SUMMER 2008

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Stretching the Shoulder

PG 14

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Triathlon® Knee System Offers Patients the Ability to Return to Normal, Everyday Activities

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knee joint resulting in a natural feel for the patient. Not only does this implant bend and rotate, but it is also designed for natural motion. The design addresses patients' concerns, increasing the extent to which patients can bend their knee after the knee implant.

"Right after the operation, I felt that it had been a success… I have my life back again."

Cindy Goodfellow, 64
Stryker Knee Recipient, 2005

Cindy Goodfellow from Temple, Texas, experienced the benefits of Triathlon® firsthand. An active senior with six grandchildren, Goodfellow's arthritis affected her knees so severely that she had trouble performing routine activities.

"Every time I climbed, stood, or even sat in one place for a while, the pain was excruciating," said Goodfellow. "I felt like I was living a part-time life." She knew that she needed to take action before her pain forced her to miss the things she enjoyed most.

After consulting with her physician on possible treatments, Goodfellow decided to undergo surgery and receive a Stryker Triathlon® knee replacement.

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One of the key components of a knee system is its bearing technology. The bearing surface is defined as the two parts of the knee that glide together throughout motion. The stronger and smoother the bearing surface, the better it will glide together, and the more likely it is to resist wear. Wear is what may eventually loosen the joint and cause it to break down. Stryker's new, advanced bearing technology, called X3®, has demonstrated up to 96% decrease in wear in laboratory testing compared to standard bearing surfaces – so it's anticipated that these improved wear characteristics may improve the life of the implant and give ease of mind to patients like Goodfellow for many years to come.

"At first, knee replacement surgery seemed like a scary procedure," said Goodfellow. "But after receiving the Triathlon and having the ability to do things like kneeling in the garden and playing with my grandkids, I can't envision my life any other way."

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LETTER FROM THE CHAIRMAN


David Jacofsky, MD

At The CORE Institute, a key part of our mission is to demonstrate a commitment to innovation and learning. We hail innovation to be the definitive process of advancing healthcare through research that will enhance clinical outcomes and through the development of new orthopedic medical devices.

We are proud to share that in 2007, our physicians and researchers thrived in our mission, with dozens of abstracts and presentations accepted at both national and international medical meetings. Many of our physicians were also lauded for their extensive commitment, such as: Jason Scalise, MD, 2007 Cleveland Clinic Innovator Award winner; and Bryan Wall, MD, 2007 recipient of The Mel Post Award for Excellence in Clinical Research by the American Shoulder and Elbow Surgeons.

Thus far in 2008, we are proud to have had research articles already published in peer-reviewed journals such as *The Journal of Bone and Joint Surgery* and *Journal of Orthopedic Trauma*. Our dedicated research team is continuously challenging conventional limitations of healthcare to discover ways to advance the field of modern medicine. For example, we are vigorously pursuing motion-analysis projects within sports medicine to help quantify forces on the body's joints during different activities. We hope to ultimately shed light on the biomechanics of athletes of all levels to help prevent chronic and overuse injuries.

As we continue to create new clinical pathways with innovation, our physician leaders will also continue to demonstrate a commitment to learning and service through unique community programs. The CORE Institute is a proud participant in Arizona's State Legislature's *Doctor of the Day* program, designed to encourage and foster a better understanding and awareness of the legislative process among physicians. Additionally, we are pleased to have Dr. William Ciccone, recently named a "Master in Shoulder Arthroscopy" by the Arthroscopy Association of North America, help instruct surgeons and residents from across the nation in the latest arthroscopic surgical techniques. As we continue to educate future leaders in medicine, we will continue to help change the face of healthcare in the United States.

Keep life in motion.

David Jacofsky, MD

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PHYSICIAN SPOTLIGHT

JASON J. SCALISE, MD

Jason J. Scalise, MD, is an internationally and fellowship-trained specialist in reconstructive and arthroscopic surgery of the shoulder providing the highest level of patient care. Dr. Scalise is a leader in the fields of shoulder replacement surgery, revision shoulder replacement surgery and rotator cuff surgery.

Dr. Scalise was recently named the recipient of the 2007 Cleveland Clinic Innovator Award for his work involving a 3-D computer-aided bone-modeling technique, which allows for the precise measurement of shoulder anatomy and bone loss due to arthritis. This technique can be further utilized as a preoperative planning tool for people undergoing shoulder replacement surgery. Furthermore, a complex shoulder surgery computer simulator was developed, allowing the surgeon to perform and re-perform all the surgical steps for a specific patient prior to the real surgery. Exactness of implant fit, the need for additional bone graft and determining which implant best suits a particular patient can all be calculated prior to the operating room. The expectation is that more precise shoulder replacement surgery can be performed with patient-specific anatomic considerations accounted for.

Dr. Scalise completed his undergraduate degree at the University of California in San Diego and then went on to complete his medical degree at Finders University of South Australia School of Medicine in Adelaide, Australia. He completed his residency at Wayne State University, in Detroit, Michigan, where he received the Herbert E. Pedersen Resident Award for Excellence in Orthopaedic Surgery and the Mid-America Orthopaedic Association's Educational Grant. He then completed his fellowship training in shoulder surgery at the renowned Cleveland Clinic in Cleveland, Ohio. After his fellowship training, he was brought on-staff at the Cleveland Clinic as a shoulder specialist.

Dr. Scalise has published several book chapters and articles in academic journals, such as *The Journal of Bone and Joint Surgery,* the *Journal of Shoulder and Elbow Surgery,* the *Journal of Surgical Orthopaedic Advances* and the *Journal of Orthopaedic Trauma.* He has also presented research in forums such as the American Academy of Orthopaedic Surgeons and the American Orthopaedic Association.

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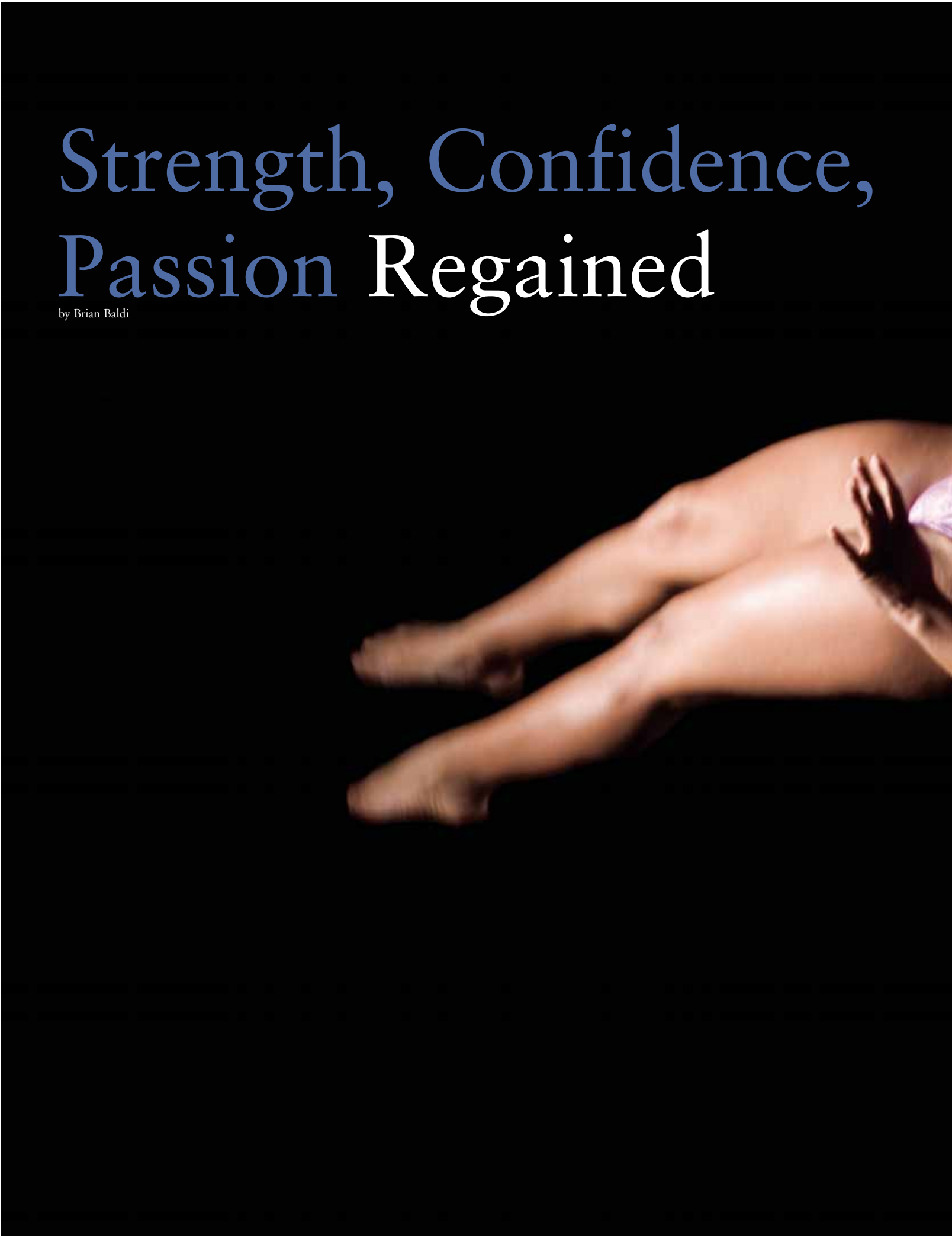
Strength, Confidence, Passion Regained

by Brian Baldi



She started at the age of two, energetic, bubbly and excited for life. Bianca Nixon wasn't your average toddler — she was one who knew she was meant to cultivate a talent. Her mom knew this too; Yasmina Nixon always believed her daughter's energy would take her places, so she began to channel Bianca's vivacity through gymnastics. The appeal of such a unique playground that could help instill discipline, strength and self-esteem into her daughter was all it took for Bianca to tumble her way into the passion that she lives for today.

