of pain and change in biomechanics in overhead athletes. Superior Labrum Anterior Posterior (SLAP) tears have classically been described and studied in baseball players. There is little literature regarding labral tear pathology in competitive swimmers. The purpose of this study is to describe the personality of glenoid labral tears and the outcome of surgical repair in competitive swimmers with shoulder pain.

METHODS: We retrospectively reviewed 75 isolated SLAP glenoid labral repairs performed from 2009-2011 and identified 16 shoulders in 13 competitive swimmers. All shoulders failed at least 3 months of nonoperative management that included rest, swimming modification, physiotherapy, and corticosteroid injections. All swimmers were unable to participate in their swimming event preoperatively. Glenoid labral repairs were performed arthroscopically with standard suture anchor techniques and followed for a minimum of 36 months. Preoperative swimming personal best times and events were compared to these postoperative measurements. Subjective shoulder questionnaires (SANE, WOSI, DASH, ASES) were measured and compared to asymptomatic control shoulders.

RESULTS: All swimmers competed at the high school, competitive club, or collegiate level. All but one swimmer returned to the same or higher preoperative swimming level of competition and 85% were satisfied with their results. All subjective questionnaire score showed improvement and no significant difference from control asymptomatic group of shoulders. 77% (10 of 13) swimmers demonstrated improved time when compared to personal best time in the preoperative period. Postoperative personal best times were statistically significant than preoperative personal best times in 100 meter events only (p=0.04). Labral tear location was anterosuperior (12:30-3:30 o’clock) on the glenoid and did not involve the biceps anchor. (See figure)

CONCLUSION: Repair of the glenoid labrum can lead to improved pain and function in competitive swimmers. Labral tear personality is located at the anterosuperior quadrant of the glenoid and does not involve the biceps anchor. Repair of the torn glenoid labrum in this region may secure the anterior glenohumeral ligament anchors. This stabilization may help in alleviating micro-instability of the glenohumeral joint leading to better swimming biomechanics and less shoulder pain.
Neutralization Versus Anti-glide Plating for Lateral Malleolus Fractures

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DJ Frank Conference
Poster Presentation | University of Cincinnati College of Medicine, May 8, 2015

RESULTS: A total of 60 surgically treated isolated Weber B fractures were identified.

Thirty-one patients underwent ORIF using a neutralization technique, and twenty-nine patients with an anti-glide technique.

Median age of the cohort was 45 years (range 21 - 86) with a mean BMI of 29.6 (range 20 – 53).

There were 29 males (48%) and 31 females (52%).

Mean surgical time was 71 min (range 33 – 118 min) with a mean tourniquet time of 43 min (range 0 – 88 min).

Mean estimated blood loss was 36 mL (0 – 250 mL).

The median implant size was a 6-hole 1/3 tubular plate with 5 screws (4 cortical, 1 cancellous) at a mean cost of $262.

The mean OR cost was $12,693 (range $7,527 – $19,087) per procedure.

No statistically significant differences were noted between neutralization and anti-glide plating techniques in regards to age, BMI, tobacco use, DM status, MOI, fracture laterality, dislocation frequency, EBL, or implant removal.

The mean OR cost of anti-glide plating ($11,860) was significantly less than that of neutralization plating ($13,472; p = 0.04).

The total implant cost of anti-glide plating ($207) was also significantly less than neutralization plating ($314, p < 0.001). No statistically significant differences in patient reported functional outcomes scores (SF-36, FADI) were observed between anti-glide and neutralization plating techniques. Interestingly, slightly more patients in the neutralization group required symptomatic postoperative implant removal (n = 3) compared to the anti-glide plating group (n = 1), although this difference did not reach statistical significance (p = 0.33).

Limitations of the study include the retrospective design and small sample size.

CONCLUSION: There are no statistically significant differences in patient-reported functional outcome scores between anti-glide and neutralization plating for Weber B fibula fractures.

Both techniques are comparable in their implant removal rates.

By reducing both OR cost and implant cost, the anti-glide technique offers a significantly less expensive approach to isolated Weber type B fractures than the typical neutralization technique.

INTRODUCTION: Unstable distal fibula fractures at the level of the syndesmosis are typically treated with a lateral neutralization plate and independent lag screw utilizing a direct lateral approach.

Anti-glide plating has been proposed as an alternative technique, where the plate is positioned through a posterolateral incision.

To our knowledge, no study has compared the total cost or subsequent patient-reported functional outcomes between anti-glide and neutralization plating techniques for the treatment of lateral malleolus fractures.

OBJECTIVE: The primary outcome of this study was a cost comparison between neutralization and anti-glide plating techniques for isolated Weber type B fractures. Secondary outcomes included patient-reported functional outcomes scores, as well as demographic, injury, and treatment characteristics.

HYPOTHESIS: Anti-glide plating for isolated Weber B fibula fractures is significantly less expensive than neutralization plating while yielding similar patient-reported functional outcomes.


Inclusion criteria: > 18 years, closed isolated OTA type B fibula fracture that underwent surgical fixation with neutralization or anti-glide plating techniques.

Exclusion criteria: medial or posterior malleolus fracture that required ORIF, syndesmotic injury, locking or hook plates

Operative Costs
Combined price of operative room use and anesthesia personal reimbursement for surgical time based on current rates for major surgery at our institution.

Use of the operative theatre
• $6,233 for the first 30 min of surgery
• $136 for each additional minute

Anesthesia personnel
• $862 for the first 30 min of the procedure
• $24 for each additional minute

Implant Costs
Determined by the total price of the fixation construct utilized in each surgery based on the pricing of Synthes implants at our institution.

Functional Outcomes
Functional outcomes were measured at a minimum of 12 months postoperatively using the Medical Outcomes 36-Item Short-Form Health Survey (SF-36) and the Foot and Ankle Disability Index (FADI).
Flexible Growing Rods: Polymer Rods Provide Stability to Skeletally Immature Spines
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International Research Society for Spinal Deformities
Podium Presentation
2014 John Sevastik Best Paper Award in Treatment

BACKGROUND: Surgical treatments for early onset scoliosis (EOS), including growing rod constructs, involve many complications. Some are due to biomechanical factors. A construct that is more flexible than current instrumentation systems may reduce complications. The purpose of this preliminary study was to determine spine range of motion (ROM) after implantation of simulated growing rod constructs with a range of clinically relevant structural properties. The hypothesis was that ROM of spines instrumented with polyetheretherketone (PEEK) rods would be greater than metal rods and lower than noninstrumented controls. Further, adjacent segment motion was expected to be lower with polymer rods compared to conventional systems.

METHODS: Biomechanical tests were conducted on 6 skeletally immature porcine thoracic spines (domestic swine, 35-40 kg). Spines were harvested after death from swine that had been utilized for other studies (IACUC approved) which had not involved the spine. Paired pedicle screws were used as anchors at proximal and distal levels. Specimens were tested under the following conditions: control, then dual rods of PEEK (6.25 mm), titanium (4 mm), and CoCr (5 mm) alloy. Lateral bending (LB) and flexion-extension (FE) moments of ±5 Nm were applied. Vertebral rotations were measured using video. Differences were determined by two-tailed t-tests and Bonferroni correction with four primary comparisons: PEEK vs control and PEEK vs CoCr, in LB and FE (a=0.05/4). Results: In LB, ROM of specimens with PEEK rods was lower than control at each instrumented level. ROM was greater for PEEK rods than both Ti and CoCr at every instrumented level. Mean ROM at proximal and distal noninstrumented levels was lower for PEEK than for Ti and CoCr. In FE, mean ROM at proximal and distal noninstrumented levels was lower for PEEK than for metal. Combining treated levels, in LB, ROM for PEEK rods was 35% of control (p<0.0001) and 270% of CoCr rods (p<0.01). In FE, ROM with PEEK was 27% of control (p<0.001) and 180% of CoCr (p<0.01).

