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18 ORTHOPAEDICS

3 Contributors

4 Treating Fractures Through Time

The History of Orthopaedics Stretches All the Way Back to Ancient Egypt and Rome

By Bennett Grimm, MD and Sourendra Raut, MD

6 Advances in Orthopaedic Trauma

By Douglas W. Lundy, MD, MBA, FACS

9 Arthritis at the Base of the Thumb

By Edward H. Holliger IV, MD

10 Anterior Cruciate Ligament Injuries

By Ryan Chen, MD

14

14 The State of Low Back Pain

By Bennett Grimm, MD

18 Athletic Injuries of the Foot and Ankle

By Sourendra Raut, MD

24 Bursitis and Hip Pain What You Need to Know About Causes, Types and Diagnosis

By Bob Yarbrough, MD

SPOTLIGHT

28 Giving Back in Big Ways Philanthropy in the Medical Field Provides Care to Those Without Access or Funds

By Helen K. Kelley

MEDICAL ASSOCIATION OF ATLANTA

32 Board Member Profiles

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TREATING FRACTURES THROUGH TIME

The history of orthopaedics stretches all the way back to ancient Egypt and Rome

By Bennett Grimm, M.D. and Sourendra Raut, M.D.



Nicholas Andry de Bois-Regard
(1658-1742)



Antonius Mathysen
(1805-1878)



Wilhelm Conrad Rontgen
(1845-1923)



Russell A. Hibbs
(1869-1932)



Gerhard Kuntscher
(1900-1972)

The setting of fractures and injured extremity immobilization can be traced back to ancient Egypt, where mummies have been discovered with splints made of reed or wood.

Some of the first accounts of the use of artificial limbs come from ancient Rome. Galen, a gladiatorial surgeon (129-199 BC) provided detailed anatomic study of the musculoskeletal system, in particular how the brain and nervous system controls muscles allowing movement.

The term Orthopaedics was first coined by a French physician, Nicholas Andry de Bois-Regard, who in 1741 published the book *Orthopédie*, deriving the title from the Greek words *ortho*, meaning straight, and *paidion*, meaning children. In it he describes methods of treating various spinal and bony deformities of children.

One of the illustrations from Andry's book, a crooked sapling affixed to a straight post, serves as the symbol of the specialty to this day. (See the magazine cover.) Forty years later, the first orthopaedic hospital for the treatment of deformities was established in Switzerland by Jean-Andre Venel, marking the beginning of the early modern period of orthopaedics. Venel is considered by many to be the father of modern orthopaedics,

as he documented and published his techniques and devised various methods of bracing deformed extremities.

Plaster of Paris splinting was invented in the 1850s by Antonius Mathysen (1805-1878), a Dutch surgeon, for the purpose of holding fractures once they were set into place. Plaster of Paris casts or splints serve as an excellent method of immobilization and are still in use today.

The 20th century saw rapid developments in orthopaedics as anesthesiology techniques became refined, allowing for patients to be safely and effectively anesthetized. Moreover, the advent of the X-ray by Wilhelm Conrad Rontgen (1845-1923) in the early 1900s enabled surgeons for the first time the ability to evaluate the precise anatomy of the fractures they were treating.

In 1911, Russell A. Hibbs (1869-1932) performed the world's first spinal fusion at New York Orthopaedic Hospital to correct a deformity caused by a tuberculosis infection of the spine. He later applied the same techniques to a similar procedure to halt the progression of scoliosis. Gerhard Kuntscher (1900-1972), a German surgeon, developed the technique of intramedullary nailing during World War II. This technique involves placing a metal rod within the

medullary canal of a long bone for the treatment of fractures. It revolutionized the treatment of long bone fractures, enabling patients to mobilize and a quicker return of function compared to earlier methods. Intramedullary nailing of femur fractures is the standard of care to this day.

Orthopaedic Subspecialties

Today, orthopaedics has arborized into several subspecialties, including sports medicine, spine surgery, pediatric surgery, foot and ankle surgery, hand and upper extremity surgery, joint replacements and orthopaedic trauma surgery. Standard North American training for orthopaedic residents consists of a one-year surgical internship followed by a four-year orthopaedic residency, which is often followed by at least one additional year of subspecialty training in a resident's particular interest. Subspecialty care has enabled surgeons to improve clinical outcomes by allowing graduating residents to hone their specific subset skills, thereby improving the quality of care to our patients.

Sports medicine specialists focus on the operative and non-operative treatment of conditions of the shoulder, hip and knee as they pertain to each joint's tendons, ligaments and other soft tissue structures. While the patient of a sports medicine surgeon may be a high school, college or professional athlete injured during competition, at least as many are individuals injured during recreational activities such as skiing or bicycling. Common procedures done by a sports medicine surgeon include shoulder, knee and hip arthroscopy, anterior cruciate ligament (ACL) reconstruction and cartilage transplantation.

Spinal surgeons engage in the comprehensive surgical and non-surgical care of adult degenerative conditions such as spinal stenosis as well as deformities and traumatic injuries of the axial skeleton, from the cervical spine to the pelvis. Severe pain radiating from the neck into the upper extremities or from the low back into the lower extremities are the presenting symptoms of cervical and lumbar radiculopathy respectively, which are common conditions that lead patients to seek out care from a spine specialist. Procedures performed by spine surgeons include discectomies, lumbar decompressions, spinal fusions, scoliosis correction and vertebral fracture fixation.

Pathologies of the foot and ankle are the purview of the orthopaedic foot and ankle surgeon. The patient who has noticed a slowly progressive, painful deformity of the first metatarsalphalangeal joint (the big joint of the big toe) may need the services of a foot and ankle surgeon for a bunion correction, one of the most common operations performed

by such surgeons. Other common procedures performed by these surgeons include ankle fusions, hammertoe correction and fracture fixation of bones of the foot and ankle.

Hand and upper extremity surgeons focus their practice on the care of patients with traumatic injuries, degenerative and adult developmental conditions of the shoulder, elbow, forearm and hand. Numbness and tingling in the thumb, index and middle fingers, commonly at night, are symptoms consistent with carpal tunnel syndrome and may encourage patients to seek the care of a hand surgeon. Common procedures performed by these surgeons include carpal and cubital tunnel release, treatment of acquired hand contractures, and wrist and hand fractures.

Joint replacement surgeons' primary focus is the reconstruction of joints that have become arthritic as a result of a trauma or more commonly as a result of osteoarthritis, also known as "wear and tear" arthritis. Although their focus is primarily replacement of hips and knees, many also perform shoulder replacements. A significant part of a joint replacement surgeons' practice consists of revision surgeries of hip and knee replacements that have worn out over time or may have become infected. Often these total joint revisions require special techniques in bone stock restoration to provide an adequate platform to affix the revised joint replacement.

Finally, orthopedic traumatologists deal with the treatment of fractured bones and joints. While all orthopaedic surgeons learn fracture fixation during residency, fellowship-trained trauma surgeons have specialized skills that enable them to fix complex fractures of the pelvis, acetabulum (hip socket) and joints. Common procedures that these surgeons deal with include femur fractures, hip fractures, pelvic fractures, acetabular fractures and complex fractures involving the knee, ankle and heel.