"Most people think gymnastics is an easy sport, but I want to prove to people that it takes more dedication and determination than most other sports. I also enjoy the 'death-defying' aspect of it." Bianca radiates with enthusiasm and such a youthful energy that it is hard not to feel such a contagion around her. "I am a Level 9, working my way toward the top level — 10, which is a collegiate or Olympic qualifying level."

"It is quite the accomplishment to be a Level 9 at only age 13," Yasmina said. "It takes good grades and tremendous dedication to achieve this level. But I know she will keep working hard to get to the top, to get to 10."

Last year, there was no doubt in Bianca's mind that she could achieve her dream of becoming a Level 10 gymnast. She knew that her years of hard work, patience and dedication to excellence would serve as a solid foundation for the collegiate career she saw herself developing. This unique talent she cultivated and the passion that she grew all came down to a crashing halt though during one devastating day of practice.

Bianca had completed a round-off back handspring and was preparing for a full flip when she stopped in mid-air. Something caused her to lose concentration and focus, so her pause in thought seemingly stopped the world around her for a split-second. As Bianca came flying down, her momentum could have caused her to land on her head and incur life-threatening injuries, so she moved her right arm away from her body to try to brace herself. As she came crashing to the floor, it was immediately apparent that Bianca had severely damaged her elbow. In tears and tremendous pain, something was terribly wrong with Bianca.

Yasmina instantly jumped into action and ran to her daughter to assess the severity of the situation. "At first, I wanted to take Bianca to a hospital ER close to our house in Surprise, but another mother at the gym recommended John C. Lincoln-Deer Valley Hospital, which was much closer to the gym, so we rushed down there."

"The fracture did not show up on the first X-ray. It took several to find. Some doctors would have given up after one, especially with how traumatized Bianca was. I'm so glad they did a thorough job," Yasmina recalls. "Then we started to think, 'Is this so severe it could end Bianca's gymnastics career?'" Bianca couldn't bear to think of giving up her dreams and her passion. But she was told she would need surgery to repair her elbow. She had an avulsion fracture-dislocation of her medial epicondyle. She tore off the medial collateral ligament (MCL) with a flek of bone and dislocated her elbow.

After searching for advice across the Valley, Yasmina knew she wouldn't accept anything less than a physician who could help her daughter return to sports. That's when she and her husband decided to place Bianca in the care of M. Wade Shrader, MD, of The CORE Institute. As a fellowship-trained specialist in pediatric orthopedic surgery, Dr. Shrader was confident he could help Bianca.

Dr. Shrader recalls the surgery. "We had to transpose her ulnar nerve, to keep it safe, so she wouldn't have any problems using her hand later. We then reattached her ligament and the bony flek to the elbow with suture anchors and basically 'weaved' her tendon back together in order to make it more stable in the future so she wouldn't dislocate it again."

Bianca's operation went very smoothly, and she was on her way to recovery shortly thereafter.

At this point, Bianca began to develop her own doubts that she would be able to compete at the same competitive levels she had been at before. Her mother's confidence helped to get her enthusiasm back, instilling courage in the somewhat-apprehensive teen. "I had no doubt that I would be back," Bianca expresses. "I didn't want to be afraid, and I knew that I had to get back to the sport I love." So she began her road to recovery.

From the moment that Bianca started her rehabilitation program at Canyon Physical Therapy in Surprise, she knew getting reconditioned wouldn't be easy. She completed a rigorous two-hour training session three times a week for several months to rebuild her muscle strength and continue conditioning.

"I hated the physical therapy … but I loved the people. They were so encouraging. They told me I could only get back to gymnastics if I worked hard in my physical therapy sessions," Bianca says with a smile.

Bianca remained optimistic throughout her rehabilitation program. She worked hard, and she is now able to do light training back at Phoenix Gymnastics Academy. She is carefully getting back into the training routines she carried out before her injury. Recently, she completed a challenging series of back handsprings that she would never have been able to do again had she not gone through with the operation.

"Throughout the process, Bianca was incredibly patient and confident that she would find a way to return to gymnastics," Dr. Shrader notes. "She worked extremely hard during her therapy and wouldn't give up until she got back into competition. I am very proud of her."

"She has come out of this experience mentally and physically stronger," Yasmina adds.

Now that Bianca is back in gymnastics, she has time to think about her future. She has always wanted to compete in collegiate gymnastics while she studies to become a doctor. "I had always wanted to be a doctor, but my experience with The CORE Institute has inspired me to become an orthopedic surgeon."

Like most teenagers, she is already thinking about college and possibly attending schools far away from home, while her parents are hoping she'll choose something a little closer. "We'll cross that road when we get there," Yasmina says, "but for now, I am extremely proud of her."

A visible scar on her right elbow remains, but any apprehension Bianca had about performing on her surgically repaired elbow is starting to fade away. "Thank you so much for helping me get back to my love."

She's done this a thousand times before, and now she'll be able to do it a thousand times over.

Photos by Pete Pallaghi

Stretching the Shoulder

by Kevin Fay

There are many components to a healthy lifestyle, such as exercise, nutrition and stress reduction to name a few. While many would agree resistance and cardiovascular exercise have numerous benefits for muscular strength, joint stability, and heart and lung health, as well as many others, a commonly overlooked or underappreciated component of fitness and injury prevention is *flexibility*.

With few exceptions, flexibility is important for everyone. When needed, we can improve our flexibility primarily through stretching exercises. It is, for the most part, important to stretch regularly in order to maintain or regain lost flexibility as we age. We can all agree that in our lives, our bodies endure a host of stresses and strains. One joint in particular that is subjected to various stresses of daily life and subsequent losses of flexibility is the shoulder.

The shoulder is unlike any other joint in the body. It is designed for maximum mobility to allow for a broad spectrum of upper-body movements to occur, such as swinging a golf club, placing a box on a shelf or reaching into a back pocket. Unfortunately, this mobility can come at the expense of stability. While mobility and stability of the shoulder joint must coexist to create efficient movement, the topic of shoulder stability is beyond the scope of this article but remains an important area of focus regarding pathology in the shoulder.

Losses in flexibility can lead to a number of shoulder dysfunctions. Although numerous research studies have looked at the effects of too little or too much shoulder flexibility in athletic populations, there is little research that specifically addresses the effects of shoulder stretching for middle-aged and elderly persons for whom flexibility may be an issue. In one such study conducted in 2003, Swank, et. al. looked at a stretching program for improving range of motion (ROM) for healthy elderly subjects. The stretching program included some of the body's major joints, including the shoulder. They concluded that stretching exercise is an effective means of increasing ROM for older adults. In addition, the researchers noted that range of motion decreases with increasing age, due in large part to the aging process itself, trauma from mechanical stress, disuse and diseases such as arthritis.

One the greatest influences in the development of negative or undesirable physical adaptations in the shoulder joint are our daily postures and activities. Job demands, driving, computer usage, and habitual and relaxation postures — especially over the course of many months and years — are some of the most common detrimental sources of stress on the shoulder joint that can eventually lead to a loss of flexibility and ROM. Furthermore, these same stresses can have consequences on the joints of the neck, mid-back, low back, hip … you name it! So for someone who has lost some flexibility of one or both shoulder joints over the years or in recent weeks (for whatever reason), performing certain stretching exercises to help regain lost ROM may be of some benefit.

When considering the potential benefits of shoulder stretching, there are certain points to consider. Since the flexibility of a joint depends on many factors, such as the length and tension of the muscles around the joint as well as the ligaments, people who have adequate or excessive shoulder ROM will likely not need any specific shoulder-stretching exercises. Having too much flexibility in the shoulder joint can lead to a myriad of problems. These types of people will likely benefit most from a well-planned strengthening program. But for those who need to improve their shoulder flexibility, there are a number of different stretching techniques, such as static stretching, contract/relax stretching and active (or dynamic) stretching, that one may choose from. Each of these techniques has their own benefits and, depending on the individual and his or her needs for improving shoulder flexibility, each may be applied at certain times.

With regards to sport and exercise, stretching is considered an important component of injury prevention. However, there has been considerable debate as to the benefits of performing traditional stretching before athletic activity. In the March 2004 issue of *Medicine & Science in Sports & Exercise*, the Centers for Disease Control and Prevention published a review of the literature on stretching and concluded that the research at the time was inadequate to answer most questions regarding the benefits of stretching for reducing injuries and improving performance. Moreover, other research has found that a pre-activity warmup, which increases blood flow through the muscles and makes them more ready to respond to exercise, can reduce the risk of injury.