CONCLUSIONS: PEEK rods decreased flexibility versus noninstrumented controls, and increased flexibility versus metal rods. Smaller increases in ROM at proximal and distal adjacent motion segments occurred with PEEK compared to metal rods, which may help decrease junctional kyphosis. Flexible growing rods may eventually help improve treatment options for young patients with severe deformity.
Anatomic Reduction of Acetabular Fractures—
When is the Best Time to Operate?”
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Podium Presentation | April 26, 2015

OBJECTIVE: The purpose of this study is to determine which demographic, injury, and treatment characteristics influence acetabular reduction quality.

HYPOTHESIS: Earlier operative intervention for acetabular fractures will significantly increase the proportion of anatomic reductions observed. Secondarily, other demographic, injury, and treatment characteristics influence acetabular reduction quality.

MATERIALS & METHODS: IRB-approval was obtained for retrospective evaluation of a prospectively collected acetabular fracture database from a single surgeon at an academic level I trauma center. All acetabular fractures that underwent ORIF between Sep. 2001 and Feb. 2014 were included. 78 fractures fixed percutaneously in situ were excluded. 650 operatively treated acetabular fractures were available for analysis.

The primary outcome measurement was quality of reduction as it related to OR interval. OR interval was defined as the number of days from injury to ORIF. Quality of reduction was assessed via post-operative radiographs (AP and two 45˚ oblique Judet views) as well as intra-operative fluoroscopy. Maximal articular displacement seen on any of the radiographic views of ≤ 1 mm was considered an anatomic reduction (A), 1-3 mm imperfect (I), and ≥ 3 mm poor (P). Secondary outcome measurements included: patient demographics (age, gender, BMI), injury characteristics (mechanism, injury severity score, fracture pattern, hip dislocation, comminution, marginal impaction, femoral head injury), and treatment variables (skeletal traction, injury to OR interval, and surgical approach).

STATISTICAL ANALYSIS: A two-tailed pairwise Wilcoxon rank sum test was used to evaluate ordinal/nonparametric data. The chi-square test was used to compare proportions. The correlation between OR interval and quality of reduction was evaluated as a continuous variable using logistic regression analysis by comparing anatomic reductions (A) to non-anatomic reductions (I, P). Finally, a multivariate model was used to compare the relative contribution of all statistically significant variables identified. For all tests, an alpha value of 0.05 was considered statistically significant.

RESULTS: Reduction quality
• Anatomic = 85%
• Imperfect = 11%
• Poor = 4%
There was no significant difference noted between anatomic (A) and nonanatomic (I, P) reductions in regards to: gender, BMI, MOI, marginal impaction, femoral head injury, comminution, skeletal traction, or surgical approach.

Anatomic vs. nonanatomic reductions significantly different (p > 0.05) for age, ISS, hip dislocation, fracture pattern, and OR interval.

Fracture pattern
Elementary: 96% anatomic
Associated: 79% anatomic, p < 0.05

Injury to OR interval
Anatomic: med. 3 days
Imperfect: med. 4.5 days (p = 0.02)
Poor: med. 7 days (p < 0.001)

Multivariate model
• Fracture pattern strongest predictor
Injury to OR interval has 4x greater log odds effect for predicting reduction
Continuous logistic regression revealed injury to OR Interval has log effect of -0.12
• Odds of anatomic reduction decrease 12% each day from injury to ORIF

DISCUSSION:
Advantages
• Large sample size
• Consistency of single surgeon at single institution
• Evaluation of several variables not previously analyzed in relation to reduction quality

Limitations
• Observer bias
• Reduction quality assessed by operative surgeon
• Grading should be consistent throughout cohort
• Retrospective review

CONCLUSIONS
• Probability of achieving anatomic acetabular fracture reduction increases with:
  • Decreased patient age
  • Elementary fracture types
  • Presence of a hip dislocation
  • Decreased Injury Severity Score
  • Decreased Injury to OR Interval
• Injury to OR Interval is the only significant variable identified that can be influenced by the operative surgeon.

Acetabular surgeons should attempt to minimize Injury to OR Interval in order to increase the probability of achieving an anatomic reduction
INTRODUCTION: Both intra-operative fluoroscopy and postoperative radiographs are routinely used during acetabular fixation to access reduction quality, and concomitantly identify intra-articular fragments or screw penetration. Although these imaging modalities are usually adequate for identifying these surgically correctible factors, computed tomography (CT) has been found to be more sensitive and specific. Despite the improved diagnostic capability, some argue that routine postoperative CT after acetabular ORIF should not be utilized due to increased radiation exposure and additional expense to the patient. Missing a correctible complication, however, can lead to the development of post-traumatic arthritis and associated complications.

The objectives of our study were (1) to evaluate the efficacy of routine postoperative CT following acetabulum ORIF and (2) to identify factors that make a patient more likely to benefit from postoperative CT.

HYPOTHESIS: Routine postoperative CT scan following acetabular ORIF will identify surgically correctible factors not observed with intraoperative fluoroscopy or plain radiographs.

METHODS: We retrospectively reviewed a prospectively collected acetabular fracture database (IRB# 02-05-29-06-EE), which included surgically treated acetabular fractures at a single institution between January 2003 and December 2012.

Inclusion Criteria:
- All Patients ORIF Acetabulum
- Evaluated with intra-op fluoro & 3 standard radiographs (AP and two 45º Judets)
- Patients underwent postop CT

Revision vs Index population:
The revision population included patients who had a revision ORIF based on CT Findings

Compared Variables:
Age, Gender, Body Mass Index, Mechanism Of Injury, Fracture Pattern (Letournel), Surgical Approach

RESULTS: 612 consecutive acetabular ORIF, (6 bilateral) with intra-op fluoro and plain films (AP and Judets) prior to leaving OR. 569 cases (93%) underwent postop CT. 14 Patients underwent revision surgery

DISCUSSION:
Limitations:
- Protocol for routine post-op CT not implemented until 12 months after database collection started
- Revision surgery determined subjectively by senior surgeon
  Exception: Malreduction of 10mm gap / step on CT
- Retrospective review of a prospective protocol
- No long term functional outcomes reported

Strengths:
- Single surgeon series—consistency with decision for revision surgery
- Large cohort

CONCLUSION:
A small percentage (2.5%) of patients will benefit from a routine CT scan following acetabular fracture fixation. No specific risk factors were identified for patients that will most benefit from routine postoperative CT after acetabulum ORIF.

Intra-operative fluoroscopy during ORIF procedure. No obvious abnormality was identified.

Postop CT Pelvis from same patient shows intra-articular hardware requiring revision procedure for exchange.
Reaction Times and Peripheral Vision Reaction Times are Slowed Post Concussion

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Society for Academic Emergency Medicine
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BACKGROUND: Visual symptoms post-concussion are one of the most common symptoms post mild traumatic brain injury, with headache and balance being frequently reported as well. Recent publications have found that visual sensory symptoms are reliable indicators of concussion and useful for concussion management. Vision related dysfunction has also been associated with patient reports of being in a “fog”. “Fog” during concussion is described in the literature as being like going from a high-definition TV to a standard TV, or that the patients feel one step behind themselves. Those two metaphors, visual loss of fidelity and temporal delay, are telling. It implies a visual dysfunction as well as a change in timing or the perception of time. Temporal changes or dysfunction during a concussion are often found when a subject’s reaction times are assessed. A slowing in reaction time can be an indicator of concussion and also slowed reaction times are considered a risk for athletes when making return to play decisions. An athlete with slowed reaction times might be more susceptible to injury.