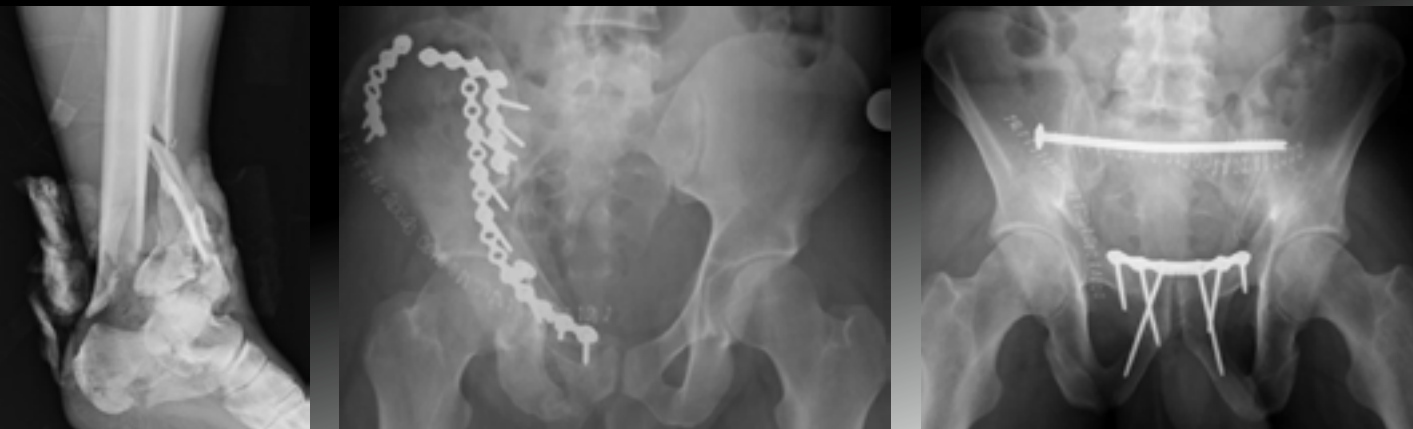
We are very fortunate here in Atlanta that we have access to the full gamut of orthopedic subspecialists, who are always available to assist with any musculoskeletal issues that may arise in your practice. This month's issue features excellent overviews of some of the common issues that orthopaedic surgeons encounter in practice and offer the perspective of subspecialists in almost every field listed above.

Enjoy your read, and we hope to be able to serve your needs in the near future. ■

Orthopaedics has arborized into several subspecialties:

- sports medicine
 - spine surgery
 - pediatric surgery
 - foot and ankle surgery
 - extremity surgery,
 - joint replacements
 - trauma surgery
-





Advances in Orthopaedic Trauma

By Douglas W. Lundy, M.D., MBA, FACS

Orthopaedic surgery is a diverse specialty comprised of multiple subspecialties focused on anatomic areas or pathologic processes (degenerative disease, developmental or trauma). Although the origins of orthopaedic surgery stem from treatment of children affected by polio, a tremendous portion of orthopaedic surgery throughout the world today involves the treatment of injuries to the bones, joints and surrounding tissues of the musculoskeletal system. Orthopaedic trauma surgery has advanced significantly over the last 50 years, with massive strides in the understanding of injury and the techniques to successfully return these patients to a functional level of living.

The subspecialty of orthopaedic trauma is an underrepresented discipline in orthopaedic surgery that has benefited greatly from the conflict in Iraq and Afghanistan. It is a very unfortunate truth that the treatment of injury always increases greatly in the time of war. It is especially unfortunate that many young American men and women must be injured in battle for funding to become available for these very important initiatives.

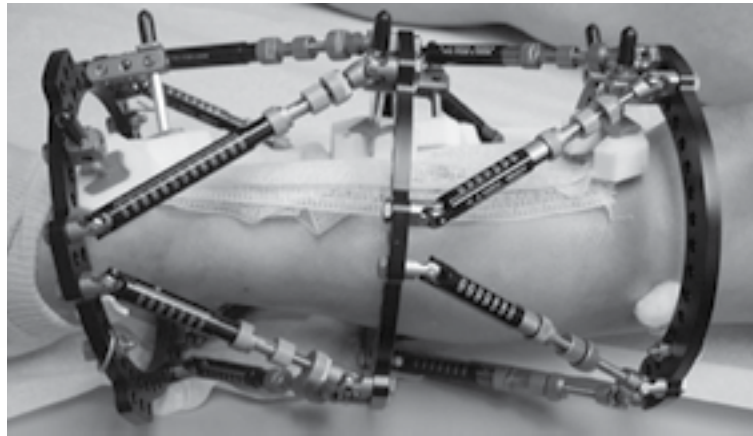
Through the aggressive lobbying efforts of orthopaedic surgeons, hundreds of millions of dollars have been directed

by Congress to fund research on the treatment of extremity injuries during war. The valuable lessons learned from the suffering of American combatants will further improve the treatment of American citizens now and in the years to come.

Trauma continues to be a major problem in the state of Georgia. Although trauma is the No. 1 killer of Georgians between the ages of six months to age 44, the state continues to underfund efforts to improve the trauma system and establish a truly effective trauma network.

Trauma costs this country \$406 billion a year, including both healthcare costs and lost productivity. Studies by the Georgia Trauma Care Network demonstrate that fatality rate from motor vehicle crashes doubles as the distance from a verified trauma center increases.

At 13.2/100,000, the death rate in Georgia from trauma is higher than the national average of 11.3. Nonetheless, when Georgia Trauma Care Funding, Amendment 2, an effective constitutional amendment to fund trauma care in the state, was placed on the ballot four years ago, the initiative was defeated 52.6 percent to 47.4 percent. Ironically, the sections of the state that would have benefitted the most from this funding actually voted en masse to defeat the effort.



Treatment of Mangled Extremities

Significant improvement techniques and a better understanding of severe extremity trauma has occurred over the last several years. The use of vacuum-assisted devices in the treatment of severe soft tissue trauma has dramatically decreased the morbidity of the treatment of these injuries. Improvements in the surgical and pharmacologic care of these injuries have resulted in lower rates of infection and other complications. Once again, much of this learning resulted from the horrific injuries sustained by our soldiers as they served valiantly in Iraq and Afghanistan.

The Lower Extremity Assessment Project (LEAP) was a tremendous effort by orthopaedic trauma surgeons to better understand the outcomes and ideal treatment of mangled extremities. I contributed some of the patients to this study during my fellowship 15 years ago, and this project resulted in over three dozen publications describing best practices in patients with these injuries.

The main findings of this study were sobering. Patients with severe lower extremity injuries did equally poorly whether their extremities are reconstructed or amputated, and the worse news is that the patients actually deteriorated in function between two and seven years after injury. This finding highlights that although we can reconstruct the bone structure and often gain healing, the extent of the soft tissue injury often determines the eventual functional outcome of the patient. Even though we have made significant strides in the treatment of these injuries, we still have a long way to go.

Pelvic and Acetabular Fractures

Pelvic and acetabular fractures with their associated injuries are some of the most catastrophic injuries affecting patients injured from motor vehicle crashes or falls. Increased understanding of the mechanisms leading to hypovolemic shock and death from pelvic injuries has resulted in a decrease in death rates and improvements in surgical techniques and functional outcomes. Minimally invasive techniques have resulted in faster returns to work and decreased morbidity for these badly injured patients.

Damage Control Orthopaedic Surgery

One of the biggest advances in orthopaedic trauma is the increased understanding of the contribution of major fractures to the overall stability of badly injured patients. With increased collaboration of orthopaedic surgeons with trauma surgeons and the trauma service, critically injured patients that would have died not too long ago now survive to live productive lives. Carefully timed and tactical emergent treatment of femoral and pelvic fractures, compartment syndromes and mangled extremities help optimize the patient's condition during the critical hours after injury. After the patients have stabilized, we then return to surgery to anatomically reduce and stabilize articular fractures and accomplish definitive stabilization.

Advances in the care of patients with severe extremity injuries continue to develop, and these patients are enjoying much greater functional outcomes than they would have in the not too distant past. Although there is still much to accomplish in the care of these patients, we have come a long way. Atlanta has fellowship-trained orthopaedic trauma surgeons on staff at Grady Memorial Hospital, Kennestone Hospital, North Fulton Hospital and Gwinnett Medical Center trauma centers ready to care for patients presenting with severe injuries. ■

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Arthritis at the Base of the Thumb

By Edward H. Holliger IV, M.D.