Along these lines, if someone is looking to improve shoulder and upper body flexibility in order to improve his or her golf swing, then perhaps an active or dynamic method of warmup will best suit his or her situation. This is a demanding method of mobility training and requires an in-depth assessment, instruction and supervision before someone can become proficient. But if someone's main goal is to improve shoulder ROM to better perform daily functions, such as reaching up into a cabinet or for dressing and grooming activities, then traditional static stretching may be the most useful. There is much research that points to the beneficial effects of stretching on improving ROM as well as function, as mentioned above.

One interesting point that someone should consider when assessing a lack of shoulder flexibility is to ask ***why*** there is tightness and loss of ROM in the first place. If it is from a specific injury (such as a strained or torn muscle) or condition (such as arthritis), then the answer may be obvious. Still, the reason the muscle or a joint is tight in the first place may likely be due to it being improperly used. Muscles do not get tight (or weak) for no reason. Muscles become tight because of the way they are used. If muscles are tight, it's more than likely because a person has chosen to use them in a shortened range, and the activities they perform do not lengthen them to their full potential.

A commonly seen aspect of rehabilitation is when one muscle is tight, its counterpart often becomes weak and lengthened to accommodate the tight muscle. In regards to the shoulder complex and the aforementioned postural dysfunctions that develop over time, many people who sit for long periods of time (at a desk) may develop tightness in their chest muscles while at the same time weakness to the muscles of the posterior shoulder and through their mid-back around their shoulder blades. This can have an effect on shoulder ROM and subsequently cause shoulder dysfunction.

In conclusion, while it would be advisable for someone to consult with his or her doctor or therapist about a specific shoulder-stretching program, there are certain points that one should keep in mind. When stretching, stretch in a controlled manner and don't be over-aggressive. Be careful not to hold your breath, as this may cause muscles to tense, which will defeat the purpose of stretching. Pay attention to daily postural habits and body mechanics, as these can have both positive and negative consequences on the shoulders in the short term as well as the long term. If there is an issue with lost ROM and flexibility in the shoulder joint — for whatever reason — and it is affecting daily activities and/or causing pain and dysfunction, seek help from a qualified professional such as a doctor or therapist. A thorough assessment by your doctor (or rehab professional) may be needed in order to determine how this dysfunction can be lessened or corrected. This is especially important for the elderly, for whom adequate ROM is important for performance of activities of daily living and maintenance of an independent lifestyle. It is also very important for the active or athletic individual, as flexibility imbalances and left/right asymmetries can lead to compensation patterns and subsequent injury. Remember, stretching for flexibility is just one of many components of a healthy lifestyle. Go out and make it a healthy habit!

Kevin earned his doctor of physical therapy degree from A.T. Still University in Mesa, Arizona, in 2004. He specializes in the evaluation, treatment and prevention of orthopedic and sports-related injuries. Through his work and clinical internship experience, Kevin has worked with a wide variety of clientele, ranging from professional athletes to weekend warriors to amateur sportsmen.

Shoulder Biomechanics Research

by Matthew Hansen, MD

The shoulder is a remarkable joint, yet we often take it for granted until there is a problem. The next time you get dressed, cook dinner, play catch or go golfing, take notice of how much you use your shoulder. In fact, there is more motion at the shoulder than any other joint in the human body. Now consider doing these activities without being able to move your shoulder. Many would be very difficult, if not impossible. My patients often comment about how surprised they are at the degree of limitation caused by shoulder injuries or pain.

The shoulder is made up of three bones — the humerus (arm bone), the scapula (shoulder blade) and the clavicle (collar bone) — and the chest. The majority of motion at the shoulder occurs at the joint between the humerus and the scapula. This is a ball-and-socket joint, with the socket located in the scapula and the ball located at the top of the humerus. What most people don't realize is that a significant amount of motion also occurs between the shoulder blade and the back of the chest. Watch someone from behind as he or she raises his or her arms overhead, and you will see that the shoulder blade also moves. This is a complex, coordinated three-dimensional motion. Conditions such as rotator-cuff tears, labrum tears, impingement and arthritis are associated with abnormal motion of the scapula.

Our understanding of the shoulder and conditions that affect the shoulder continues to grow thanks to recent expansion of clinical and basic science research in these areas. However, compared to other joints such as the hip and the knee, shoulder research has lagged behind. At The CORE Institute, we see this as a great opportunity to answer questions that will significantly improve our patients' lives.

In partnership with The Sun Health Research Institute, we are utilizing the SHRI-CORE Biomechanics Laboratory to find answers to fundamental shoulder questions. Our facilities include two motion-analysis systems that use optical markers to track motion in three dimensions. This is the same technology that is used to capture motion for video games and computer-generated characters for movies such as *The Lord of the Rings*.

The person being tested wears small infrared lights or reflective markers on his or her skin or clothing that are tracked by a series of specialty cameras. There are typically several markers on each arm and leg as well as the torso and head. As the person moves, the cameras track each marker in three-dimensional space. Sophisticated software then integrates the data from the infrared cameras and calculates the motion of each body segment. Position, velocity and acceleration are all determined. The power of this technique is evident when the investigator reviews the data and can dissect specific three-dimensional movements for each joint that occur over less than one-hundredth of a second. This is a level of precision that is just not possible with the naked eye or with visible-light video. These techniques have been used in our lab to identify deficiencies in the golf swing, measure improvements in walking and stair-climbing after hip and knee replacement surgery and to quantify recovery after hip fractures.

Since the scapula is almost entirely covered by muscles, it is difficult to precisely measure its motion. Our engineers and surgeons have adapted optical motion-tracking technology to precisely track motion of the bones of the shoulder. With our custom tools and software, we are able to measure in a noninvasive fashion precisely how the bones of the shoulder move. This knowledge of shoulder motion will help us design and improve rehabilitation programs, surgical techniques and joint replacements that restore the ability to use the shoulder.

To complement our technology that measures joint motion, we are also developing a system that determines the forces that create that motion. These are the two main areas of focus in biomechanics research — motion and the forces that cause motion. While measuring motion is relatively straightforward, measuring forces is much more complicated, especially for the shoulder.

We are currently building a device that allows us to determine individual muscle forces at the shoulder. We call this the "shoulder controller," and I designed and built the first generation of this device while in residency in New York City. My initial interest in this area of research was motivated by the following observation: while many patients with rotator-cuff tears have difficulty lifting their arms, some patients with large rotator-cuff tears have little or no loss of function. Although the rotator cuff, as its name implies, is important for rotating the shoulder, it is also essential for lifting the arm. How are some patients with large rotator-cuff tears able to lift their arms?

Using the shoulder controller, my research team and I were able to provide a scientific answer to this question. We demonstrated the effect of size and location of the rotator-cuff tear. We found that 30 percent to 90 percent greater strength was required in the remaining portion of the rotator cuff that was not torn. Greater strength was also required of the deltoid muscle. Patients who are able to develop this amount of increased strength can maintain the ability to lift their arms, even with a large rotator-cuff tear. However, as the tear size increases, the required muscle strength becomes too great, and the increased force in the rotator cuff may contribute to making the tear larger. This research was recently published in *The Journal of Bone & Joint Surgery* — the main journal for orthopedic surgeons.

The second-generation shoulder controller will provide a level of sophistication in shoulder research that is unmatched. It will be useful for testing and improving surgical techniques such as rotator-cuff repair and labrum repair. It will also be used to test new designs for shoulder replacements. This includes the reverse shoulder replacement, which has been used in the United States for the last four years in patients with very large rotator-cuff tears that cannot otherwise be repaired.

We are excited by the opportunities for shoulder research and the platform capabilities we have developed in our laboratory. We look forward to performing many meaningful research studies that will help our patients. After all, that is the ultimate goal of this research effort — improving the lives of patients by restoring shoulder function.

Mathew L. Hansen, MD, specializes in orthopedic sports medicine; advanced shoulder and elbow surgery, including arthroscopic rotator cuff and labrum repair; shoulder replacement; elbow arthroscopy; elbow replacement; elbow ligament reconstruction; knee ligament reconstruction (ACL and PCL); and cartilage restoration. Additionally, he is a leader in orthopedic research.

Common Knee Injuries

by William Ciccone II, MD

Knee pain from injury and overactivity is a common reason patients seek an evaluation from their local orthopedic sports medicine specialist. The pain can sometimes start somewhat insidiously, with no obvious trauma, or can be associated with a serious high-energy event. Knee pain can stem from cartilage (meniscus) tears and ligament injury. While most of these complaints can be treated with initial nonoperative management, persistent symptoms may necessitate surgical intervention.

Meniscus tears, commonly called cartilage tears, occur frequently with the medial (inside) meniscus being more commonly injured that the lateral (outside) meniscus. The menisci themselves are C-shaped specialized tissue — they have the consistency of dense rubber and are located in the middle of the knee joint. Their function is to disperse your body weight during activities in order to protect the knee joint from arthritis. Meniscus tears occur most commonly with squatting and twisting activities. They cause a persistent irritation within the knee, associated with pain and swelling. Due to a poor blood supply, the meniscal cartilage does not heal. The diagnosis of a meniscus tear can usually be determined by a doctor when examining your knee. MRI scans are useful in seeing how much of the meniscus has been torn. If the meniscus tear remains painful, a simple outpatient surgical procedure can be performed. Most patients are at full activities four to six weeks after this type of surgery with high satisfaction rates.

