Active Bones
Orthopaedic Surgery and Sports Medicine Teaching and Research Foundation Newsletter
otrfund.org
Spring/Summer 2019

Dear Readers:

My grandmother used to say "if you rest, you rust." It wasn't until I was older that I understood what she meant. Our bodies need to keep moving and when we hibernate like a lot of us did during this past winter, it is important we don't start moving this spring without gradually getting our muscles, joints, tendons and heart into shape so we don't unintentionally injure ourselves. One area to pay particular attention to is making sure to warm up and stretch your hamstrings. We've included an article on hamstring injuries to help ensure you don't strain one, or worse.

This spring marks a major milestone for hundreds of Illinois high school lacrosse athletes who as of the 2018-2019 school year are now sanctioned under the Illinois High School Association and will hold their first state finals just down the road from my office. We decided to take a closer look in this issue at the sport, its history and common injuries encountered so participants can work to avoid them. Through my foundation, we also have an in-season conditioning program specific to lacrosse to improve performance and prevent injuries.

As the warmer temperatures arrive, coats, hats, gloves and boots get replaced with shorts, tees and flip flops. It is the latter that we look at in this issue because of the potential injuries that can develop from wearing them because you are essentially going barefoot—something to seriously consider before buying a new pair. The physical therapy community joins me in suggesting you consider a shoe with more structure, support and protection so you can enjoy the warmer weather and prevent possible injury to your feet.

Last, but not least, I want to take an opportunity to update you on the use of biologics that are being hyped as a cure for a host of musculoskeletal ailments. In my opinion there may be a place for them in the future but right now there just isn't enough research and evidence to support their use.

Steven Chudik, MD
President OTRF
Orthopaedic Surgeon and Sports Medicine Physician

Biologics: PRP and "Stem" Cells

by Dr. Steven Chudik

During the past decade, there has been a lot of excitement regarding the use of "biologics" such as growth factors and stem cells and their claimed ability to cure almost any musculoskeletal (bone, tendon, muscle or joint) condition. There are anecdotal stories about famous athletes with sprained joints, torn tendons, and damaged cartilage travelling to special clinics or doctors to receive injections of platelet rich plasma (PRP), stem cells or now even amniotic fluid. There are many reports crediting these injections for allowing athletes and other patients to return to their activities more quickly than traditional treatments alone. Unfortunately, many companies that sell these biologics provide misinformation through direct-to-consumer marketing about these largely unproven "biologic" treatments.

Despite the growing publicity, popularity and use, there are many unanswered questions and a lack of proof that biologic treatments actually work. The composition and bioactivity are variable and the mechanism of action is unknown. Biologics require more study and should include a minimum of reported information for the consumer just as packaged food labels provide the ingredients and the amounts of nutrients.

What is PRP?

Blood consists of fluid called plasma and solid components including red blood cells, white blood cells, platelets and other circulating proteins. The platelets are most known for their role in clotting blood to stop active bleeding. To initiate a cascade of events in the healing process, they contain hundreds of small proteins called growth factors which are released from platelets during bleeding from injuries.

PRP is created by drawing a sample of blood from a patient and placing it in a centrifuge apparatus which spins the blood to help separate the platelets from the blood. The separated component of plasma concentrated with platelets is obtained, placed in a syringe and injected back into the patient at the desired injury site. There are different methods of preparation that result in either less platelets and less white blood cells and others that have more platelets, but also more white blood cells. The blood drawing and PRP injection procedure can be performed in the office and is often repeated multiple times (up to three) at one-week intervals. Alternatively, surgeons may also choose to perform the blood draw and PRP injection procedure in the operating room and inject the PRP at the surgical repair site. It is not known exactly how PRP works but theoretically, by injecting more platelets to release more platelet-derived growth factor around healing tissues, doctors hope it stimulates a stronger healing response to repair tissues faster and stronger.

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PRP

Continued from page 1

What conditions are treated with PRP?

Research is currently being conducted to evaluate the effectiveness of PRP treatment. Reviews of the literature reveal a need for better research and at this time, the results of these studies are inconclusive. There are many factors that can influence the effectiveness of PRP treatment including:

- The composition of the PRP, different in different patients and with different types of preparation
- The type of injury or condition treated
- The overall health of the patient
- Whether the injury is acute (such as from a fall) or degenerative (an injury developing over time)

Common applications, uses for PRP

Chronic tendon injuries

- According to the research studies currently reported, PRP is potentially most effective in the treatment of chronic tendon injuries of the elbow, particularly lateral epicondylitis or tennis elbow.
- PRP for other chronic tendon injuries such as chronic Achilles or patellar tendinosis at the knee (jumper's knee) has not shown to be more effective than traditional treatment.

Acute ligament, muscle injuries

- PRP injections have received much publicity regarding the treatment of acute sports injuries, such as ligament and muscle injuries. PRP has been used to treat professional athletes with common sports injuries like pulled (sprained) hamstring muscles in the thigh and knee sprains. However, there is no definitive scientific evidence PRP therapy improves the healing process in these types of injuries.