OBJECTIVES: There is a critical need in the neuro diagnostic community of clinicians who diagnose mild traumatic brain injury (mTBI) or concussion for a method that objectively assesses a patient’s concussion symptoms and progress during recovery. The putative requirements for such a system are that it should be quantitative, objective, reliable and sensitive such that it can track subtle changes during the course of a concussion patient’s recovery. Having a baseline data set on patients would be ideal, but as baselines are often not available such a system should also be able to be used with or without a baseline.

METHODS: We compared 17 consecutive concussion patients to 30 control subjects and measured their central visual reaction time compared to the visual reaction time in the periphery (about 45 degrees off center). Visual reaction times were assessed using the Dynavision D2 light board (Westchester, Ohio).

RESULTS: In non-concussion subjects we found that the central visual field reaction time was 0.294 + 0.044 seconds for central visual field and 0.340 + 0.049 seconds for the peripheral visual field. That is a 16.3% slower reaction time in the peripheral visual fields. In concussion patients the mean central visual field reaction time was 0.371 + 0.118 seconds and 0.495 + 0.146 seconds for the peripheral visual fields. That is a 36.0% slower reaction time in the peripheral visual fields. The concussion patients had reaction times and peripheral vision reaction times that were significantly (p<0.001) slower compared to controls.

CONCLUSION: We believe that a 0.494 second delay in sensory information from the visual system may cause or contribute to fog perceived by concussion patients. It is quite possible that a sensory and or processing mismatch could lead to the perception of fog, which might be useful as a diagnostic for assessing concussion. Because we measured the central vs peripheral vision reaction times and found that the fall in peripheral reaction time was greater in concussion patients this test could be used as an objective biomarker on concussion patients. More work is needed on a larger patient population to determine the utility of measuring central vs peripheral vision reaction times as well as its relationship to fatigue and fog.
**INTRODUCTION:** Proper total hip arthroplasty component positioning is important for the longevity and successful outcome of total hip arthroplasty (THA). The accurate positioning of the acetabular component and femoral component are important for combined anteversion and to restore leg length. This ensures full motion and minimizes risk of dislocation and complications. The purpose of this study is to analyze the accuracy of patient-specific guides for proper acetabular and femoral component positioning.

**METHODS:** A computed tomography (CT) scan of a human female cadaver pelvis and femur was performed to obtain anatomical landmarks. Computer-aided design (CAD) software was used to determine pelvic planes and anatomical landmarks of the acetabulum and femur. A 3-dimensional printer was utilized to generate patient-specific guides for the acetabulum and femur. This was contoured to fit exact areas of the acetabular geometry and planned to prepare and place the acetabular component at 45° of inclination and 25° of anteversion. The femoral guide was contoured to fit exact areas of the femoral neck geometry and designed to guide the saw along a resection level at a precise height above the lesser trochanter. The femoral guide also includes an indicator to direct femoral component anteversion, which in this case was planned to be 27.4°. The planned combined anteversion was 52.4°. A direct anterior approach THA was performed on the cadaver, and the patient-specific guides were used to control the acetabular and femoral component preparation and placement. Post-procedural CT scan was performed to determine the accuracy of implant placement compared to the specific plan.

**RESULTS:** The post-procedural CT scan determined acetabular component position at 40.4° of inclination and 24.0° of anteversion. Therefore, the patient-specific instruments resulted in acetabular component placement within 4.6° of inclination and 1.0° of anteversion from the patient-specific plan. The femoral resection height was within 1.4mm of the planned level, and placed at 15.6° anteversion (11.8° variance from the plan). The resultant combined anteversion was 39.6° (13° variance from the plan).

**CONCLUSION:** In this prototype study, patient-specific instrumentation was effective in accurately positioning the acetabular component and femoral neck resection level. The combined anteversion was able to be measured, but varied from the plan primarily due to the femoral anteversion. Additional studies will determine if these patient-specific instruments can reproduce and improve on these results, ultimately translating to clinical trials.
Direct Anterior Approach Total Hip Arthroplasty (THA) with a Straight Tapered Titanium Stem: A Learning Curve for Neutral Alignment

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Transatlantic Orthopaedic Congress
International Congress for Joint Reconstruction
Presentation | October 2014

**BACKGROUND:** With the increased interest in the direct anterior surgical approach for total hip arthroplasty (THA), surgeons may look towards smaller or curved stem designs to facilitate placement of the femoral component. For surgeons accustomed to using a straight tapered stem design, the anterior approach may be more of a challenge to learn and properly place the femoral component in neutral alignment. The goal of this study was to evaluate the learning curve for proper stem positioning using the anterior approach with a press fit straight tapered stem design.

**METHODS:** Between May, 2011 and May, 2013, 58 patients underwent a direct anterior THA using a press fit straight tapered stem design. Postoperative radiographs were reviewed and femoral stem alignment was recorded as varus, valgus, or neutral. Patient diagnoses included 47 with osteoarthritis, 7 with avascular necrosis, and 4 with femoral neck fractures.

**RESULTS:** Of the surgeon’s first 58 direct anterior THAs using a press fit straight tapered stem, 12 (20.7%) were placed in varus, 2 (3.4%) were placed in valgus, and 44 (75.9%) were placed in neutral alignment. Seven of the first 14 (50%) direct anterior approach THAs using a press fit straight tapered stem were positioned in varus alignment, while only 7 of the next 44 (15.9%) THAs were in varus or valgus alignment.

**CONCLUSION:** Continued use of familiar implants is an option when transitioning to a less familiar surgical technique. For surgeons familiar with a press fit straight tapered stem design and interested in converting to the direct anterior surgical approach, consideration of a smaller or curved femoral implant to accommodate this surgical approach may not be necessary. Although a press fit straight tapered stem can be placed in neutral alignment through the direct anterior approach, there is a learning curve combining this approach and stem design to avoid varus positioning.
Retinal Changes Based on Concussion History: A Study of Division 1 Football Players
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UCMC Research Week 2015
DJ Frank Conference
Poster Presentation | May 7-8, 2015

BACKGROUND: The long term effects of a sports concussion or mild traumatic brain injury (mTBI) is poorly understood. The term chronic traumatic encephalopathy (CTE) is associated with protein deposition observed post mortem; thus the diagnosis of CTE in living subjects is impracticable using protein deposition as a diagnostic criterion. To date, there is no validated, objective method to observe and document pathologic changes post mTBI. The brain, optic-nerve, retina axes is closely linked; it is believed that some aspects of mTBI may be reflected in the retinal nerve fiber layer (RNFL) and that optical coherence tomography (OCT) could be a means to observe and document these changes. In this paper we show an association between a history of concussion and RNFL changes in college athletes.

METHODS: Each member of the University of Cincinnati football team was surveyed for a history of diagnosed concussion during pre-season camp. All players participating in camp were consented and were subjected to both a retinal exam using the Optovue iVue OCT retinal imaging system and a balance challenge by performing a visual motor task (Dynavision D2) on a BOSU Pro Balance Trainer (BOSU ball) and on a firm surface. Eye-hand coordination, balance and RNFL thickness measurements for the athletes with a history of concussion were compared to those the athletes with no history of concussion.

RESULTS: A total of 34 athletes reported having at least one previously diagnosed concussion that occurred up to 10 years prior to data collection; 73 reported no history of diagnosed concussion. Data analysis of the OCT retinal images demonstrated significant thickening of the RNFL in those athletes with a remote history of concussion when compared to athletes with no history of concussion, 106.8 μm vs 103.7 μm (p = 0.009), respectively. With the BOSU ball challenge there was no change in performance with or without a balance challenge 4.57 vs 4.63 hits per minute (p=0.93) for those with history of concussion versus no history. The performance task on the Dynavision D2 is an eye hand coordination task and a balance task, so eye hand coordination was not impacted by the RNFL changes.