Injuries to the large knee ligaments are usually associated with high-energy trauma. The main knee ligaments are located on the outside of and within the knee joint. The collateral ligaments are large structures located on either side of the knee. Injuries to the inside (medial) collateral ligament (MCL) are more common than injuries to the lateral collateral ligament (LCL). Most MCL injuries are treated with a brace for six to eight weeks and heal on their own. LCL injuries do not heal and, depending on your activity level and age, surgical repair may be necessary. The other main supporting ligaments are the anterior and posterior cruciate ligaments. These ligaments are located within the knee joint and are necessary for the rapid motions associated with sports. While knee stability can be reproduced with specialized bracing, this can be associated with restrictions, and a fair number of patients decide to have these ligaments reconstructed surgically.

William J. Ciccone II, MD, is a fellowship-trained sports medicine specialist whose experience is highlighted by previous positions as team physician for the Colorado Rockies AAA team Sky Sox, medical director for the Rocky Mountain State Games and the State Games of America and the United States Olympic Training Center events in Chula Vista, California. Dr. Ciccone was recently named a "Master in Shoulder Arthroscopy" by the Arthroscopy Association of North America (AANA). With this distinguished ranking, Dr. Ciccone will instruct surgeons and residents in arthroscopic surgical techniques at courses sponsored by the AANA.

REVERSING THE TREND

A Newer Type of Shoulder Replacement Offers Patients Hope of Better Shoulder Function

by Jason J. Scalise, MD and Bryan T. Wall, MD

Jason J. Scalise, MD

Bryan T. Wall, MD

Recently, there has been much discussion about a relatively new type of shoulder replacement, which offers many patients who otherwise would have had few good options the prospects of pain relief and better shoulder function. As with many newer devices, the appropriate use of the technology plays a major role in the overall success. The purpose of this article is to discuss this new technology, the "reverse shoulder replacement," the concepts behind the device and the patients for whom it is typically suited.

Background

The first scientific data concerning the results of patients who underwent conventional shoulder-replacement surgery began to emerge in the early 1970s. The results were overall very good and gave people a tremendous improvement in their shoulder function. However, there was a small subgroup of patients who did not do so well with the standard shoulder replacements. Although these patients also had shoulder arthritis, they lacked a functioning rotator cuff. The rotator cuff is the sleeve of muscles and tendons that surrounds the ball-and-socket joint of the shoulder and provides stability, leverage and mobility to the shoulder. Patients with a large rotator-cuff tear typically have abnormal mechanics with the shoulder such that a conventional shoulder replacement frequently functions poorly. Often, these patients have no better than chest-level function.

The rotator cuff provides a type of dynamic fulcrum or leverage point to the shoulder that the other strong muscles of the shoulder (e.g. the deltoid muscle) can utilize in order to effectively move and elevate the shoulder. Recognizing this, several investigators began research with new implant designs, which replaced this muscular pivot point with an artificial metal joint. The idea was if the normal fulcrum could be recreated, the shoulder's remaining muscles should have enough strength to adequately power and move the shoulder despite the lack of a rotator cuff. The reason it is referred to as a "reverse shoulder replacement" is because the ball-and-socket relationship is reversed: a new metal ball is placed on the socket, and a new socket is placed in the normal position of the ball. The new socket can now pivot around the new ball.

However, early designs were not sufficiently durable to withstand the tremendous and complicated forces across the shoulder joint. Loosening implants, broken implants and dislocated shoulders were too often encountered in the early trials of these devices. As such, many surgeons abandoned the use of such implants in favor of more conventional shoulder replacements despite the understanding that the conventional implants performed rather poorly in such patients.

In the late 1980s, the reverse shoulder implant was redesigned to address the mechanical shortcomings of the earlier devices, leading to the redesigned implant's wide release in Europe in the early 1990s. Promising and durable results of this newer design prompted the U.S. Food and Drug Administration to reassess the reverse shoulder replacement with subsequent approval for use in the United States in 2004.

Current Use

Traditionally, the primary reason to utilize a reverse shoulder replacement is in patients with arthritis associated with large rotator-cuff tears. The vast majority of the available scientific literature is focused on this subset of patients. However, greater use and experience has seen its use in other settings, including certain shoulder fractures and for treatment of failed conventional shoulder replacements.

Patient age remains a substantial consideration for the surgeon contemplating the use of the reverse shoulder replacement. Current published recommendations are that this device should be reserved for patients 75 years old or older. This recommendation stems from concerns that younger, more active patients may exert excessive forces upon this device, leading to premature implant failure. Of course, this subjective recommendation is not an absolute, but it is rooted in the real concerns that the event of a failed reverse shoulder implant would leave few reconstructive options for the patient and surgeon. Suffice it to say, caution is mandated when considering use of the reverse shoulder replacement in patients younger than 70. There are uncommon situations, however, in which a reverse shoulder replacement represents a viable option in younger patients. An awareness of the advantages and limitations, as well as the potential pitfalls of a reverse shoulder replacement from a surgeon experienced in its use, is central to maximizing a successful outcome.

Expectations

Patients undergoing reverse shoulder replacement surgery for a rotator-cuff-deficient shoulder with arthritis should typically expect, first and foremost, a substantial reduction in their pain. Replacing the worn and arthritic bearing surfaces of the shoulder

with smooth, artificial surfaces helps to promote the dramatic pain relief often seen.

Before surgery, many patients have waist-level-only function. That is, arm elevation above the level of the waist is typically difficult or impossible for patients with severe rotator-cuff-deficient arthritis. The best reported results in the current scientific literature demonstrate forward arm elevation to about 140 degrees after this type of surgery. This translates into function at approximately eye level. Although restoration of "completely normal" shoulder function is less common, this level of elevation typically entails a substantial increase from the patient's pre-operative waist-level-only function. The extent of external rotation, however, is often harder to predict for a patient in the post-operative setting. External rotation is important for motions including reaching to the top and back of one's head.

Rehabilitation After Surgery

Because the success of reverse shoulder arthroplasty designs are dependent upon a well-functioning deltoid muscle, post-operative rehabilitation programs are designed to focus on this structure. In the early post-operative setting, patients are typically taught to perform simple shoulder-stretching exercises at home. The role of early outpatient physical therapy is typically very limited. In general, the rehabilitation during the first six weeks after surgery is often performed at home by the patient. These gentle stretches help maintain the shoulder motion while allowing the tissues to heal adequately. Organized outpatient physical therapy is then often started at approximately six weeks after surgery. This therapy focuses on deltoid and shoulder-blade muscle tone and coordination. These muscles act as the primary motors of shoulder function in the absence of the rotator cuff. By three months after surgery, many patients are performing well enough to no longer need organized therapy and can continue their exercises at home.

Conclusion

The advent of reverse-type shoulder replacements has initiated a new era in the treatment of traditionally complex and challenging shoulder problems. This technology and the corresponding surgery have offered a powerful tool for surgeons in a realm where few other good options had previously existed. However, like all powerful tools, its appropriate use in the appropriate circumstances is critical in order to avoid potential and substantial complications. The surgeons' understanding of which patients would most benefit from this technology and surgery is vital to any successful outcome. The reverse shoulder replacement will undoubtedly continue to play an essential role in the ability of shoulder surgeons to offer patients a viable reconstructive option to a historically very challenging problem.

Jason Scalise, MD, is an internationally fellowship-trained specialist in reconstructive and arthroscopic surgery of the shoulder. Dr. Scalise was named the recipient of the 2007 Cleveland Clinic Innovator Award for his work on the "Use of Virtual Bone Model to Measure Bone Loss and Preoperative Surgical Simulator." Bryan Wall, MD, is a fellowship-trained specialist in arthroscopic and reconstructive surgery of the shoulder. Dr. Wall was named the 2007 recipient of the The Mel Post Award for Excellence in Clinical Research by the American Shoulder and Elbow Surgeons (ASES).

SPRING TRAINING

by John A. Brown, MD

Editor's Note: Some character names have been changed, and the physician-patient scenarios are only depictions of typical athletic injuries seen in baseball.

"Dr. Brown, can we count on you and your team once again this spring to help with the team?" Matt, the team trainer and medical coordinator for the Texas Rangers, asks the rather rhetorical question with utter sincerity.

"Absolutely," I reply. "When are we kicking things off this year?"

The first call usually comes around mid-January.

"Not quite sure of the exact date … pitchers and catchers arrive first, sometime in mid-February," Matt explains.

"Sounds good. Count us in. Just let me know with enough notice so I can adjust my schedule to accommodate for your needs." It's never convenient and many times disruptive, but I wouldn't pass on the opportunity to help take care of the big-league club during the hallowed ritual of spring training.

Every year, the boys of summer make their annual pilgrimage to the red dirt, sunshine and hoards of dedicated fans — to the Cactus League. The Cactus League is an ever-expanding conglomeration of Major League Baseball teams performing their spring training in Arizona. The majority of the teams are based out of the Phoenix area, while others call Tucson their home. The West Valley has been lucky enough to absorb quite a few teams during the last several years, the Texas Rangers being one of them. They come to hone their skills and get ready for the season, vie for positions or simply begin their odysseys in big-league baseball. They play hard and sometimes hurt themselves or simply just overdo it.