Arthritis at the base of the thumb is a common diagnosis. It is usually found in patients between the ages of 50 and 70, but it can often manifest earlier due to injury or heredity. Pain is due to the movement of the thumb metacarpal on the trapezium, with inadequate cartilage in the joint. It often affects peoples' lifestyle, and there are many treatment options.

Hundreds of thousands of people will be affected by this during their lifetimes, and it is commonly treated in the hand surgeon's office.

Symptoms begin with pain doing activities that involve pinching, making these actions more difficult. This includes turning keys, opening doors, hooking a bra and pulling up pants or socks. The most commonly mentioned difficulty is opening jars. Certainly other activities can be affected, such as manual activities like hammering, sports including golf and tennis, and recreational activities such as shuffling cards.

Diagnosis begins with taking a history and doing a physical exam. Patient's signs can include mild malalignment due to subluxation at the carpometacarpal (CMC) joint at the base of the thumb. Tenderness occurs when the proximal metacarpal is pressed into the joint or axially compressed into the trapezium. Pain while pinching or gripping is usually present.

Radiographs confirm the presence of narrowing and possibly malalignment at the CMC-1 joint. Bone-on-bone changes and bone spurs can also be present. An MRI is usually not necessary for diagnosis.

There are myriad treatment options available. Non-operative measures begin with condition-specific

bracing. Non-steroidal anti-inflammatory medications (NSAIDs) at prescription strength can be used in the appropriate patients. Topical anti-inflammatories and compounds that include them have begun to be used with some success as well. Corticosteroid injections, such as 20 mg of Solu-Medrol (a methylprednisolone sodium succinate injection), can be used intra-articularly at infrequent intervals for two to four years maximum.

If all the above treatments do not yield acceptable results, surgery can be considered. The philosophy of the surgery involves keeping the metacarpal and trapezium bones from moving against one another. Most of the commonly performed treatments include removal of some or all of the trapezium. Many include reconstruction or replacement of ligaments to stabilize the thumb and may also include use of the nearby tendon as an interposition for the now-absent trapezium. Certainly there are other options, but the above description involves the majority of operations currently performed.

Postoperative care includes immobilization for 5 to 6 weeks full time, followed by therapy that may go on another 2 to 3 months. Most patients improve steadily for 6 months and may slowly improve for up to 6 years. In those patients who undergo operations because all other reasonable conservative options have failed, there is about an 85 percent satisfaction rate.

Our office treats hundreds of people with this condition per year, and we are always open to trying to assist in the care of these patients. ■



Anterior Cruciate Ligament **INJURIES**

Ryan Chen, M.D.

“A-C-L” is the three-letter word that no athlete wants to hear. The anterior cruciate ligament is critical to stability of the knee and is the primary restraint to anterior tibial translation. Every year, professional athletes such as Tiger Woods, Tom Brady and Lindsey Vonn sustain season-ending ACL ruptures. These high-profile athletes are among the 400,000 patients who undergo ACL reconstructions annually in the U.S.

RISK

Various factors influence the incidence of ACL tears. Risk of ACL injury varies depending upon the sport, with a higher incidence in sports such as football, soccer and basketball. Several studies have reported a higher rate of football-related ACL injuries on artificial surfaces compared to grass. ACL injuries occur up to 10 times more frequently in games than practices. In recent years, ACL tears have been on the rise in pediatric patients due to increased participation in competitive sports at younger ages.

Female athletes have up to a three to eight times higher rate of ACL tears compared to males in high-risk sports such as soccer and basketball. The higher risk of ACL tears in the female athlete has been attributed to differences in neuromuscular control, lower extremity alignment and ligament size. Further, females tend to land from a jump with more of a valgus moment, which places the ACL at risk for rupture. Some studies have suggested an association between risk of ACL tears and the menstrual cycle.

DIAGNOSIS

The classic presentation for an ACL rupture involves a sudden deceleration, a “pop,” immediate swelling and inability to continue play. Approximately two-thirds of ACL injuries are non-contact pivoting injuries.

A physical exam is sufficient to diagnose most ACL tears. An effusion is typically present, and an aspiration in the acute setting will typically reveal a hemarthrosis. The most sensitive physical exam maneuver to diagnose an ACL tear is the Lachman test. Additionally, the anterior drawer and pivot shift can help to confirm the diagnosis.

It is imperative to assess for associated ligamentous injury such as tears to the medial collateral ligament (MCL), posterior cruciate ligament (PCL), lateral collateral ligament (LCL) and posterolateral corner (PLC). Evaluation of axial alignment (varus or valgus deformity) is critical, as malalignment can predispose to surgical failure. Plain radiographs in the setting of an ACL tear assess for preexisting degenerative changes as well as associated fracture or dislocation. A Segond fracture represents an avulsion fracture of the lateral aspect of the tibial plateau and is often associated with an ACL tear. A tibial spine avulsion, which is typically seen in the pediatric population, represents an ACL avulsion and requires more urgent surgical intervention.

Magnetic resonance imaging (MRI) is often ordered to confirm the diagnosis and evaluate for concomitant intra-articular pathology. Classic bone bruises associated with an ACL tear are present at the mid aspect of the lateral femoral condyle and posterior aspect of the lateral tibial plateau. These contusions represent the bony injury that occurs during the so-called pivot shift.

The differential diagnosis for ACL injury includes patellar instability, meniscus tear, chondral injury or injury to other knee ligaments. An MRI is helpful to assess for these conditions. Meniscus tears are present in approximately half of all ACL ruptures. Associated ligament pathology can influence timing and approach to ACL treatment.

TREATMENT

The natural history of the ACL-deficient knee is one of recurrent instability with subsequent injury to the menisci and articular cartilage. This can result in accelerated arthritis in the knee.

ACL injuries can be treated with or without surgery. Nonoperative treatment is an option in low-demand or sedentary patients who are willing to modify their activities and avoid cutting, pivoting and jumping activities. Patients who choose not to have surgery are treated with rehabilitation and functional bracing.

The recommended surgical management of ACL tears is reconstruction. Simple repair is no longer advised. ACL reconstruction consists of replacing the ruptured ACL with graft tissue, which will then become a new ACL through a process called ligamentization. ACL reconstruction is indicated in active patients who are experiencing functional instability. Skeletally immature patients are increasingly being considered candidates for surgery, as compliance with nonoperative treatment in this age group is typically poor.

Grafts that are available to surgeons can be divided into autografts harvested from the patient or allografts obtained from cadaveric donors. Autograft reconstruction is often considered in young patients who engage in high-risk sports. The two most common autografts include bone-patellar tendon-bone (BTB) and hamstring.

Bone-patellar tendon-bone autograft has historically been considered the “gold standard.” Bone-to-bone healing results in less laxity on stability testing and faster incorporation compared to soft tissue grafts. However, there is significant morbidity to BTB autografts, such as kneeling pain and patella fracture.

Hamstring autograft is a desirable graft for several reasons. Quadruple hamstring grafts have very strong tensile load compared to the native ACL. There is typically less kneeling pain and better cosmesis compared to BTB. In addition, hamstring autograft is indicated in the skeletally immature patient secondary to less risk of physeal bar formation and angular deformity.

There are several disadvantages of hamstring autografts. Hamstring grafts are entirely soft tissue and do take longer to incorporate than BTB grafts. Hamstring weakness can also result, but postoperative hamstring strength is typically 90 percent of normal.

Allografts have become a popular choice for reconstruction secondary to technical ease and absence of graft harvest morbidity. In recent years, allografts have come under scrutiny secondary to a higher failure rate, particularly in young active patients.

The reasons for the higher failure rate are likely multifactorial. Sterilization with gamma irradiation weakens the biomechanical properties of the graft. Although allografts take longer to incorporate compared to autografts, athletes treated with allograft feel less pain and may return to sport prematurely. This can predispose to graft failure. Another disadvantage of allografts is the small potential risk of disease transmission. Allografts may be suitable for the older recreational athlete who needs to return to sedentary work more rapidly.