DISCUSSION: In this paper we report significant sustained chronic RNFL thickness changes occurring in athletes with a remote history of concussion when compared to similar athletes without a reported history of concussion. However, there were no statistically significant sustained changes in eye hand coordination or balance challenge performance tasks. We suggest that RNFL changes may be an indicator of a structural brain injury following a postconcussive event and may be caused by subclinical increases in intracranial pressure or other neurovisual-related pathologies.
Is Current Medical Education Adequately Preparing Future Physicians to Manage Concussion: An Initial Evaluation

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**OBJECTIVES:** In 2010, there were 2.5 million hospitalizations, emergency room visits, or deaths associated with concussions in the United States. Knowledge deficits exist among physicians regarding concussion management, which can lead to severe repercussions, including poor patient outcomes, poor patient satisfaction, and potential medical-legal issues. While concussion is a prevalent condition evaluated in the medical field, medical students continue to have a knowledge deficit regarding concussion diagnosis, prognosis, medical management, and return to play guidelines.

**METHODS:** Medical students from a mid-western medical school completed a survey on concussion diagnosis, prognosis, medical management, and return to play guidelines.

**RESULTS:** The response rate was 40%. The data suggests that the vast majority of medical students are able to define concussion; however, most reported never having a lecture dedicated to concussion during medical school and also lacked clinical experience with acute concussion and post-concussive syndrome. There are clear areas of deficiency as noted by the inability of students to correctly identify symptoms and appropriate management of concussion.

**CONCLUSION:** The current study indicates that at an individual, mid-western, top 50 medical school, current medical trainees may not be adequately educated to identify and manage concussion. Future research is warranted to determine the optimal guidelines to educate future physicians as it pertains to concussion diagnosis, management, prognosis, and return to play guidelines.
Orthopaedic Surgery at the University of Cincinnati

A History

The College of Medicine was established in 1819 as the Medical College of Ohio by Daniel Drake. In 1829, he described a method for the care of fractures of the femur. He favored the apparatus of Desault, the leading French surgeon at that time. The patient was placed on a hard bed, both knees were flexed over a double incline plane, and then Desault’s extension apparatus was applied. Other early methods of orthopaedic care are described in the ward records of the Commercial Hospital of Cincinnati. This hospital was staffed by professors of the Medical College of Ohio and was charged with the care of local citizens and also of any Ohio River boatmen who were sick or injured. Ward records of the hospital provide descriptions of some orthopaedic procedures which were in vogue at that time.

One of the earliest physicians to write on any orthopaedic subject was Daniel Drake. In 1829, he described a method for the care of fractures of the femur. He favored the apparatus of Desault, the leading French surgeon at that time. The patient was placed on a hard bed, both knees were flexed over a double incline plane, and then Desault’s extension apparatus was applied.

FROM WARD RECORDS OF THE COMMERCIAL HOSPITAL OF CINCINNATI:

James Burton, Scotch, aged 32, boatman. Admitted April 1, 1865. Two days before admission, while drunk, got into a quarrel with a man who knocked him down and kicked him so that his clavicle was broken at the middle and outer thirds. When first admitted his arm was merely supported in a sling and he was kept in bed. On April 10, whenever he moves he displaces the fragments and in order to prevent this a figure of 8 bandage was applied. April 19, consolidation has commenced. May 8, the stiffness has to a great extent disappeared; was today at his own request, discharged.

Thomas Fitzgerald, Irish, aged 33 years. Admitted April 1, 1865. States that the day previous he fell down an excavation, breaking his left leg, which upon examination we find to be a compound comminuted fracture of tibia. There is an erysipelatous appearance to it and it is to be put in a box with Bran dressings and a fermenting poultice to a wound. May 2, the protruding bone was exfoliated today. May 31, no union has yet taken place.

May 12, 1866, Thomas Bell, age 17, boatman. Admitted today, states that three days ago he received an injury at the wrist joint of right arm of a hogshead falling on it. States that for about 36 hours he suffered considerable pain and the arm was swollen from the wrist to the elbow. There is considerable swelling at the wrist joint of the right arm. The motion of the joint is good but attended with pain; pressure over the swelling causes some pain; no fracture or displacement of any of the bones of the hand or arm. Treatment 6 leeches were applied to the wrist. Splints were then applied to the arm. May 17, swelling subsiding. June 4, no swelling, good use of the joint.
Reuben Dimond Mussey, MD, (1780-1866) was Professor of Surgery at the Ohio College and later at the Miami Medical College. He graduated from Dartmouth College in 1803, studied medicine with Dr. Nathan Smith and received his medical degree at the University of Pennsylvania in 1809. While he was Professor at the Miami College he performed many bone and joint operations, including one of historical importance—resection of the scapula and clavicle after previous amputation at the shoulder joint. Dr. Mussey was interested in hip fractures and was of the opinion that healing could occur. Dr. Mussey was also active in medical affairs in Cincinnati, and was the first President of the Academy of Medicine. In 1850, he was elected President of the American Medical Association.

George C. Blackman, MD, (1819-1870) was Professor of Surgery at the Medical College of Ohio, receiving this appointment in 1854. He attended Yale College, received his medical degree from the College of Physicians and Surgeons in New York, and studied in London. During the period of the Civil War, Dr. Blackman became interested in the care of battle casualties and he served in Kentucky with General William Nelson at the battles of Pittsburgh Landing and Shiloh. Thousands of wounded soldiers were brought to Cincinnati from these southern battlefields to receive attention at the military emergency hospitals. Dr. Blackman performed many orthopaedic procedures, on board a chartered river boat. Dr. Blackman also recorded a case of removal of the scapula for “necrosis and caries” with complete healing and recovery of function of the arm.

Andrew Jackson Howe, MD, (1825-1892) was Professor of Surgery at the Cincinnati Eclectic Medical Institute. He received this appointment in 1861. Graduating from Harvard College, he then received his medical degree from the Worcester Medical Institute, where he had been Professor of Anatomy prior to coming to Cincinnati. Howe’s primary interest was fracture work and in 1870 he published a textbook entitled “A Practical and Systematic Treatise on Fractures and Dislocations.”

Albert H. Freiberg, MD, (1868-1940) was the best known early orthopedist in Cincinnati, and probably contributed more than any other to the growth of orthopaedics in the Cincinnati area. He was born in Cincinnati and educated in the public schools. From high school, he went directly to the study of medicine at the Medical College of Ohio, a transition that was common at that time. He was greatly interested in music and was an accomplished violinist, playing in a quartet for many years with members of the symphony orchestra. When his interests turned to orthopaedics, he went to Europe to study in the clinics there. He was a pupil of Julius Wolff in Berlin, then the foremost orthopedist of Germany. When he returned to Cincinnati in 1893, he entered private practice and became associated with the Medical College of Ohio. In 1903, he was appointed Professor of Orthopaedics and eventually continued this capacity when the Ohio and Medical Colleges merged in 1909.

Dr. Freiberg published more than 90 articles on orthopaedic subjects and was an outstanding teacher to the medical students and resident surgeons at the General Hospital. One paper which he published in 1914, entitled “Infraction of the Second Amputation being performed in a hospital tent, Gettysburg, Pennsylvania, July 1863

Above: Ohioan Daniel Schuyler Young, MD, documented battle wounds while serving as surgeon during the Civil War. Below: Surgeon’s field kit from that era.
Metatarsal Bone, as Typical Injury has become a classic, and this condition is still known as Freiberg’s disease. In 1910, Dr. Freiberg was elected President of the American Orthopaedic Association. During World War I, he was Chief of Orthopaedic Surgery at Walter Reed Hospital and assisted in the preparation of the Manual of Orthopaedic Surgery for the Army. He helped organize the Crippled Children’s Program for the State of Ohio and developed the program for the Care of the Crippled Child in Cincinnati. Dr. Freiberg established The Brace Shop, which was supported by the Babies Milk Fund. He was on numerous national committees including one to investigate the treatment of structural scoliosis, and later he was appointed by President Franklin D. Roosevelt to be chairman of a committee to study infantile paralysis (polio), recognized to be one of the most dreaded disease of children throughout the country at the time. Dr. Freiberg continued his practice and continued to be Professor of Orthopaedics until he resigned in 1938. 