The CORE Institute, from its inception in January 2005, has had the honor and privilege to be a primary player in the medical coverage of the Texas Rangers baseball club.

"When are we planning physicals, Matt?" I inquire, as this is typically quite a time-consuming task, and I need to make a spot for it on my schedule.

"Last Friday in February — we've got quite a few coming in." Intentionally nebulous in his response, Matt waits to hear my reaction.

"What does 'quite a few' mean?" I call his bluff.

"Probably around 50 or 60 guys … but this should be the bulk of it." He tells it straight.

"OK, what time are we starting?" I know it'll be early.

"6 a.m. will be the first busload. We'll keep 'em coming from there."

The physicals mark the real beginning of spring training. It starts with the pitchers and catchers, as they are the first to arrive, rested arms in tow, ready for a season of new beginnings. Once these guys are on track, the rookies, special invites and "walk-ons" show, ready to impress, with big aspirations. The clubhouse and practice facility brim with the volume of players racing around like freshmen on their first day of high school, very excited but not sure exactly where to go. Finally, the veterans arrive with a relaxed nonchalance that can be expected when the contract is signed and it's only spring that's in the air.

They all have to be medically cleared. Our job as orthopedic surgeons at this point is to ensure that there is no obvious, blatant musculoskeletal problem that would preclude the player from performing at the major-league level. We perform a thorough check of the entire musculoskeletal system, starting with the neck and ending at the ankles. As most of the injuries in baseball are associated with hitting and throwing, our most thorough evaluations involve the shoulders and elbows.

"Problems with the elbow last year?" I ask a new recruit just brought in from the Yankees farm system, referring to a rather generous scar over the inside of his elbow.

"Tommy John, year and a half ago … doing great, ready to throw." He replies quickly and definitively.

I nod in agreement, "Yeah, you're probably ready to go."

The "Tommy John" is a procedure that reconstructs a torn ligament over the inside part of the elbow. Prior to this procedure, pioneered by the famous Dr. Frank Jobe at the Kerlan-Jobe Clinic in Los Angeles, California, a tear in the ligament over the inside of the elbow represented a career ending injury. In the middle of the 1974 season, Tommy John was cruising along with a 13-3 record as the Dodgers were en route to their first National League pennant in eight years, before he damaged the medial collateral ligament in his pitching arm, leading to a revolutionary surgical operation. This operation, now known as Tommy John surgery, replaced the ligament in the elbow of his pitching arm with a tendon from his right forearm. The surgery was performed by Dr. Frank Jobe on September 25, 1974, and although it seemed unlikely he would ever be able to pitch again, he spent the entire 1975 season in recovery and returned to the Dodgers in 1976. His 10-10 record that year was considered "miraculous," and John went on to pitch until 1989, winning 164 games after his surgery, and the success of the operation was born.

"Just take it easy out there to start," I reply. "Remember, everything in progression."

It's tough to keep these kids down. They're fighting for their dreams.

The next player steps up and takes off his shirt.

"What's the story with the shoulder?" I ask, eyeing three small, specifically placed incisions over the front, side and back of the shoulder.

"SLAP, two years ago. Jimmy Andrews, Alabama." I think he's been asked this question before.

"How's the velocity [pitch speed]?" An important thing to know with this type of injury and surgery.

"Back in the mid-90s, good control," he quickly responds.

"I hope so, for the batter's sake. Nobody likes a screaming 95-mile-an-hour fastball high and inside."

The SLAP tear is another ubiquitous injury we see in the overhead throwing athlete. A SLAP (Superior Labrum from Anterior to Posterior) tear or lesion occurs when there is damage to the superior or uppermost area of the labrum (cartilage surrounding the socket

of the shoulder). SLAP lesions have come into public awareness with their increasing frequency in overhead and particularly in throwing athletes. The identification and treatment of these injuries continues to evolve today; however, it is safe to say that a baseball pitcher suffering a "dead arm" caused by a SLAP lesion today is far more likely to recover such that he can return to the game at its highest level than was the case 20 or 30 years ago. Dr. James (Jimmy) Andrews was a pioneer in the initial diagnosis and treatment of the SLAP tear through arthroscopic (minimally invasive) techniques. He maintains a busy sports medicine practice in Birmingham, Alabama, and is visited and consulted by many professional athletes.

The physicals continue, and we see quite a few players with the scars to show they're battle-proven — most doing pretty well. Interesting, this game of baseball; the talent is only one part of the selection process. In this line of work, we see the reality of durability as another part of the selection process. Sure, a kid can have all the talent and desire in the world, but if his body can't stand the rigors of baseball, it wears out, leaving talent and desire no place to perform — the unfortunate end to a boyhood dream.

Most of the guys pass physicals without an issue, geared to move on and get out on the field to play. February quickly tails into March. The season is now in full swing.

"Doc, we need game coverage for the 4th, 12th, 15th, 19th, 21st, 25th and 27th." The head trainer, Jamie, catches me just as I'm about to leave the training room on my way to clinic.

"Shoot me off an e-mail with those dates; I'll make sure we have someone there for you." Jamie knows he can count on me, although I'm never quite sure how I'm going to balance their needs with my clinic and surgery schedule. But I know I'll work it out.

Game coverage is the carrot of spring training medical coverage. Three hours in a ballpark, watching from really any vantage point I choose, enjoying the warm sunshine and the easy strides of the game.

I'm in clinic and the phone rings. Its game day, a couple hours before the first pitch, and it's Jamie on the line. "Hey, Doc, can you get here about an hour before game time? Have a few players banged up a little, and I was wondering if you could check them out."

I'm already an hour behind, but of course … "Sure, Jame-O, I'll be there. Just line 'em up, and we'll take a peek. What ya got?"

I get there about 30 minutes before game time. Three players need to be seen. The first player has a high hamstring muscle tear, not too bad.

"Rest, stretch, antiinflammatories and modalities (various tools used to treat muscle strains)," I tell Matt, who is handling the injured group. "If it doesn't improve in the next week or so, we'll get some X-rays and possibly an MRI."

The second guy is holding his knee — a major-leaguer whose knee has been bothering him for a couple of weeks, but this is the first time he has let on. He's up for contract renewal this season and wants to have a big year.

"It's killing me, Doc. What do you think is wrong?" He's anxious for obvious reasons — a couple million, I would guess.

"Let me take a look." I examine his knee. I then call the team doc in Texas to let him know what is going on. We quickly send him over to my clinic for X-rays and off to the MRI scanner for further workup, all in haste, without delay. The medical care of the professional athlete — expeditious, complete and sometimes extravagant. Little is said — no words until we have a working diagnosis. We need to protect the athlete from both his own fears as well as from the media who swarm for the opportunity to break the "big story" on the high-dollar athlete with the bum knee.

The third guy is from the Dominican Republic. He speaks very little English. On all of the major-league clubs, there are a substantial number of players from the Dominican Republic and Venezuela. A couple scattered here and there are from Japan and Korea. Interestingly, many of the major-league clubs have affiliates in these countries and use these as farm systems for the up-and-coming talent. The leagues in these countries are during the off-season in the States, so a player may literally play year-round — the only downtime is for travel. The best in these leagues are invited to come to Arizona for the spring. The elite stay in the States and become major-league stars.

The first obstacle is the language barrier. I speak a little medical Spanish, so I muddle through most of the exam. "Shoulder tendonitis," I tell him through an interpreter, who may or may not be present, depending on the player and the day. Luckily, there was one there; I had a game to catch. I talk with the trainer, and we again decide on a course of rest, antiinflammatories and a rotator-cuff rehab protocol. The trainers know the drill and get right to work. I go and watch the game.

Second inning, the Rangers are playing the D-backs. A high-and-inside fastball is thrown by my SLAP repair pitcher I had checked out earlier in February. I think this one was intentional; however, it hits the D-backs player on the back of the head. Lucky for me, my colleague had just given us a refresher course on concussion management. I'm summoned for an on-field exam. The player is a little confused and remains that way for a minute — sure enough, with a concussion. He's done for the day. We'll reassess later.

The game ends, and I check out a few bumps and bruises and an ankle sprain. I then quickly run over to the visiting team's clubhouse to do a final reassessment on our concussion player. He is clear. I recommend a couple of days off and a return to play thereafter. The player is thankful for the care and the clean bill of health. He shakes my hand, and we part ways.

"Good luck this season." I really mean it, as I would love to see the D-backs make another pennant run.

Spring training is a magical time in Arizona. Although it can be demanding, it exemplifies why we do what we do. We offer unsurpassed care and service to a professional sports organization. In return, we get to experience on a much more intimate level the thrill of the game and, every once in a while, relive a little of our own boyhood dreams.

John Brown, MD, is a leader in arthroscopic surgery of the shoulder, knee and ankle and in joint-preserving techniques. He is also a specialist in shoulder replacement. Dr. Brown completed an 18-month sports medicine fellowship-training program prior to joining The CORE Institute. His passion for sports and community development has led him to care for a host of professional sports clubs, including the men's and women's World Cup and Olympic soccer teams, as well as Pepperdine University, among others.