Several concomitant injuries may require treatment with the ruptured ACL. MCL tears often occur at the same time

as ACL tears. These typically can be treated nonsurgically with a period of relative immobilization prior to ACL reconstruction. For meniscus tears, partial meniscectomy versus repair are options. Meniscus repair at the time of ACL reconstruction has a higher healing rate compared to isolated meniscus repair and should be attempted for tears that are amenable to repair.

Most surgeons release athletes to full unrestricted sports 6 to 12 months after ACL surgery, depending on graft selection and surgeon preference.

POTENTIAL OUTCOMES

ACL surgical failure has historically been less than 5 percent. Failure can result from inappropriate graft selection, inaccurate graft placement, inadequate graft fixation or tensioning, reinjury, overly aggressive rehabilitation or a premature return to sport.

Failure to address associated pathology can compromise ACL surgical outcome. Excessive malalignment or associated ligament injury, such as a posterolateral corner injury, that was not addressed at the time of the initial

surgery can result in graft failure. Concomitant meniscus tears or chondral injuries can also lead to symptoms postoperatively.

Although ACL reconstruction is generally considered a successful operation, only two-thirds of NFL players undergoing ACL reconstruction will return to their previous level of play. Furthermore, while repetitive instability from an ACL deficiency can lead to degenerative changes in the knee joint, studies have yet to show that ACL reconstruction prevents the development of arthritis.

PREVENTION

Neuromuscular training programs in female athletes have been shown to prevent ACL injuries. These programs have done so by teaching proper technique for jump landing and emphasizing core and lower extremity strengthening.

Functional bracing may provide a proprioceptive benefit to athletes postoperatively. However, there is no evidence that functional bracing after ACL reconstruction will prevent reinjury, except in the setting of downhill skiing.

The treatment of ACL tears has evolved substantially over the last few decades. Fortunately, abundant research has been dedicated to improving outcome and a return to function after this devastating injury. ■



Female athletes have up to a three to eight times higher rate of ACL tears compared to males in high-risk sports such as soccer and basketball.

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THE STATE OF LOW BACK PAIN

By Bennett Grimm, M.D.



It's safe to say that most people will experience low back pain at least once during their lifetime.

In fact, the 2010 Global Burden of Disease Study found that low back caused more disability worldwide than any other of the 291 conditions studied with a point prevalence of nearly 10 percent.¹ Similarly, low back pain is ubiquitous in American society, with greater than 70 percent of the population experiencing it at some point in their lives. Annual incidence is estimated to be between 15 percent to 45 percent with a point prevalence of between 20 percent to 30 percent and has been reported to be the third most common condition for a patient to seek treatment after skin and joint problems.^{2, 3}

Low back pain is the most common reason for disability in the United States for patients under 45 years old and accounts for \$20 billion in workers compensation claims annually. For most, back pain will resolve quickly in a matter of days to weeks, however recurrence is the norm in 20 to 72 percent of patients. Unfortunately, between 5 and 10 percent of patients



may have a more chronic form, defined as lasting more than 12 weeks. Despite accounting for only a small percentage of those who experience low back pain, patients with chronic low back pain can be especially difficult to treat and account for 75 percent of healthcare expenditures for this condition.⁴

Several known etiologies for low back pain exist: tumor or infection within the bony or spinal canal, trauma, strain, spinal stenosis and lumbar disc herniation. As often as 85 percent of the time, however, the cause is idiopathic.

Non-specific low back pain is a term that has

Low back pain is the most common reason for disability in the United States for patients under 45 years old and accounts for \$20 billion in workers compensation claims annually.

been coined to describe this type of back pain, as no specific cause can be found clinically. The pain is usually worse with activity and better with rest. Onset may be acute or insidious. Many patients recall no preceding event or may give a vague history of trauma to explain their symptoms. Because the underlying pathology of nonspecific low back pain is poorly understood and the patient's desire to know “what is wrong,” is high, a clinician may attribute a patient's low back pain to degenerative changes of the intervertebral disc and joints of

the spine noted on X-ray or MRI. These same changes however, are commonly found on the radiographic imaging of age-matched patients who have deny any history of low back pain.^{5,6}

Upon presentation patients should be screened for “red flag” signs during the history and physical such as fevers, chills, night sweats, pain that does not improve with rest or unexplained weight loss, as these constitutional symptoms may be harbingers of more serious pathology such as tumor or infection. Also, patients must be queried for acute urinary retention or loss of bowel control along with saddle anesthesia. These symptoms along with severe low back pain with or without lower extremity pain describe cauda equina syndrome, defined as acute compression of multiple lumbar nerve roots by a large herniated disc, tumor, infection or trauma, which is a surgical emergency.

Treatments for nonspecific low back pain vary. While none have shown definitive superiority, several have been shown to help alleviate symptoms and facilitate return of function.



The ideal treatment should be cost effective and accessible while minimizing side effects. Because the natural history of an episode of low back pain for most patients is resolution even without any treatment, the purpose of treatment is mitigation of symptoms during convalescence.

Non-steroidal anti-inflammatories (NSAIDs), acetaminophen, brief periods of rest, physical therapy, manual manipulation, ice and/or heat, as well as education and reassurance are common remedies for those suffering from acute low back pain. These treatments have little risk for most patients, the majority of whom will recover from this self-limiting condition within a few weeks to months.

Chronic low back pain has similar treatment options; however opioid narcotics use is controversial due to concern for addiction. Moreover, narcotics have not been shown to be superior to NSAIDs for symptom relief⁷, nor have antidepressants been shown to impart any difference in pain relief or functional improvement compared to placebo.⁷

If the presumed pain generator is a degenerative disc in the absence of scoliosis, spondylolisthesis or kyphosis, spinal fusion for chronic low back pain is an option, but it is controversial. One randomized, controlled study compared relief of low back pain between a cohort that underwent spinal fusion and another that underwent physical therapy. Sixty-three percent of spinal fusion patients reported their pain as “better” or “much better” versus 29 percent in the non-operative cohort, while 36 percent of the surgical group returned to work opposed to 13 percent of non-operative patients.⁸

Low back pain, and more specifically chronic low back pain, continues to be a significant cause of disability in the United States and indeed the world.

Other studies have shown more equivocal results demonstrating no superiority of lumbar fusion over a structured physical therapy program combined with cognitive behavioral therapy.^{9,10} In countries or regions where such treatments are not available, lumbar fusion may be a reasonable option for patients who have one or two level disc degeneration and have exhausted non-operative treatments.¹¹

Low back pain, and more specifically chronic low back pain, continues to be a significant cause of disability in the United States and indeed the world. While acute low back pain tends to be self-limiting even without treatment, few good treatment

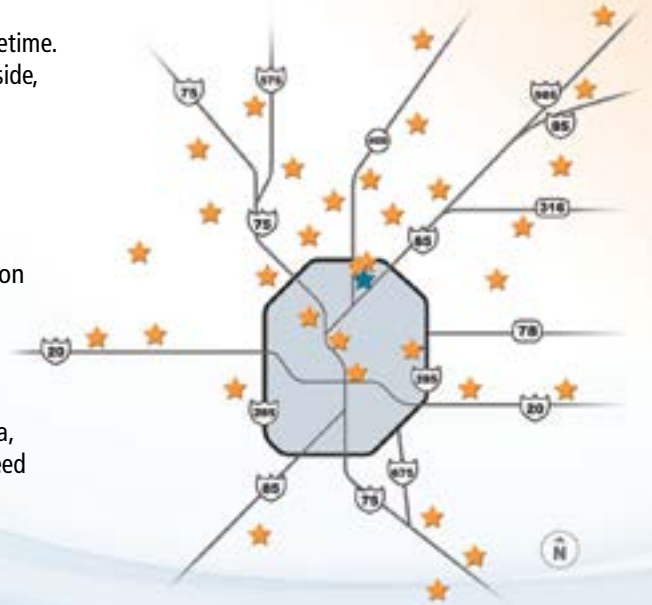
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options exist for chronic low back pain sufferers, despite a substantial amount of healthcare dollars being directed towards relief of symptoms.