Robert D. Maddox, MD, (1876-1955) graduated from the University of Cincinnati College of Medicine, and interned at the United States Marine Hospital on Kilgour Street. He then worked on the service of Dr. Robert Carothers at the General Hospital (Cincinnati). Orthopaedic training at that time was not as formal or lengthy as it is today. A note in the Cincinnati Lancet Clinic, July 4, 1908 states: “Dr. R.D. Maddox left on Monday for Boston where he will take a special course in the hospital of the Harvard Medical School. His time will be devoted exclusively to orthopaedic surgery.”

John A. Caldwell, MD, (1877-1958) was Director of the Fracture Service at the Cincinnati General Hospital for 26 years, retiring in 1948. He graduated from the Miami College of Medicine in 1902. Following post-graduate work, he became an instructor in surgery at the University of Cincinnati College of Medicine in 1917. He was interested in teaching and conducted the course in fractures at the Medical School. He published a book entitled, “A Manual of the Treatment of Fractures” in 1941. Dr. Caldwell developed many useful devices for fracture treatment including a fracture table with numerous attachments and made it possible for a surgical resident to reduce and apply casts for almost any fracture. Dr. Caldwell also devised an anti-inversion boot to prevent rotation of the lower extremity of the patient with a hip fracture. He designed pin lugs for fastening Steinmann pins to the sides of a Thomas splint as a method of fixation and traction. He thus modified Russell traction for fractures of the femur so the extremity could be suspended from an overhead frame, maintained in traction and provide free access for the care of any open wound about the thigh or leg. Finally, he is credited with describing the hanging arm cast for the treatment of humeral shaft fractures. Dr. Caldwell was President of the Ohio State Medical Association in 1934 and President of the Academy of Medicine in 1935.

Joseph A. Freiberg, MD, (1893-1974) became Professor of Orthopaedic Surgery at the University of Cincinnati College of Medicine in 1938, following the retirement of his father. He received his early education in Cincinnati, graduated from Harvard College in 1920, and from the University of Cincinnati College of Medicine in 1923. Following a year of internship at the Cincinnati General Hospital, Dr. Freiberg continued as a surgical resident on the service of Dr. Mont Reid. At this time he was greatly interested in anesthesia and did some valuable work with the use of oxygen in the Anesthesia Department. He then spent several months abroad studying in Europe with Sir Robert Jones and Sir Henry Osmond-Clarke. He returned to Cincinnati in 1928 and entered practice with his father, and worked with him in
the teaching program at the medical school and at Cincinnati General Hospital. In 1939, he established a residency program, and this proved to be an excellent, well-balanced training program. The resident physicians had the advantage of being able to work directly with Dr. Freiberg in the operating room with his private patients at the Jewish Hospital as well as with patients at the General Hospital. The orthopaedic care of crippled children was an active part of the program. During that time both acute and chronic polio was rampant. There were also many patients with tuberculosis of bone and joints as well as chronic pyogenic infections of bones (osteomyelitis). Dr. Freiberg always emphasized the fundamentals of obtaining a complete history and a careful orthopaedic examination including an exact recording of joint ranges and exact measurements of extremities. The residents also had wide experience in the treatment of acute fractures at the General Hospital on the Fracture service.

Dr. Freiberg, active in many national orthopaedic organizations, was an examiner for the American Board of Orthopaedic Surgery, Vice President of the American Academy of Orthopaedic Surgeons, Associate Editor of the Journal of Bone and Joint Surgery and President of the American Orthopaedic Association. Today, the library in the Department of Orthopaedic Surgery at the University of Cincinnati College of Medicine is named The Freiberg Library.

Nicholas Giannestras, MD, (1908-1978) graduated medical school from Tufts Medical School in 1933; and completed his internship at Cambridge City and his residency in Providence, Rhode Island graduating in 1938. He began his practice in 1939 in Cincinnati, but was interrupted shortly when he was called for military service during World War II. In 1945 he began his practice in Cincinnati at the Good Samaritan Hospital and also at the University of Cincinnati in the Foot Clinic as a Clinical Professor at the University of Cincinnati in the Department of Orthopaedic Surgery. He was a founding member of the American Orthopaedic Foot Society and served as president from 1970-1971. His oldest publication came while he was still a resident in 1938 concerning the conservative treatment of scoliosis with bracing, and he maintained his interest in correction of spinal deformity throughout his life.14

Aaron Perlman, MD, (1915-2011) graduated Yale University cum laude in 1935 and then continued at Laval University Medical School in 1939. He did his orthopaedic residency at Jewish Hospital in Cincinnati and a pediatric cerebral palsy fellowship at Johns Hopkins University. Dr. Perlman established a pediatric cerebral palsy clinic at Cincinnati Children’s Hospital in 1951. He was active in teaching at the University of Cincinnati College of Medicine 1949-1990. His legacy at the University of Cincinnati includes “The Aaron Perlman Award” presented each year to the resident at the UC College of Medicine who shows the greatest compassion for patients and exemplifying the highest quality of patient care.

Richard Freiberg, MD, would continue his father and grandfather’s tradition and become a leading orthopaedic surgeon. He received his Bachelors of Science from Harvard College in 1933; and attended Harvard Medical School from 1937-1938; and served as a General Surgery Resident at Cincinnati General from 1938-1939. Dr. Freiberg was an orthopaedic resident at the University of Illinois from 1939-1940 when he traveled to Boston and abroad to observe surgery techniques. Dr. Freiberg returned to Cincinnati and began a practice known as the Freiberg Orthopaedic Group. He also began teaching at the Arthritis Clinic at the University of Cincinnati. He was the consulting orthopaedic surgeon for the Shriner’s Burn Unit and ran the Orthopaedic service at the Veterans Administration Hospital. Dr. Freiberg served on the Board of Trustees of the Arthritis Foundation and the Jewish Hospital. He has been widely published in peer-reviewed publications. In 1996, Dr. Freiberg left the Freiberg Orthopaedic Group to become Director of Orthopaedic Surgery at the Veterans Administration Medical Center Cincinnati where he also taught Orthopaedic Surgery. He is currently a Volunteer Professor.
in the Department of Orthopaedic Surgery at the University of Cincinnati.