Living with Carp

by Frank J. Raia, MD

What Is Carpal Tunnel Syndrome?
Carpal tunnel syndrome is a compression neuropathy of the upper extremity and one of the most frequent reasons for visits to hand surgeons annually. Compression neuropathy means that a nerve is getting compressed by another structure somewhere in the arm or leg. In the case of carpal tunnel syndrome, the median nerve is compressed or pinched as it passes through the carpal tunnel just below the wrist in the palm of the hand. There is only a limited amount of space in the carpal canal for the nerve and the tendons that bend the fingers and thumb. The rigid boundaries of the canal include bones and a thick ligament (the transverse carpal ligament), so any increase in volume of the structures in the canal can cause compression of the median nerve.

What Does It Feel Like?
The median nerve supplies sensation to the tips of the thumb, index finger, middle finger and part of the ring finger. Compression of the median nerve at the carpal tunnel, therefore, causes numbness in most, if not all, of those fingers. Usually the small finger is spared and has normal sensation.

The symptoms may start gradually and increase over time to constant numbness. One of the most frequent complaints of patients with carpal tunnel syndrome is nighttime awakening from sleep. During sleep, the wrist may bend into an awkward position. This can increase the pressure on the nerve and cause numbness and pain that wakes the patient from sleep in the middle of the night. Often, patients have the feeling that their hand is "asleep," and they have to shake it to wake it up, restore normal feeling in the hand and get rid of the pain.

Other activities that put the wrist in extreme flexion or extension for a significant period of time may cause the numbness to occur as well. Driving for an extended period of time or holding a phone up to your ear may cause decreased sensation and pain in the affected fingers. Patients who have continued numbness may feel as if they have lost the ability to hold things in their hands, especially between the thumb and index finger. This especially causes problems with fine motor movements, such as handling buttons or other small objects. Needlepoint and knitting are hobbies that are usually affected by this syndrome.

The most common cause of carpal tunnel syndrome is "idiopathic." That means there is nothing in particular that causes compression of the nerve. Carpal tunnel syndrome can be associated with other endocrine disorders, including thyroid problems, so it is always a good idea to discuss the symptoms with your regular doctor as well. Masses in the canal can also cause compression of the nerve, but these instances are rare.

How Does the Doctor Diagnose It?
When you visit the hand surgeon and complain of numbness or pain in your hand, the surgeon will typically ask you questions relating to the location and duration of the numbness, as well as activities that make it worse or better. Precise answers to the questions can rule out other possible diagnoses.

In addition to a general range-of-motion exam and inspection of the affected hand/upper extremity, there are specific tests the physician does to make the diagnosis of carpal tunnel syndrome. Tapping the median nerve as it crosses the wrist into the palm is called a "Tinel's" sign and may cause parasthesias (feelings like electric shocks) into the fingers if the nerve is compressed or irritated. Pressure applied by the physician in the palm over the transverse carpal ligament is called the median nerve compression test and makes the fingers go numb if positive. Flexing the wrist to 90 degrees is called "Phalen's" test. This decreases the space in the carpal tunnel and pinches the nerve, causing numbness in the thumb, index, middle and ring fingers if the patient has carpal tunnel syndrome.

Sensation in the tips of the fingers supplied by the median nerve is compared to sensation elsewhere in the hand or the body (either

al Tunnel Syndrome

the small finger or unaffected opposite hand). This can be done subjectively, with the patient reporting that one finger is more or less numb than another, or more precisely, with the aid of a two-point discriminator. The discriminator is a device that the physician uses to quantify the amount of decreased sensation in the tips of the fingers. The disk has blunt tips set a certain distance apart, and the patient is asked to close his or her eyes and tell the physician whether he or she feels one or two points at the tips of the fingers. You can try something similar to this at home with a paper clip unwound and bent so the tips are between 4 to 5 millimeters apart. Normal two-point discrimination is about 4 to 5 millimeters, meaning that most people with normal sensation can tell the difference between one point and two points only when the two points are 4 to 5 mm apart (with two points separated by 3 mm or less, most people with normal sensation think that two points are actually one). Severe carpal tunnel syndrome can cause a patient's two-point discrimination to be greater than 10 mm.

Muscle strength is also tested. Most of the thenar muscles (the group of muscles near the base of your thumb in your palm) are supplied by the median nerve. With a long history of compression to the nerve, these muscles may get weak and become atrophied (get smaller). The physician will test your strength in these muscles by resisting thumb movement in certain directions and observing the muscles' actions.

When your physician suspects carpal tunnel syndrome, the next step to definitively make the diagnosis is performance of an EMG (electromyography) test. This is done by either a neurologist or a physiatrist (rehabilitation doctor). The EMG test uses very small electrodes along your upper extremity to record the impulses the nerves are sending along their path from the spinal cord. The EMG test is helpful to confirm the diagnosis of carpal tunnel syndrome, quantify its severity (according to the speed and strength of the nerve signal and response of the muscles innervated by the nerve) and make sure the nerve is not compressed somewhere else along its path (i.e., in the forearm or in the neck).

What Can Be Done About It?

Once the diagnosis of carpal tunnel syndrome is confirmed, the patient and physician can decide on a treatment plan. The type of treatment depends largely on the severity of symptoms. Patients who have long-standing numbness that is constant, weakness of the muscles supplied by the median nerve and severe compression on the EMG test should strongly consider surgical intervention early. If the nerve has been compressed for too long a time, the numbness in the fingers may not come back, but surgery makes sure it will not get worse.

Patients with mild to moderate carpal tunnel syndrome (occasional numbness, no atrophy, two-point discrimination only slightly elevated) may benefit from nonoperative treatment. Nonoperative treatment consists of wearing a brace or splint at night and during periods of heavy activity. Wearing a splint at night on the wrist prevents it from going into extreme flexion or extension and compressing the nerve. With relief on the nerve just at night, the symptoms may go away or become more tolerable. Antiinflammatories are sometimes used as well, either by mouth or through an injection into the carpal tunnel, though a steroid injection is usually only done a single time. While the symptoms of carpal tunnel syndrome may get better with nonoperative treatment, especially if only mild, patients often have more frequent and more intense numbness that affects their daily lives over the years. At this point, they are considered candidates for operative treatment. After surgery, the pain associated with the numbness and nighttime awakenings goes away rather quickly, while the numbness takes longer to resolve depending on its severity.

Surgical treatment for carpal tunnel syndrome is called "carpal tunnel release." This involves cutting the transverse carpal ligament that is the roof of the carpal tunnel. Once this ligament is released, the space in the carpal tunnel is increased, and the nerve is less likely to be constricted by surrounding structures. The release is performed either by open or endoscopic methods. An open carpal tunnel release is done through an incision about one inch long in the palm of your hand in line with your fingers. Endoscopic is done through one or two transverse incisions where a small camera is inserted to view the contents of the carpal tunnel and cut the ligament.

The surgeons at The CORE Institute perform open carpal tunnel release because we like to have a full view of the nerve and the structures in the hand and wrist. The operation is performed on an outpatient basis in the hospital or at an ambulatory surgical center. Various types of sedative and local anesthetics are used according to your surgeon's and anesthesiologist's preference to make you relaxed and to make sure you have no pain during the operation. After the skin incision in the palm, the surgeon identifies the transverse carpal ligament and cuts it completely, always protecting the median nerve underneath. Skin sutures are used to close the wound, and either a soft bandage or a splint is applied to the wrist. The procedure generally takes no more than 20 minutes. After surgery, the patient is permitted to move the fingers and thumb freely. The only important restriction is not getting the incision wet for the first seven to 10 days. Patients are free to return to work as early as a few days after the operation if they have the type of job that permits it.

Summary

You might have carpal tunnel syndrome if you have numbness and pain in your hand, specifically the thumb, index and middle fingers. The feeling of your hand falling asleep at night and waking you up is the most classic symptom. Identification and treatment of carpal tunnel syndrome early in its course will prevent irreversible numbness and weakness of the muscles. Operative treatment of carpal tunnel syndrome is quick and minimally disabling and is supported by years of excellent outcomes.

Frank J. Raia, MD, is a specialist in hand and upper-extremity surgery. He has been lauded for his numerous publications and presentations on operative hand treatments given to the international medical community.

CORE Physician Assistants: Playing an Integral Role in Orthopedic Healthcare

by Jennifer Speer

What Is a Physician Assistant?
A physician assistant (PA) is a healthcare provider who is licensed to practice medicine under the direct supervision of a physician. At The CORE Institute, each PA spends a majority of his or her time with one physician. This allows for a team approach when it comes to patient care. The physician-PA model at The CORE Institute allows for comprehensive and thorough care of the patient.

In the scope of practice of a PA, each provider can conduct physical exams, diagnose and treat illnesses, order and interpret tests, counsel patients on prevention, assist in surgery and write prescriptions for various medications. A typical day for a PA at The CORE Institute starts off early in the morning visiting patients at local hospitals, also known as "morning rounds." During rounds, each inpatient is examined and evaluated by the PA, and any necessary changes in the course of treatment are made. When done with rounding, the PA then heads to the clinic or to the operating room. In the clinic, the PA can see new or established patients and provide care that is within his or her scope of practice. In the operating room, the PA acts as a first assistant. In this capacity, the PA can prep and drape the surgical patients, provide exposure for the surgical site via retraction, close surgical wounds and apply appropriate dressings.