Future directions will focus on identifying genetic and environmental links to patients who may be at risk for chronic low back pain. Treatments will have to be proven to be effective with an eye on budgetary considerations in the face of an aging population. ■

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Athletic Injuries of the Foot and Ankle

By Sourendra Raut, M.D.

Foot and ankle injuries are common in both recreational and competitive athletes. As we encourage our patients to become more active, we will begin to see an increasing number of these ailments, both on the sideline and in our clinics.

At the collegiate level, ankle ligament sprains accounted for 14.9 percent of all injuries during practice and competition, a staggering number when compared to ACL tears (2.6 percent) and concussions (5.0 percent). At the high school level this is even more pronounced, with almost 40 percent of athletic injuries being to the foot and ankle.

The appropriate initial evaluation and management of athletic foot and ankle injuries is crucial to a successful recovery process, and the physician should be on the lookout for many serious and unique injuries for an accurate diagnosis.



Evaluation

When approaching the evaluation of an athlete with an injury in the foot and ankle, it is important to first localize the injured bony or soft tissue structures. This allows a focused physical examination and will assist in formulating a good differential diagnosis. It will also guide the need for further testing and radiographic studies.

The mechanism of injury often yields clues regarding the injured structures and the severity of the injury, including injuries to other parts of the skeletal system and body.

Another critical component of the initial evaluation is determining the timeframe for a safe return to play. This decision must take into account the severity of the injury, the sport, temporal issues and the level of competition.

Injury prevention is of vital importance when dealing with the athletic population, and it should be an integral component of training and education in all athletes. When specifically evaluating the foot and ankle, one should begin by observing the patient's gait, following this with a thorough exam of the patient's ankle strength in inversion, eversion, plantar and dorsiflexion. Range of motion of the hind foot and forefoot joints should be performed, as well as palpation for any points of tenderness. A detailed exam for any sensory deficits, loss of pulses and capillary refill should be included in every physical exam.

Special attention should be paid to four specific injuries that are frequently seen and often missed when evaluating foot and ankle injuries in the athlete. These include the turf toe injury, ankle sprains (specifically high ankle sprains), Lisfranc injuries and stress fractures.

Turf Toe

The classic turf toe injury is caused by a hyperextension of the big toe metatarsophalangeal joint (MTP). The classic mechanism of injury consists of a direct axial stress on the heel when the foot is in plantar flexion with the toe in dorsiflexion.

In this type of injury, the plantar ligament and capsule of the MTP joint are disrupted, which can often lead to joint instability. The incidence of this

injury is increasing at all levels of competition. A recent study by Rodeo et al² found that 45 percent of professional football players had experienced a significant turf toe injury.

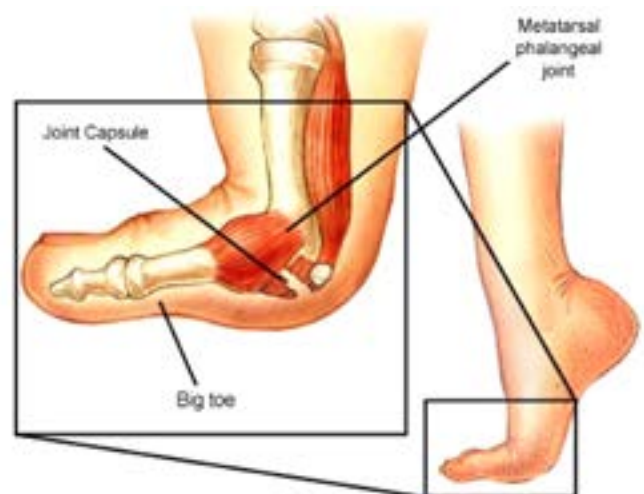
Patients with this injury will frequently describe the aforementioned mechanism and complain of a difficulty with push-off activities and challenges with cutting drills. The keys to examining these injuries include evaluation of the MTP stability and flexion strength at the MTP joint.

40% of athletic injuries being to the foot and ankle are at the high school level.

Athletes presenting with this type of injury should get weight-bearing comparative radiographs of both feet. The position of the sesamoid bones should be carefully compared, with any proximal migration suggestive of a plantar capsule injury. Care should be taken to look for fractures of the sesamoid bones.

If differences in either the position or the separation between the sesamoid fragments are noted, an MRI can often be a supplemental tool to assess the soft tissue structures.

Based on the severity, these injuries can be treated with simple immobilization in a hard-soled sandal, casting and protected weight-bearing or surgical





approximation of the disrupted sesamoid bone.

A return to play is dictated by the severity of the injury but can extend all the way up to 4 to 6 months post-injury.

Ankle Sprains

There are two major categories of ankle sprains: inversion and eversion sprains. Inversion sprains are the most common injury in competitive athletics and usually involve injuries where athletes report having “rolled” their ankle.

Athletes who can bear weight after such an injury and can demonstrate running, cutting and jumping techniques can return to sports immediately. If they can’t do these things, then further evaluation is necessary.

Inversion injuries are associated with copious acute swelling and bruising anterolateral in the ankle. These injuries can be classified into three grades depending on severity. Grade 1 injuries result from a stretched lateral ligament, grade 2 injuries are due to a partial tear of the ligament and grade 3 injuries consist of a complete tear of the ligaments.

A patient's clinical presentation mimics the severity of tear, with grade 1 injuries resulting in swelling and pain but ability to weight bear, while grade 2 and 3 injuries often present with increased swelling and impaired ability to walk.

The initial management of these injuries consists of rest, ice, compression and elevation. Immobilization for a short period of time in a walking boot, followed by early mobilization with lace-up brace support and directed rehabilitation is the mainstay of treatment for these injuries.

The vast majority of people with this type of injury recover with non-operative management within an 8-week time frame. Those that do not often need an MRI for further evaluation, with the possibility

of requiring surgical intervention to stabilize the ligamentous structures.

Eversion injuries are more commonly known as high ankle sprains or syndesmosis injuries. These are rarer injuries, occurring only 1 percent of the time, but require a much longer recovery with a high incidence of residual symptoms.

The index of suspicion for these injuries should be higher in collision sports. The most common mechanism is direct contact to the leg with the foot fixed on the ground. This causes the knee to externally rotate, stressing the ligaments between the tibia and fibula.

For these injuries, one will find swelling or ecchymosis proximal to the ankle, and squeezing the fibula above the injury can elicit pain in these ligaments.

Radiographic imaging should be initially used, with care taken to look at the tibiofibular overlap on single leg standing ankle X-rays. MRI imaging can be helpful in demonstrating findings that are in keeping with a more subtle injury.

If radiographs show no widening, then the injury is considered stable and can be managed with immobilization until the patient is pain free, an expected recovery time for this lower level of injury. Hopping 15 times on the affected extremity is a good measure of when an athlete can return to play with such an injury.

If there is radiographic evidence of widening of the tibiofibular space or of the medial clear space in the ankle, surgery is the preferred method of treatment.

Return to play is often protracted with these injuries, often approaching 9 months for those treated operatively.



Tarsometatarsal Joint Injuries

Injuries to the tarsometatarsal joints (midfoot) in an athletic environment occur as a result of an axial loading mechanism. These injuries are often very subtle clinically and radiographically, and so a high index of suspicion is needed to appropriately treat them.

Most athletes will describe feeling a “pop” in the foot followed by great difficulty bearing any weight. When examining these patients, pain can be elicited with compression of the midfoot, twisting it or pushing the first ray dorsally or plantarly.