Edward H. Miller, MD, became Director of the Orthopaedic Service at the General Hospital in 1969. Dr. Miller graduated from medical school at the University of Cincinnati, received orthopaedic training at the University of California and served in a United States Air Force Hospital in California prior to returning to Cincinnati. The same year that Dr. Miller became the Director, the new General Hospital opened and facilities for clinical work improved tremendously. The number of resident trainees increased rapidly—from 8 in 1969 to 21 in 1971. Dr. Alan R. Kightlinger became Assistant Director of the service. A rotation program was established for residents to study hand surgery with Dr. Harold E. Kleinert in Louisville, Kentucky.¹

In 1975 Dr. Miller became Acting Director of the newly established Department of Orthopaedics which combined the fracture and orthopaedic services. He was appointed Director and Professor in 1976. Also in November 1975, the Department of Orthopaedic Surgery established the Christian R. Holmes Outpatient Center at the Holmes Division of University Hospital. In October 1978, the department centralized outpatient care of orthopaedic patients at the medical center by relocating to the Medical Center Clinic Building. This move was in keeping with our concept of the structure of a university medical center and it facilitating the provision of the same high standard of health care to all patients. The teaching was further broadened when the orthopaedic programs at some of the private hospitals in Cincinnati became affiliated with the University of Cincinnati Medical Center. The Service at the Christ Hospital was directed by Dr. Robert Heidt; the program at Jewish Hospital by Dr. John Levitas; and Dr. Edward J. Zenni was Director at the Good Samaritan Hospital. Dr. Miller was given the honorary title of Professor Emeritus in 2000.²

Frank Noyes, MD, was born in 1939 in El Paso, Texas. He received his Bachelor of Arts Degree in philosophy from the University of Utah in 1962 and graduated cum laude from George Washington University Medical School in 1966. He served as an Intern and Orthopaedic Resident at the University of Michigan Medical Center from 1966 to 1971. Dr. Noyes served as a Lieutenant Colonel in the United States Air Force from 1971 to 1975 with a joint assignment at the Department of Orthopaedic Surgery and also as a Senior Research Associate, Aerospace Medical Research Laboratory at Wright-Patterson Air Force Base. Dr. Noyes established a close and continuing collaboration with Edward S. Grood, PhD, to conduct ground-breaking knee research investigating the biomechanical properties of knee ligaments in humans and primates, including strain rate effects, age related properties, immobilization and exercise. The research resulted in the AAOS Kappa Delta Award. Dr. Noyes joined the University of Cincinnati Department of Orthopaedics in 1975 as Director of the Sports Medicine Institute and Director of Orthopaedic

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Research. Together with Dr. Grood, they established one of the nation’s first Biomechanical Laboratories within the College of Medicine and the Department of Engineering. In 1981, Dr. Noyes founded the clinical and research facility, the Cincinnati SportsMedicine and Orthopaedic Center and non-profit Research and Education Foundation where he serves as Chairman and Medical Director.

Dr. Miller recruited Alvin H. Crawford, MD, to be the Director of the Division of Orthopaedic Surgery at Cincinnati Children’s Hospital Medical Center in 1977, where he remained Chief for 29 years. Dr. Crawford graduated cum laude from Tennessee State University, where he became the first African American to graduate from the University of Tennessee College of Medicine. He completed his residency at Boston (Chelsea) Naval Hospital; and at the combined Harvard University Orthopaedic Program. His postgraduate fellowships included the OREF Carl-Berg International fellowship; Otto Aufranc Reconstructive Surgery of the Hip; Pediatric Orthopaedics at Children’s Hospital, Boston, MA; the Alfred I. DuPont Institute, Wilmington, DL, and the Senior Scoliosis Research Society Asian Traveling Fellowship. He has trained 54 fellows in Pediatric Orthopaedics and Spine Surgery. He has published more than 200 peer-reviewed articles, more than 63 chapters, and six books. He is a fellow of the American Academy of Orthopaedic Surgeons, American Academy of Cerebral Palsy, the American Academy of Pediatrics, the American College of Surgeons, and Scoliosis Research Society. Among his long list of positions, honors, and awards include president of the Scoliosis Research Society in 2001; the 2007 Diversity Award from the American Academy of Orthopaedic Surgeons; the 2009 Candle in the Dark Award from Morehouse college for his contributions in the field of Medicine; and the 2008 Hall of Fame of Historically Black Colleges and Universities. He presented the prestigious Paul Harrington, MD Lecture at the Scoliosis Research Society in 2012; Presidential Oration at the Indian Pediatric Orthopaedic Society in 2013; received the Lifetime Achievement Award in Medicine from Closing the Health Gap in Cincinnati; Mayor Mark Mallory proclaimed May 8, 2013 to be Dr. Alvin Crawford day in Cincinnati; the Laurel Wreath Award from Kappa Alpha Psi fraternity in 2013, its highest award for a members’ achievement in service; and the Distinguished Achievement Award from the Pediatric Orthopaedic Society in 2014. Currently, Dr. Crawford is Professor Emeritus at the University of Cincinnati College of Medicine. Specializing in treating scoliosis, or curvature of the spine, he is one of the nation’s foremost authorities on video-assisted thoracoscopic surgery and an authority on neurofibromatosis in children.

Clark Hopson, MD (1944-2009), became Chairman in 1978. He was born and raised in East Orange, New Jersey. He was a two-sport varsity athlete and graduated magna cum laude from Brown University in 1966. He went on to attend Cornell Medical School and subsequently completed his medical training in Orthopedics at Tufts in Boston. He was Professor and Chairman of the Department of Orthopaedic Surgery at the University of Cincinnati from 1978 to 1991 and had an active clinical and academic practice. He relocated to Hilton Head Island in 1994 where he established a private practice. He continued to actively practice medicine until his death in 2009.

The Department encountered some organizational issues during the early 1990s resulting in the resignation of the Chair and nearly all of the faculty, placing the residency program in academic probation. During this time, the College of Medicine reached out to Peter Stern, a nationally-known hand surgeon in the community and volunteer associate professor, who agreed to step-in as acting director. One of the remaining faculty members was Angelo Colosimo, a young and energetic sports surgeon who wasn’t easily intimidated. Colosimo chose to ride out the turmoil stating “I recognized a tremendous opportunity to build a Sports Program from the ground-up while working with a Division-1 college.” In late 1992, Stern recruited a young and promising hand surgeon straight out of fellowship, who he’d personally trained for the last year, John Wyrick. He also enlisted a former UC resident alumnus and attending surgeon, Edward V.A. Lim, who returned as director of the trauma service. In 1993, Stern brought Patrick Kirk on board, a community-based board-certified reconstructive surgeon; followed by Anthony Guanciale in 1995, as director of the spine service. For the next 14 years Stern served as both Chair and program director while continuing to strategize and further strengthen the department. In 2001, Dr. Stern recruited the department’s first fellowship-trained traumatologist, Michael Archdeacon, who later became the director of the musculoskeletal trauma division. In 2006, Keith Kenter, an academically-driven sports surgeon joined the department as program director, where he remained for the next decade as a passionate educator and teacher.
Peter Stern, MD, was appointed Interim Chair in 1991 and was later appointed to full Professor and Chair in 1992. Dr. Stern is a native Cincinnatian and grew up in Clifton where he attended Clifton Elementary School and Cincinnati Country Day High School. Dr. Stern served two years in the United States Air Force as a General Medical Officer. He graduated from Williams College in Williamstown, MA and received his medical degree from Washington University School of Medicine in St. Louis. He completed his Orthopaedic residency at the Harvard Combined Orthopaedic Program followed by a hand surgery fellowship in Louisville under the guidance of Harold Kleinert, MD. He is the Norman S. and Elizabeth C.A. Hill Professor at the University of Cincinnati; and served as Chairman of the Department of Orthopaedic Surgery at the University of Cincinnati from 1992-2013. Dr. Stern is a past President of the American Society for Surgery of the Hand, the American Board of Orthopaedic Surgery and the American Orthopaedic Association. He is a past Trustee of the Orthopaedic Research and Education Foundation, and a past Chairman of the Orthopaedic RRC. He is a former Deputy Editor for the Journal of Bone and Joint Surgery and now serves on JBJS Board of Trustees. He has served as a visiting professor at over 70 institutions, has given over 40 endowed lectureships and has over 180 peer review publications. Teaching and learning have been constant driving passions for Dr. Stern, who has devoted his entire professional career to advancing education in Orthopaedic and Hand Surgery. He has educated 56 fellows and over 120 orthopaedic residents. Each year at graduation a medical student is presented with the "Peter J. Stern Orthopaedic Surgery Award" for excellence in the field of Orthopaedic Surgery.