How Was the Physician Assistant Profession Started?
In the 1960s, there was a shortage of primary care physicians in America. Dr. Eugene Stead of Duke University noticed this shortage and organized a group of Navy corpsmen to become the first class of physician assistants in 1965. He elected to use corpsmen because they had already received a large amount of medical training during their time in the Vietnam War. The curriculum that he developed at Duke was based on his own experience fast-tracking physician education programs during the World War I era. Today, this current medical-based model is still used to train physician assistants.

What Type of Education Does a Person Need to Become a Physician Assistant?
Like other healthcare professionals, a physician assistant is required to attend an educational program that is accredited by a governing body. The accreditation body for physician assistant programs is the Accreditation Review Commission on Education for Physician Assistants (ARC-PA). There are currently 140 accredited programs in the nation. Each program must continuously meet standards set forth by the ARC-PA and undergo site reviews to maintain its accreditation.

The content of each program is based on the medical model of education that complements physician training. A typical program is approximately 26 months long. During the first year, the physician assistant student is in the didactic phase. During this period, the student spends his or her time in the classroom. The student then moves on to the clinical phase of the program, in which he or she has clinical rotations. During these rotations, the student is out in the medical field shadowing either a physician or physician assistant in various specialties of medicine. In clinicals, the student is given the opportunity to practice his or her evaluation and diagnostic skills.

Once formal schooling is completed, a student must take a national exam in order to enter into practice as a PA. The examination is developed and governed by the National Commission on Certification of Physician Assistants (NCCPA). When an individual passes the examination, he or she becomes "certified." When certified, the credentialing initials change from PA to PA-C.

What Do You Have to Do to Maintain Your Credentials as a Physician Assistant?
All physician assistants must maintain their certification status by performing two key items. The first requirement is to log 100 hours of continuing medical education every two years. There are various ways to obtain these hours, with the most common way being conference or lecture attendance at those that provide continuing medical education credit. The American Academy of Physician Assistants (AAPA) provides a yearly conference for physician assistants. The AAPA is the professional society that represents the physician assistant profession nationally.

The second requirement is to pass a recertification exam every six years. The exam is given by the NCCPA and must be taken and passed every six years as long as one is practicing as a physician assistant.

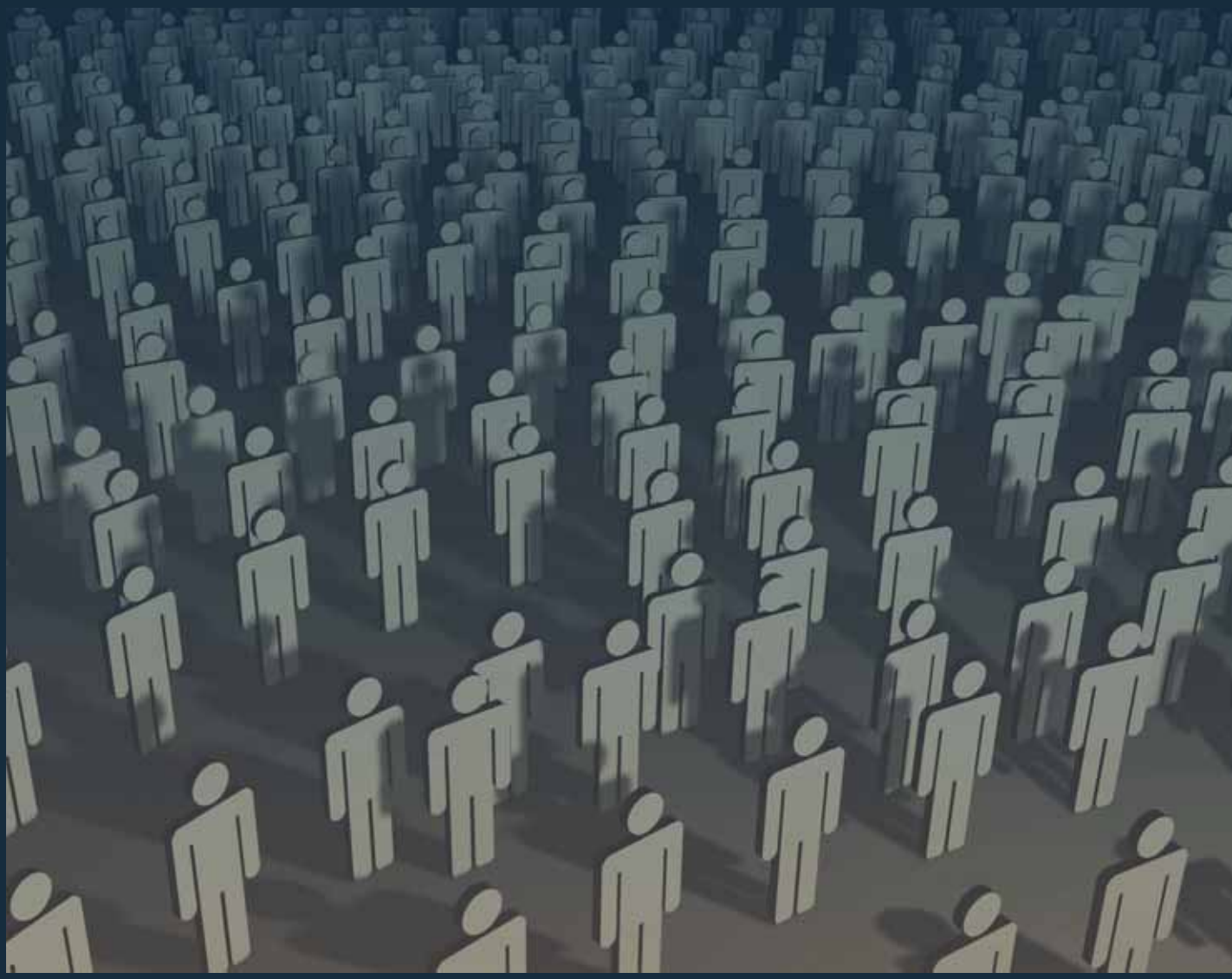
A physician assistant must also continue to meet state guidelines. Each state sets forth its own legislature that a PA must follow. In Arizona, the requirement for a physician assistant is to log 20 hours of continuing medical education and renew a state license annually.

What Can a Physician Assistant Do for Me During My Appointment with Him or Her at The CORE Institute?
A patient should feel comfortable with seeing a physician assistant. As a highly trained healthcare provider, the PA can perform an examination, order and interpret appropriate studies and then provide a patient with an array of appropriate treatment options. Treatments that are typically ordered and rendered by the PA include physical therapy, injections such as cortisone or viscosupplementation, bracing/splinting or prescription of medications. If it is felt that surgical intervention is necessary, a PA can discuss the surgical procedure and recovery with the patient. The patient would then be referred to the appropriate physician who would perform the procedure. If at any time the patient or the physician assistant feels that the complexity of the case requires attention by a physician, an appropriate referral would also be made.

To learn more about the dynamic physician assistant team at The CORE Institute, you can log onto our Web site at www.thecoreinstitute.com and read each PA's biography, research and experience.

To learn more about the physician assistant profession, you can also visit the American Academy of Physician Assistants' Web site at www.aapa.org.

Jennifer Speer is a certified physician assistant with an extensive background in orthopedics. Her training accolades include Certified Athletic Trainer (NATABOC), Fellow of the American Academy of Physician Assistants, and Fellow of Physician Assistants in Orthopedic Surgery.



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The Arizona Sports Medicine Society – Providing Education in Our Community