Weight-bearing radiographs of both feet should be obtained, and on these radiographs, there should be a displacement of >2 mm between the first and second metatarsal bases when compared to the opposite side. Sometimes a small fleck of bone can be seen arising from the lateral edge of the medial cuneiform or medial side of the second metatarsal base.

An MRI can be used to diagnose more subtle injuries if there are no findings on X-ray, but this investigative tool is not necessary if the X-rays show clear evidence of a diastasis.

The treatment of these injuries can range from non-surgical management for injuries showing no displacement on radiographs to surgical stabilization with plates and screws. The goal of surgery is to restore the normal anatomy of the affected joints and to preserve this anatomy until the body has a chance to heal the injuries.

These injuries require adherence to a strict protocol of non-weight bearing for 6 weeks, followed by progression of weight bearing with an arch support at 6 weeks. The typical return to sports is 4 months, although elite-level athletes will often need to wait a full year.

Stress Fracture

Stress fractures are the most common overuse injury seen in

the athlete and can potentially be one of the most serious. The vast majority of these fractures involve the lower extremity, especially the tibia and bones of the foot.

These injuries are frequently seen in athletes who engage in repetitive activities, such as runners. If care is not taken to manage them appropriately, they may progress to full fractures or heal slowly.

Typical findings within a patient's history that should lead one to think of a stress fracture include an increase in training intensity, major changes in a



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training program, changes in shoe wear and running on hard surfaces.

Three stress fracture patterns in particular are highly missed, and special care should be taken to evaluate for these injuries. They include navicular stress fractures, fifth metatarsal stress fractures and medial malleolar stress fractures. These three injuries are at the highest risk of progressing to a more complicated recovery.

Patients with stress fractures will frequently present with swelling and pain located in a specific part of the foot and ankle. A one-legged hop test may also elicit pain, as would percussion over the site of the injury.

It is not uncommon for plain radiographs to be negative with this type of injury, so one should have a very low threshold for obtaining further imaging,

The vast majority of stress fractures can be managed non-surgically, either in a boot or cast with protected weight bearing for **6-8 weeks.**

specifically an MRI that has a very high sensitivity and specificity. Once identified, a CT scan can often delineate any subtle displacement at the fracture site.

The vast majority of stress fractures can be managed non-surgically, either in a boot or cast with protected weight bearing for 6 to 8 weeks.

Impact activities should be avoided, but low-impact and limited weight-bearing activities like biking, swimming and elliptical machines can be used.

In the setting of recurrent or frequent stress fractures, nutritional considerations are important, specifically eating deficiencies that may predispose an athlete to repeatedly fracturing.

Other Considerations

As more individuals become athletic, and as our high school and collegiate athletes get bigger, stronger and better conditioned, higher-energy injuries are becoming more common. Changes in shoe wear, from more robust, stiffer shoes to softer, lightweight flexible shoes also puts athletes at a greater risk of injury.

The physician taking care of the athletic patient has to act as an intermediary among multiple parties, including parents, coaches, teams and the athlete themselves, tempering expectations while still striving for the fastest return to activity.

Management of foot and ankle injuries in a highly active patient population therefore involves a delicate balancing act between aggressive rehabilitation and early return to sport while taking care not to compromise healing or long-term clinical outcomes in these patients.

The challenge is formidable, but with appropriate attention paid to all of the medical, social and environmental details surrounding an injury, the outcomes are generally quite rewarding. ■

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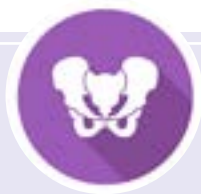
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BURSITIS AND HIP PAIN

What you need to know about causes, types and diagnosis

By Bob Yarbrough, M.D.

Injuries surrounding the hip are common sources of pain in adults. Effective treatment relies on accurate diagnoses and pointed treatments. Often, hip pain is mistakenly diagnosed as back pain and vice versa. Simultaneous evaluation of the lumbar spine is recommended in these patients.

Accurate diagnosis of hip problems requires a sound understanding of the anatomy and pathophysiology of hip disorders. The hip is a universal ball and socket joint that connects the lower extremity to the pelvis. The acetabulum forms the socket of the hip. The labrum, a ring of fibrous tissue that attaches around the rim of the acetabulum deepens the socket giving the hip joint inherent stability given its constrained design.

The hip is capable of motion in all three planes. Even during simple walking, motion occurs in all coronal, sagittal and transverse planes. Forces transmitted across the hip joint have been measured to be three to five times a person's body weight and increase with activities such as stair climbing and running.

FEMOROACETABULAR IMPINGEMENT

Femoroacetabular Impingement, or “FAI” is a relatively new diagnosis in the realm of orthopaedics. FAI is a source of groin pain and is caused by abnormal morphology of the hip. Active men and women ages 40 to 50 are most often affected. They can present with anterior hip or groin pain during and after activities and may also complain of stiffness and loss of hip motion. The pain is typically intermittent and sharp. Continued FAI can lead to further cartilage damage and often develops into osteoarthritis.

There are two separately identifiable morphologic features of FAI: Cam and pincer lesions of the hip. Cam lesions are found on the femoral side and represent a loss of true sphericity of the femoral head. This lesion

essentially creates a bump on the normally rounded edge of the femoral head. The lesion has been described as a “pistol-grip” deformity of the femoral head.

The pincer lesion is found on the acetabular side. Pincer lesions reflect “over coverage” of the femoral head. These lesions are often represented by a sharp spur or protuberance off the lateral edge of the acetabulum. Both lesions are visible on routine hip X-rays, best seen on the AP.

Physical examination of the hip reveals a loss of passive motion. Internal rotation and adduction are most affected. A positive “impingement” test consists of recreation of the patients’ characteristic groin pain with hip flexion, internal rotation and adduction. This is best elicited with the patient supine on the examining table. This test reproduces in the abnormal femoroacetabular contact with recreation of pain.

Standing radiographs, AP and lateral tests should be ordered to help make the diagnosis. Radiographs often reveal the pathognomonic cam and pincer lesions about the hip. An MRI arthrogram can be helpful to identify associated tears of the acetabular labrum.

Treatment consists of activity modification, NSAID therapy, rehabilitation and intraarticular hip injections under fluoroscopic or ultrasound guidance. When conservative measures fail, surgical intervention may be an option. Surgical options include arthroscopic repair and “hip reshaping.” Joint replacement is reserved for severe cases that fail conservative treatment.

BURSITIS

Bursitis is a painful condition caused by inflammation of the bursa, a fluid-filled sac found adjacent to many joints in the body. Hip pain in adults is frequently due to bursitis. The diagnosis is most commonly seen in females around 50 years of age.

Overuse results in excessive friction about the hip, which commonly leads to the development of bursitis. Post-traumatic bursitis is a result of a direct injury or blow to the hip. Anatomic features such as a wide pelvis also contribute to the development of bursitis.

There are three different bursae located around the hip: ischial, iliopectineal and the trochanteric. The ischial bursa is located along the posterior pelvis region and the iliopectineal is found anterior to the hip.

Trochanteric bursa is located along the lateral aspect of the hip between the iliotibial band (or IT band) and the greater trochanter of the hip. It is by far the most frequent location of bursitis. With trochanteric bursitis, patients often complain of lateral hip pain aggravated with sleeping on a side, rising from a chair and walking. Tenderness is elicited with palpation of the lateral hip, and pain is provoked with external rotation of the hip. Tightness of the overlying IT band often contributes to the problem. In addition, individuals with a broad pelvis or leg length inequality may be at increased risk for the development of trochanteric bursitis.

Treatment of trochanteric bursitis consists of activity modification, a short course of non-steroidal anti-inflammatory drugs (NSAIDs) and daily stretching of the IT band. Symptoms commonly last for several months. Refractory cases are treated with steroid injections and prescribed physical therapy. A minimum of 3 months is allowed between repeat steroid injections in the same location.

These cases can commonly persist for six months and sometimes longer. Surgery is rarely indicated.