Today, Michael Archdeacon, MD, MSE, is the Peter J. Stern Professor and Chair of the Department of Orthopaedic Surgery and Adjunct Professor in the Department of Biomedical Engineering at the University of Cincinnati. He serves as the Medical Director of Perioperative Services and Director of the Division of Musculoskeletal Traumatology at the University of Cincinnati Medical Center. He is Board Certified by the American Board of Orthopaedic Surgery and specializes in difficult fracture care. Dr. Archdeacon attended Tulane University School of Engineering and obtained his BS in Biomedical Engineering. He then attended the Ohio State University College of Medicine where he received his M.D. He obtained a M.S. in Biomedical Engineering at the Ohio State University College before he completed a General Surgery Internship and an Allen Orthopaedic Surgical Research Fellowship. After completing his residency training at Case Western Reserve University School of Medicine he obtained fellowship training in Orthopaedic Traumatology at Tampa General Hospital. He joined the Department of Orthopaedic Surgery at the University of Cincinnati in 2001. Dr. Archdeacon is currently serving on the Orthopaedic Trauma Association Board of Directors, the Mid-America Orthopaedic Association Finance Committee as well as the Executive Board of the Ohio Orthopaedic Society as the Treasurer Elect. He currently has more than fifty peer-reviewed publications and book chapters. Dr. Archdeacon has been named a "Best Doctor in America" by Cincy Magazine and is a member of America’s Top Surgeons.

Currently, the Department of Orthopaedic Surgery, of which there are 35 faculty and 25 residents, boasts a nationally recognized cadre of clinicians, educators and researchers. The faculty represent numerous institutions including the University of Cincinnati Medical Center, West Chester Hospital, Cincinnati Children’s Hospital Medical Center, and the Veterans Administration Medical Center Cincinnati as well as several highly devoted surgeons in the Cincinnati community. Our department is committed to advancing the art and science of orthopaedic surgery with collaborations across the institutes of UC Health and the College of Medicine, the UC College of Engineering and the UC Department of Athletics. The history of the Department and of Orthopaedic Surgery in Cincinnati is illustrious. Built upon the accomplishments of many in the region, the future of Orthopaedic Surgery in Cincinnati is exciting and remains bright.

Written by Shelley Hess

References
Residency Program: Acquiring a Comprehensive Approach to Treatment and Management of Musculoskeletal Diseases and Injuries

The orthopaedic residency program is directed by Ferhan Asghar (Program Director), Brian Grawe (Associate Program Director) and Kim Reising (Program Coordinator). The program is designed so that the resident acquires both clinical and surgical skills in a graduated fashion. In the PGY-II and -III years, the resident is instructed in the fundamentals of history taking, regional physical examination and interpretation of musculoskeletal diagnostic tests. This is complimented with instruction regarding the formulation of a differential diagnosis. The junior residents are encouraged to acquire a comprehensive approach to treatment of musculoskeletal diseases and injuries combined with early exposure to the operative skills required to surgically manage these problems.

The PGY-IV and V years are characterized by increased responsibility and autonomy in the outpatient setting as well as the operating room. In the outpatient setting, the resident is expected to hone his/her skills in information gathering, formulation of a differential diagnosis and establishment of a treatment plan with acceptable alternatives. In the operating rooms, the residents progressively gain the ability to perform standard orthopaedic procedures with graduated supervision.

The six divisions are: hand surgery; joint reconstruction; pediatric surgery; spine surgery; sports medicine and trauma.

Continues next page
Residency, continued

**Hand Surgery Division**

The Division of Hand Surgery is comprised of two fellowship trained hand surgeons at University of Cincinnati Medical Center and UC Health's West Chester Hospital (WCH) as well as two Pediatric Hand fellowship trained surgeons at Cincinnati Children's Hospital Medical Center (CCHMC). Orthopaedic residents receive exposure to adult hand surgery during their PGY-III and PGY-V years. During the PGY-III year the resident works directly with Drs. Sinclair and Stern. The resident is expected to learn the fundamentals of the hand surgical examination and to carry out basic surgical procedures. The resident is exposed to a spectrum of hand disorders including the management of compression neuropathies, hand fractures and dislocations, inflammatory disorders, tendon injuries, tendinopathies and acquired disorders such as Dupuytren and Kienbock disease. In-house call is taken at UCMC every sixth night.

From an educational standpoint, there are 3 subspecialty conferences per week. These include a problem conference on Mondays, a Journal Club each Thursday, and a didactic lecture on Friday. The PGY-III resident on the service also gives a presentation at the end of the rotation on the topic of his/her choice. In addition to training in adult hand surgery, the PGY II and PGY IV residents are also exposed to Pediatric Hand surgery pathology and surgery during their Pediatric Orthopaedic rotations. This experience enhances the training received during the adult hand rotations. Upon graduation, the resident is expected to be comfortable managing the majority of osseous disorders of the hand and wrist and is familiar with the essentials of management of soft tissue problems.

**Joint Reconstruction Division**

The Division of Joint Reconstruction is comprised of two fellowship trained arthroplasty surgeons at UCMC and WCH. Additionally, several other faculty have an arthroplasty component to their practice. The Division of Joint Reconstruction offers residents a well-rounded approach to Adult Reconstruction encompassing surgery, inpatient care, and outpatient evaluation of patients with arthritis. The rheumatology subset division refers patients with a full spectrum of arthritic diseases amenable to surgery including bone and soft tissue tumor experience.

This rotation provides PGY-II residents a basic understanding of joint arthroplasty and a clinical experience in evaluating patients with osteoarthritis. In the PGY-IV rotation, the resident assumes progressively more independent responsibility. Joint replacement surgery is the major focus, but residents also address osteotomies of the knee and hip and surgical management of arthritic conditions of the shoulder and elbow. On completion, residents will have a good foundation of skills to build on in the Chief year.

In regard to research and education, the division maintains a clinical database collecting patient information prospectively. Monthly conferences cover various topics in reconstructive surgery.

**Pediatric Surgery Division**

The Division of Pediatric Orthopaedic Surgery housed at CCHMC is composed of 13 full-time attending faculty and one to two fellows each year as well as four community physicians who assist in staffing outpatient clinics. CCHMC is one of the largest children's hospitals (475 beds) in the country. The division sees over 12,000 emergency and outpatient cases and performs over 1,500 operations yearly. General pediatric orthopaedic clinics are supplemented by many specialty clinics including spinal deformity, cerebral palsy, myelomeningocele, sports medicine, hip, neurofibromatosis, tumor, and limb deficiency.

Educational programs include Journal Club, a monthly spinal deformity conference, and other regular conferences designed to enhance the residents’ education. Special programs include a "Pediatric Hip Day" and “Pediatric Hand Day.”

Residents and fellows are required to perform clinical research and their work is sponsored at national and international meetings. Over 150 papers, presentations, and book chapters have resulted.
Spine Surgery Division
The Division of Spine Surgery has four spine-fellowship trained faculty and provides comprehensive assessment and treatment of spinal disorders including problems related to degenerative wear-and-tear, traumatic injuries, and complex spinal curvatures (scoliosis and kyphosis), tumors and infections. Non-surgical care with multi-disciplinary coordination between pain management specialists and rehabilitation specialists is an important component of the educational exposure. Resident education includes review of spine injuries at weekly trauma rounds and fracture conference as well as review of more specific injuries at the monthly spine conference. A multidisciplinary spine conference will be initiated in the 2016 academic year for both faculty and residents.