by John Kearney, MD

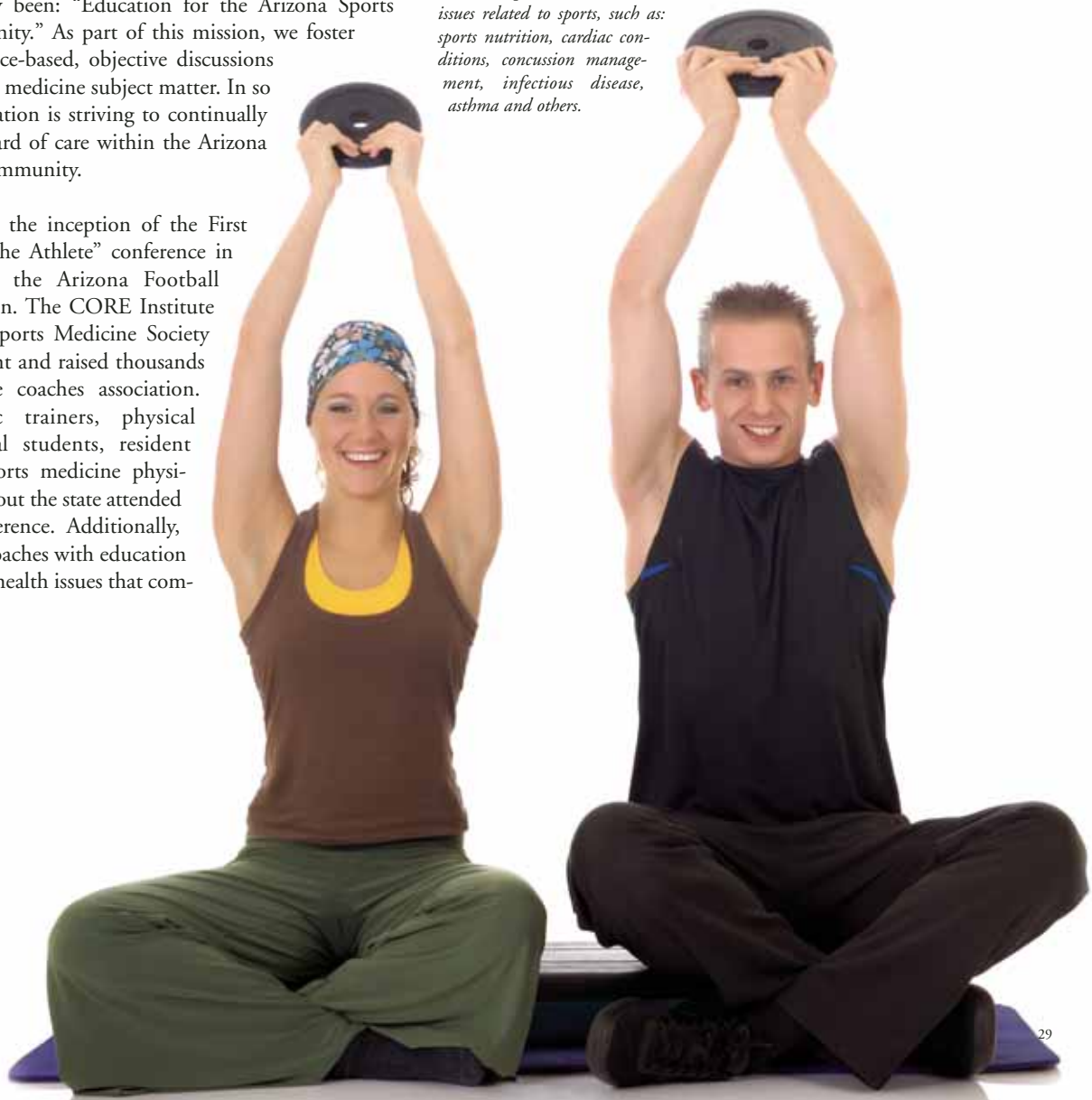
March 20, 2007, will go down in history as an important day within the Arizona sports medicine community. On this day, the inaugural meeting of the fledgling Arizona Sports Medicine Society was held. Since that time, our efforts have grown to include providing free continuing professional education credits to hundreds of certified athletic trainers, physical therapists and sports medicine physicians within our state. While the first year has certainly been a success for all involved, we have by no means accomplished our goal of reaching out to the entire sports medicine community in our state.

Since the beginning, the mission of the Arizona Sports Medicine Society has simply been: "Education for the Arizona Sports Medicine Community." As part of this mission, we foster non-biased, evidence-based, objective discussions on pertinent sports medicine subject matter. In so doing, the organization is striving to continually improve the standard of care within the Arizona sports medicine community.

Last year also saw the inception of the First Annual "Care of the Athlete" conference in conjunction with the Arizona Football Coaches Association. The CORE Institute and the Arizona Sports Medicine Society sponsored this event and raised thousands of dollars for the coaches association. Certified athletic trainers, physical therapists, medical students, resident physicians and sports medicine physicians from throughout the state attended this one-day conference. Additionally, we also provided coaches with education about injuries and health issues that commonly arise in their athletes so that coaches, training staff members and athletes can better achieve their goals of learning the lifelong lessons that high school sports can offer. Based on the success of last year, we have expanded our efforts to include other sponsoring institutions this year, including a strong presence from our local medical schools and other orthopedic groups within the state.

Moving forward, the society is excited for the many opportunities that lie ahead. We look forward to offering more services to the hardworking professionals that help us all stay active and "stay in the game." Their services are greatly appreciated.

John Kearney, MD, is a specialist in non-operative, rehabilitative and medical aspects of sports medicine. He is highly skilled in non-surgical rehabilitative options, treatments, and principles for most musculoskeletal injuries. Dr. Kearney is also experienced in medical issues related to sports, such as: sports nutrition, cardiac conditions, concussion management, infectious disease, asthma and others.



by Mali R. Schantz-Feld

A mixture of football and soccer, Rugby has survived controversy and changes during its 200-year history.

It has been reported that, in 1823, during a soccer game at the Rugby School in England, student William Webb Ellis picked up the ball and ran with it. Whether this act was predicated upon creativity or insolence, some people thought that was a pretty good idea — and rugby was invented. Others contend that the legend surrounding Ellis was fabricated to provide good press for the Rugby School. Although Ellis did attend the school during that fateful time, the first reference to Ellis reportedly appeared in a Rugby School magazine in 1875, four years after Ellis's death, by an author who was trying to refute claims that rugby was an ancient game. The controversy thickens when research shows that handling the ball was permitted in soccer (or "football" in England) in the early 1800s, before Ellis's tenure at Rugby, when players were allowed to take a mark and a free kick.

Whether or not William got his kicks by altering the game, the sport is now played by male and female teams in 100 countries and has been a pastime of such recognizable names as former President Bill Clinton, and the late Pope John Paul II.

The Basics

The basic game involves 15 players, generally divided into eight forwards and seven backs.

The object of the game is to score as many points as possible by carrying, passing, kicking and grounding an oval ball in the scoring zone at the in-goal area at the far end of the field.

There are two basic rules: players may not pass the ball forward, and players may not touch the ball while it is in play if it was last touched behind them nearer to their own goals or by players on their own teams. The ball may be kicked forward but not passed forward, and players may not receive the ball in an offside position or wait in an offside position. Play only stops when a "try" is scored (a try is when the ball touches the ground at the opponent's goal line), when the ball goes out of play, or if an infringement occurs. When the ball goes out, it is thrown back in at a "line-out," where opposing "forwards" line up and jump for the ball.

A game usually lasts for 80 minutes and is divided into 40-minute halves with no time-outs. Seven substitutions are permitted during a match in addition to injury replacements, but injured players may not return once they leave the game.

The game usually begins with a place-kick and is continued by a scrummage, or scrum, in which the forwards of each team pack together with their arms across each other's shoulders and their heads down. These forwards push against the forwards of the opposing team while attempting to hook the ball backward with their feet to the back called the scrum half. When the scrum half gets the ball, he can either run with the ball until downed or immediately pass the ball to his teammates.

The Object of the Game

Teammates try to advance the ball forward across the opponent's goal line, and if it touches the ground at the goal, it is a "try" and worth five points. After scoring a try, a team can take a conversion kick from anywhere on a line perpendicular to the goal line at the point where the ball was touched down. If the kick propels the ball over the crossbar and between the uprights, the team is awarded two additional points.

Punishment for a minor infringement is usually a scrummage. For a serious infringement or foul, the referee may award a penalty kick that could result in a three-point score. One referee and two judges oversee the game. The appointed captain of the team is the only person allowed to communicate with the referee.

Players are not allowed to address the referee unless they are called upon. Rugby players' uniforms consist of long-sleeved collared cotton shirts and mid-thigh-length cotton shorts. They do not wear any padding except for a mouth guard.

Knee-length socks with turnover tops are worn along with shoes similar to soccer cleats. An optional piece of clothing is the scrum cap, made of leather or cloth and worn by some forwards for ear protection.

The grass field for playing rugby cannot exceed 110 yards (100 meters), and the width cannot exceed 75 yards (69 meters). Each try zone cannot exceed 25 yards (22 meters) long. A five-yard alley runs along the length of the field for the out-of-bounds area, known in rugby as the "off-the-touch line." The standard size of the ball is 11 inches in length and 24 inches in circumference at the center.

In many ways, rugby appears similar to American football; however, differences exist. No one with possession of the ball is allowed to move downfield ahead of the ball, and running interference or blocking is prohibited.

A New Game in the Making

Rugby's governing body, the International Rugby Football Board (IRFB) located in Dublin, Ireland, is responsible for deciding international matters such as laws of the game and the amateur status of the players. In the United States, there are more than 1,400 rugby clubs and more than 100,000 players governed by USA Rugby, based in Colorado Springs, Colorado.

Some controversies have spawned different types of rugby. The Rugby Union and the Rugby League are two separate entities that split over the issue of paying players. The Rugby Union stayed a strictly amateur organization, and the Rugby League has a professional edge. The rift resulted in Rugby League teams having 13 players, with two substitutions permitted, and the Rugby Union teams having 15 players and no substitutions except for injury. Also, league play stops after every tackle and does not use lineout to restart play after the ball goes out.

Some alterations in the game changed rugby's goals. In the 1880s in the United States, the scrum was replaced by a line of scrimmage. In 1905, after photographs of a harsh game between Swarthmore and Philadelphia created an uproar, President Theodore Roosevelt insisted on reforms to lower the brutality or else he would consider abolishing the game. As a result, in 1906, the forward pass and the game of American football were kicked off in the States.

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