SNAPPING HIP SYNDROME

Snapping Hip Syndrome (SHS) is a painful problem in which an audible and tactile snap occurs with certain hip movements. Typically the snapping occurs during hip flexion and extension.

The cause of the snap can be intraarticular or external to the hip joint.

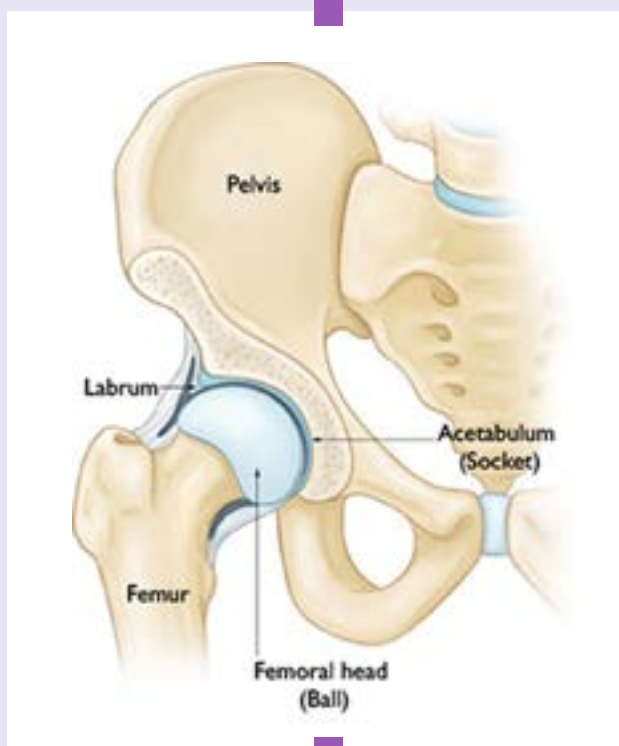
When a tight iliotibial band slides over the greater trochanter, it can cause external hip snapping. The snapping is often felt and heard over the trochanteric or lateral area of the hip. Patients can usually reproduce the snapping by standing and squatting. Normally the IT band glides smoothly over the greater trochanter; however, when the posterior portion of the ITB becomes thickened, snapping can result.

Snapping can also be caused by the iliopsoas tendon catching on the femoral head as the hip moves from flexion to extension. This snapping is felt more medial, near the groin. It can often be reproduced with the patient supine on the examining table and moving the hip from extension to flexion.

Intraarticular causes of snapping hip include loose bodies, chondral damage and labral disease. The snapping is felt over the anterior hip near the groin. These patients usually cannot reproduce the snapping in clinic and often present with the complaint of hip pain and episodic “catching” of the hip. Snapping hip syndrome is usually found in younger populations and frequently related to overuse injuries involved with athletics.

A patient history and physical exam is the mainstay of diagnosis for both types of snapping. Routine X-ray imaging is recommended. In difficult or chronic cases, an MRI can be helpful to rule out other etiologies of hip pain, such as avascular necrosis, stress fracture and chondromalacia. If intra-articular snapping is suspected, an MRI arthrogram can provide a better picture of labral injuries.

With a detailed history and physical exam, most hip disorders can be accurately diagnosed at the initial presentation. Plain radiographs are very helpful at ruling out arthritis and malignancies as potential sources of pain. An MRI examination is useful in cases that are elusive and resistant to conservative treatments. Disorders of the lumbar spine must be considered and evaluated simultaneously to ensure precise treatment recommendations. Cortisone injections can be utilized in select cases to help accelerate recovery. Consult your orthopaedist when needed. ■





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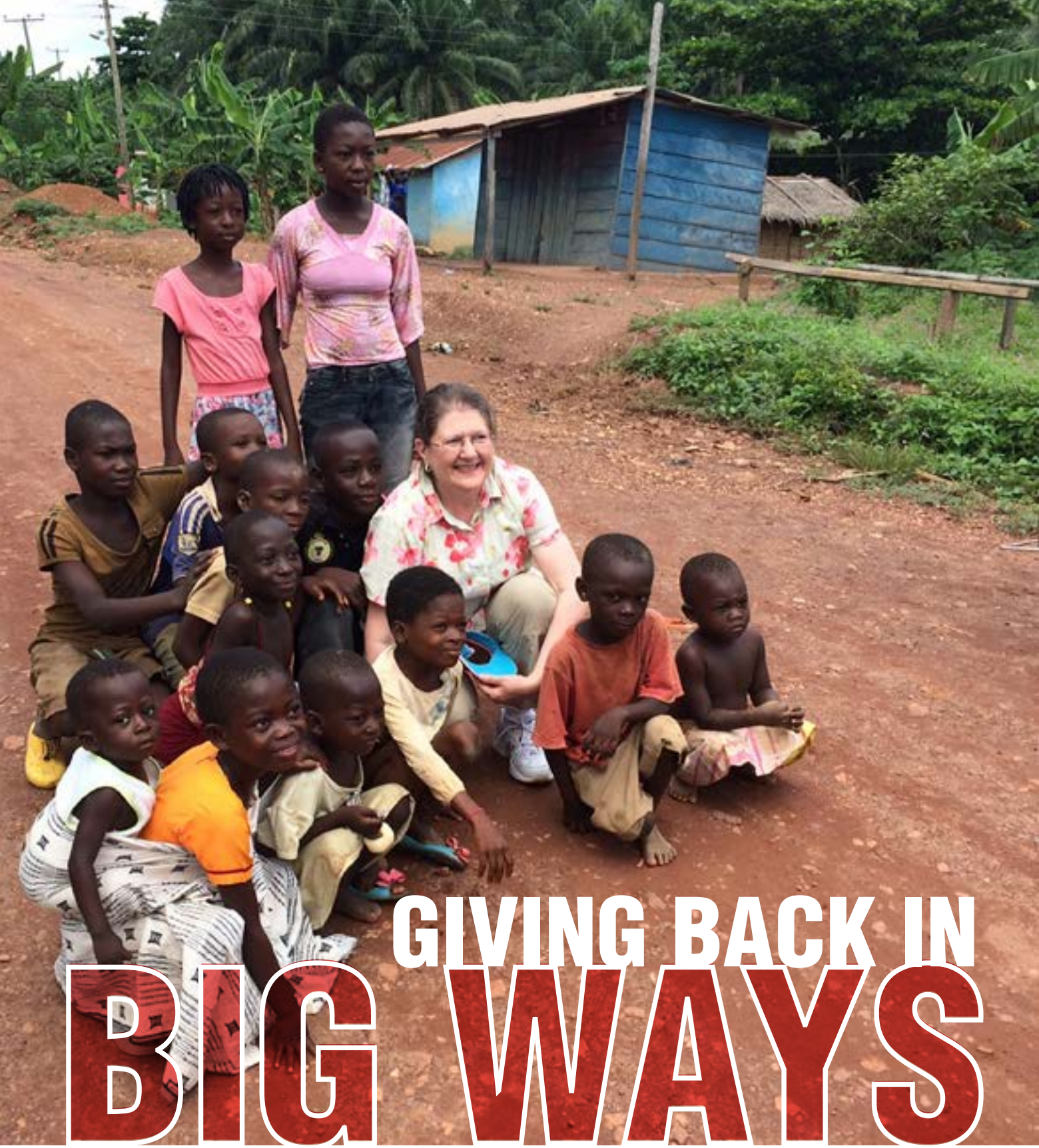
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GIVING BACK IN

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PHILANTHROPY IN THE MEDICAL FIELD PROVIDES CARE TO THOSE WITHOUT ACCESS OR FUNDS

By Helen K. Kelley

When it comes to philanthropic causes, physicians are often on the front lines. Here, we feature some Atlanta doctors who are making a difference in the lives of others, both at home and across the miles.

PROVIDING FREE CARE AND EDUCATION TO ATLANTA'S UNINSURED

When Charles E. Moore, M.D., a head and neck cancer specialist with Grady Health System, saw that many of his patients had limited treatment options because they had sought help too late, he began looking for the reasons why.