Sports Medicine Division
Faculty in the division include four sports fellowship trained orthopaedic surgeons and three primary care/emergency medicine sports physicians. The Division of Sports Medicine has received local and national recognition for its contributions to the field of sports medicine. Care of the injured athlete at the University of Cincinnati College of Medicine means many things, including superb patient care utilizing the most advanced orthopaedic surgical, non-surgical and physical therapy modalities, research and education, intercollegiate and interscholastic sports coverage and community service.

The division serves the needs of a variety of patients from the elite athlete, both pre- and post-surgical, to the treatment of all common athletic injuries found in “weekend warriors”. The division is extremely active in amateur, college and professional athletics throughout the greater Cincinnati area.

From a didactic standpoint, lectures include a weekly sports medicine conference and monthly journal club, which reviews all current sports medicine literature. An arthroscopic bioskills laboratory is available for the residents’ use and teaching.

Trauma Division
The Division of Orthopaedic Trauma is comprised of five fellowship trained traumatologists, and currently supports two Chief residents, a PGY III resident as well as an Orthopaedic Intern. The service provides care at UCMC, the only Level I trauma center in the region, as well as at WCH, a community-based Level III trauma center. In regard to clinical care, the division has developed a high-volume, regional referral practice with expertise in complex periarticular fractures, limb deformity and correction, pelvic and acetabular surgery, periprosthetic fracture management, complex post-traumatic foot reconstruction, bone infection and osteomyelitis as well as the treatment of non-unions and malunions.

From an academic standpoint, the division has developed a strong national reputation in regard to education and teaching. Division members routinely serve as both Chairs and faculty for many national educational venues including AO Basic and Advanced Fracture courses, the OTA Resident Fracture courses and the Stryker Fellows Pelvic Course. Of note, the faculty have held an annual trauma educational meeting titled “Trauma 101” for thirteen consecutive years.

From a research perspective, the division continues to publish routinely in peer reviewed journals including the Journal of Orthopaedic Trauma, JBJS, CORR, the Journal of the American Academy of Orthopaedic Surgeons as well as numerous other journals. Additionally, the division is engaged in ongoing research with four current prospective studies in progress and several others in various stages of implementation. In summary, the Division of Orthopaedic Trauma strives to meet the tripartite mission of the UC College of Medicine incorporating expert clinical care, dedication to medical education and a commitment to research in the musculoskeletal domain.

General Orthopaedics
Non-operative
2015–16 Residents

Adam Burzynski, MD  
Chief Resident

Chris Casstevens, MD  
4th Year Resident

Tonya Dixon, MD  
Chief Resident

Brad Jaquith, MD  
Chief Resident

Justin West, MD  
Chief Resident

Carrie Heincelman, MD  
4th Year Resident

Michelle O’Brien, MD  
2nd Year Resident

Tyler Keller, MD  
4th Year Resident

Wendy Ramalingam, MD  
4th Year Resident

Albert d’Heurle, MD  
3rd Year Resident

Rafael Kakazu, MD  
2nd Year Resident

Phillip Ross, MD  
3rd Year Resident

Preetha Sinha, MD  
3rd Year Resident

Steven Dailey, MD  
2nd Year Resident

Andrew Jimenez, MD  
2nd Year Resident

Brad King, MD  
2nd Year Resident

Ashley Miller, MD  
2nd Year Resident

Ramon Ruberte Thiele, MD  
2nd Year Resident

John Fritch, MD  
1st Year Resident

Andrew Jen, MD  
1st Year Resident

Rafael Kakazu, MD  
1st Year Resident

Tara Nagaraja, MD  
1st Year Resident

Melissa Summers, MD  
1st Year Resident

Endowed Lectureships
University of Cincinnati  
Department of Orthopaedic Surgery endowed lectureships help bring outstanding clinicians and researchers to Cincinnati for beneficial education and professional exchange, and the department appreciates the advance of its mission shown by such support. Recent presentations include:

Freiberg Family Lectureship  
November 20-21, 2015  
Carl Deimengian, MD  
Associate Professor of Orthopaedic Surgery  
Thomas Jefferson University  
Sidney Kimmel Medical College

Edward H. and Carol W. Miller Visiting Lectureship in Orthopaedic Surgery  
February 12-13, 2016  
Jo Hannafin, MD  
Professor of Orthopaedic Surgery  
Weill Medical College of Cornell University

Jolson Sports Medicine Lectureship  
April 22-23, 2016  
Robert Arciero, MD  
Professor of Orthopaedic Surgery  
University of Connecticut Health Center

DJ Frank Memorial Lectureship  
May 5-7, 2016  
Javad Parviz, MD  
James Edwards Professor of Orthopaedic Surgery  
Thomas Jefferson University  
Sidney Kimmel Medical College

Sports Medicine Fellows

Krisha Reddy, MD  
Orthopaedic Sports Medicine Fellow

Keith Burley, MD  
Primary Care Sports Medicine Fellow

Ahmed Khan, MD  
Primary Care Sports Medicine Fellow
Spieles Participates in Mission Trip

Christopher Spieles, MD, a UC College of Medicine alumna ('92), and Orthopedic residency graduate ('97) participated in a medical mission trip to the Dominican Republic in 2015 and reports: “I was able to take my whole family on the trip which proved to be educational in many ways. Three of my children had an opportunity to observe and participate in surgery. Outpatient medicine in the barrios was very interesting as well. Language barriers were broken down by smiles and a caring attitude. I hope to take advantage of similar opportunities in the future.” Spieles practices orthopaedic surgery in Wauseon, Ohio, at West Orthopaedics & Rehab.

Class of 2010…..Where are They Now?

Steven Brantley, MD  
Specialty: Sports Medicine  
Private Practice in Oklahoma City, Oklahoma

Nathan Gause, MD  
Specialty: Foot and Ankle  
Private Practice in West Burlington, Iowa

Oner Khera, MD  
Specialty: Spine  
Private Practice in Phoenix, Arizona

Matthew Tweet, MD  
Specialty: Shoulder and Elbow  
Private Practice in Sacramento, California

ALUMNI: We want to hear from you! Please send any news-related items to the editor, Shelley Hess, at shelley.hess@uc.edu. Thank you.

CALENDAR OF EVENTS

AAOS Annual Meeting  
March 1-5, 2016  
Orlando, FL

POSNA Annual Meeting  
April 27-30, 2016  
Indianapolis, IN

Trauma 101 Fracture Care  
(14th Annual)  
April 28-30, 2016  
Clearwater, FL

DJ Frank Memorial Lectureship  
May 5-7, 2016  
Javad Parvizi, MD  
James Edwards Professor of Orthopaedic Surgery  
Thomas Jefferson University  
Sidney Kimmel Medical College

Louisville-Indianapolis-Cincinnati Hand Conference  
June 10, 2016  
Indianapolis, IN

Chief Resident Graduation  
June 17, 2016  
Cincinnati Country Club

AOA Annual Meeting  
June 24-25, 2016  
Seattle, WA

AOSSM  
July 7-10, 2016  
Colorado Springs, CO

ASSH Annual Meeting  
September 29 – October 1, 2016  
Austin, TX

OTA Annual Meeting  
October 5-8, 2016  
National Harbor, MD

Crawford Lectureship  
October 14, 2016  
Cincinnati Children’s Hospital Medical Center

NASS Annual Meeting  
October 26-29, 2016  
Boston, MA

AAHKS  
November 10-13, 2016  
Dallas, TX

Residency Interviews  
November 19, 2016  
December 3, 2016  
December 10, 2016
The University of Cincinnati Department of Orthopaedic Surgery provides this news and updates for its alumni, current members and supporters.

For information, contact the editor, Shelley Hess, at shelley.hess@uc.edu

UNIVERSITY OF CINCINNATI DEPARTMENT OF ORTHOPAEDIC SURGERY

The roots of expert orthopaedic care in our city go deep.

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