“I found that most of my patients were coming from three zip codes in medically underserved areas around Grady, and that many of them had cancers that could have been easily treated if the disease had been identified early. There was a need for education and increased awareness,” he says. “Some of my patients would come to me, asking me to visit certain areas and provide help. I knew I needed to do something for these people.”

Dr. Moore began conducting what he calls “Tupperware clinics” out of the back of his car. Armed with medical supplies, he drove out into the community, visiting nontraditional areas like homeless shelters, bridges and overpasses to talk about head and neck cancers and do screenings. There, he saw all of the additional medical needs that weren’t being addressed in people who had no access to care. He recruited colleagues to help provide primary and specialized care.

From those humble beginnings, the initiative grew – the physicians began operating out of mobile health units and then a comprehensive medical facility, the HEALing Community Center, was established. Today the Center, located in downtown Atlanta, offers free and sliding scale healthcare to the uninsured, including primary, pediatrics and specialized care, and behavioral and mental health services.

Additionally, the Center focuses on teaching people about prevention, offering health, nutrition and cooking classes, and even one-on-one health



coaching. Dr. Moore hosts a regular event called “Walk With a Doc,” in which he invites a specific community to hear a brief talk about health and then go on a one- to three-mile walk with him.

Dr. Moore says there are so many small things that make the project rewarding.

“People are so grateful for the help, and they’re hungry for the knowledge,” he says. “We help them take small steps toward improving their health and, in some aspects, their lives. We can provide them with hope that there’s a chance for something better. That’s the biggest reward.”

There is always a need for more physicians in primary care and various specializations to volunteer at the HEALing Community Center and participate in community outreach activities. For more information, call 404-564-7749 or go to www.healingcommunities.org.

BRINGING HOPE TO RURAL GHANA

“Imagine what life would be like with no access to healthcare, no hospital or doctors in your community, nowhere to turn when illness or injury strikes you or a loved one. This is a reality for the inhabitants of rural Ghana, where children and adults die of pandemic disease and disabling conditions that are both treatable and preventable.”

This is the introduction shared on The Yonkofa Project’s website. The Yonkofa Project was born from the experiences of Dr. Gabriella Nanci and Dr.

Deborah Martin, who first traveled together to Ghana on a short-term medical mission in 2010. There, the doctors found that many of the rural villagers' diseases could be prevented with basic access to medicine and preventive care.

Shortly thereafter, Dr. Nanci conceived the project and together with Dr. Martin formed a nonprofit to bring sustainable healthcare to the remote areas of this struggling country. "Yonkofa," which means "friendship" in the local Twi language, was chosen as the name. Building plans were developed, the land for the first clinic was donated, and, in the rainforest village of Yiwabra, The Yonkofa Project took root.

"There are not many hospitals in Ghana; the nearest one to Yiwabra is a regional facility located more than an hour's drive away. Getting a taxi to come to the village is almost impossible and the villagers can't afford cab fare anyway. There is such a need for primary care clinics throughout the country," Dr. Martin says. "Dr. Nanci and I wanted to take part in something that involved more than just occasional short-term medical missions to Ghana. We wanted to create a sustainable source of primary medical care."

The Yonkofa Project is not simply a philanthropic effort by American doctors. It is a growing collaboration that includes physicians, local residents, Ghana's Ministry of Health, the University of Ghana and more. The clinic in Yiwabra is well underway, with two buildings constructed from prefabricated components that often take several months to arrive via cargo containers.

"The village chiefs donated the land for the clinic, and the local villagers are doing most of the construction with supervision by a Ghanaian engineer," Dr. Martin says. "The difference in what we're doing is in the partnerships and the teamwork. We have made the connections to establish something permanent."

Dr. Martin says that the goal of the project doesn't stop with the completion of the clinic in Yiwabra.

"Our hope is to build a new clinic in a different region of Ghana each year until there is a source of primary care available to every Ghanaian citizen," she says.

Learn more about The Yonkofa Project by visiting www.yonkofa.org. ■



Resurgens Charitable Foundation focuses on youth health and fitness

Established 13 years ago by Resurgens Orthopaedics, the Resurgens Charitable Foundation has three major goals: making playgrounds accessible to all children, combating childhood obesity and injury prevention.

The Foundation recently reached a milestone in its philanthropic quest by surpassing the \$1 million donation mark. A portion of the funds raised has come from Resurgens' own physicians and employees, who are also passionate about the work the foundation does.

Funding has been distributed to organizations and projects that promote active and healthy lifestyles to people of all ages and ability levels.

Dr. Kay Kirkpatrick, president of the Foundation and co-president of Resurgens Orthopaedics, says the entire board and all of the Foundation's supporters view this work as essential and something that directly impacts the future of Atlanta's children.

"We are so fortunate to have a dedicated, enthusiastic team that views this work with the same importance as they do their day job. This is an investment in Atlanta's future, and something we take very seriously," she says. "The biggest reward for us is when we can see smiling faces of children who just rode down a slide or soared on a swing for the first time."

Learn more about Resurgens Charitable Foundation by visiting www.resurgensfoundation.com.



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This Month's Featured Board Members



Michael C. Hilton, M.D.

Dr. Hilton is a General and Forensic Psychiatrist, who has been practicing in Buckhead, Atlanta, Georgia for 24 years. He obtained his medical degree from The University of Alabama at Birmingham in 1984 and completed his residency in General Psychiatry at Johns Hopkins Hospital in 1989 followed by completion of a Fellowship in Forensic Psychiatry at the University of Maryland in 1990. Since 1990, Dr. Hilton has been in private practice and treats a wide range of adult psychiatric conditions including affective and anxiety disorders, stress reactions, alcohol and substance abuse, chronic pain and work injury related psychiatric conditions. He is board certified by the American Board of Psychiatry and Neurology and is a Distinguished Fellow of the American Psychiatric Association. He has been elected to Best Doctors in American. Dr. Hilton's forensic practice addresses a variety of medical-legal issues. He has performed forensic examinations nationally and internationally. He is a former President of the Medical Association of Atlanta and is currently on the Board of Directors for the Medical Association of Georgia and the Medical Association of Atlanta.



Alan Redding, M.D.

Dr. Alan Redding, along with his twin brother David, started Redding Allergy and Asthma Center, a practice in Buckhead, in 2010. They specialize in treating allergic diseases and asthma in adults and children. Alan grew up in Sandy Springs and then attended the University of Georgia, where he was a First Honor Graduate. After receiving the degree of Bachelor of Arts, summa cum laude, with Highest Honors from UGA, he attended the Medical College of Georgia. He then completed a residency in internal medicine at the Medical University of South Carolina and a two-year fellowship in pediatric and adult allergy and immunology at the University of Tennessee Health Science Center. He is a Fellow of the American Academy of Allergy, Asthma, and Immunology and the American College of Allergy, Asthma, and Immunology. In 2011, he began serving on the Board of Directors for the Medical Association of Atlanta.



William E. Silver, M.D., FACS

Dr. William Silver, a native Atlantan who has practiced facial plastic surgery for over 30 years, recently joined the Atlanta Institute for Aesthetic Facial Surgery. Dr. Silver graduated from Emory University and the Medical College of Georgia, completed an internship and surgery residency at Mount Sinai Hospital in New York City and finished his training in Otolaryngology/Head and Neck Surgery at NYU-Bellevue Medical center. Following a two-year tour in the army, Dr. Silver opened a private practice in Otolaryngology and Facial Plastic Surgery in Atlanta. He has served as vice president of the American Academy of Otolaryngology, chairman of the GAO-HNS society, first vice president of the Medical Association of Georgia, and he has been the secretary, treasurer and the president of the MAA. Dr. Silver is currently a clinical professor at both Emory University and the Medical College of Georgia.



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