Surgery

- PRP has also been used during surgery to help tissues heal, particularly in shoulder surgery to repair torn rotator cuff tendons. However, the studies show little or no benefit when PRP is used in these types of surgical procedures.
- PRP has also been used in surgery to repair torn knee ligaments, particularly the anterior cruciate ligament (ACL). At this time, there appears to be little or no benefit from using PRP during ACL surgery.

Knee Arthritis

PRP has been injected into the arthritic knee. It is still too soon to determine whether PRP injections are any more effective than current treatment methods.

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PRP

Continued from page 2

Fractures

PRP has also been used in a limited way to attempt to speed up the healing of broken bones. It has not shown any significant benefit so far.

Is PRP effective? The jury is still out

Current research studies do not support the extraordinary claims made in the media about the effectiveness of PRP. Although PRP may appear to have some effect on pain in the treatment of chronic tendon injuries about the elbow, more scientific studies without bias are needed to determine whether PRP therapy actually works.

What are "STEM" cells, or rather what is cell therapy?

Consensus recommendations from the 2018 American Academy of Orthopaedic Surgeons/ National Institute of Health (NIH) U-13 Conference opined that the minimally manipulated autologous cell preparations (a patient's own cells drawn for reinjection) should more accurately be referred to as "cell therapy" rather than "stem" cells. True stem cells have unique characteristics that are not met by these cell therapies being widely marketed in the United States. As defined by the NIH, "Stem cells differ from other kinds of cells in the body. All stem cells have three general properties: they are capable of dividing and renewing themselves for long periods; they are unspecialized; and they can give rise to specialized cells" such as muscle, tendon, bone, or cartilage cells. Virtually all of the current cell therapies offered in the United States for orthopaedic conditions involve the transplantation of adult cells obtained through harvest and minimal preparation of native tissues like blood, bone marrow and fat. These preparations contain stem cells, but they are the least abundant cell type. Depending on the tissue from which it was harvested, only one-in-one-thousand to one-in-one -million cells harvested from healthy tissues are actually stem cells capable of differentiating into one or more connective tissues such as bone, cartilage and fat in the right environment. The efficacy of cell therapies also is dependent upon the cell source, processing technique and setting in which they are applied. Theoretically, the harvested and re-injected cells could migrate to an injury site and differentiate into the desired cells to promote healing. But in reality, there is currently a lack of studies proving these injected cell therapies actually work and practically, it does not seem plausible that an injection of cells (containing a minimum of actual stem cells) into an osteoarthritic joint can adhere to the worn out bone surfaces in the joint and regenerate a new layer of the complex cartilage tissue in such a mechanically challenging environment.

In conclusion

Biologics like PRP and cell therapy may play a big role in the future with healing of acute and chronic musculoskeletal injuries and conditions. Unfortunately, the process is still in its infancy and scientific research on the use and effectiveness of PRP and cell therapy for orthopaedic injuries and surgeries does not support widespread clinical use to suggest orthopaedic surgeons abandon other current standards of treatment

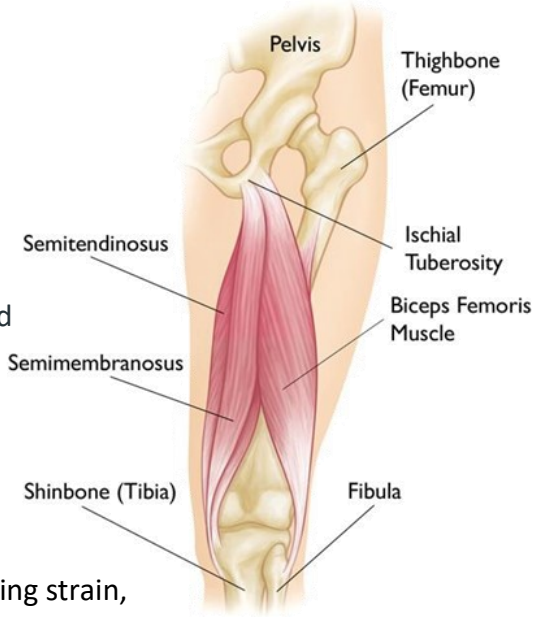
Hamstring injuries are a pain in the butt

by James Wolf, PT, DPT

Strained (pulled) hamstrings are a common injury among both recreational and competitive athletes participating in sports that require repetitive sprinting activities. Because a mild strain can sideline an athlete for at least two weeks and re-injury rates are high, it is important to properly manage this injury so it does not become a chronic or recurrent issue.

The hamstring is comprised of a group of muscles including:

- Semitendinosus
- Semimembranosus
- Biceps femoris



They originate from the ischial tuberosity of the pelvis beneath the gluteus medius muscle (buttock) and run down the back of the thigh to cross the knee joint and insert to bones in the leg below the knee. The hamstring muscle fibers attach the bones on both ends through their tendons composed of tough collagen. The hamstring muscles function to allow the knee to flex (bend) and extend (straighten) the hip.

Previous injury is the greatest risk factor for another hamstring strain, and re-injury rates are reported to occur 30 percent to as high as 60 to 70 percent in some studies. The most common mechanism for athletes to strain their hamstring muscle is while sprinting or kicking. As the leg swings forward rapidly with kicking or sprinting, the hamstring fires eccentrically to slow your leg down at the end of the stride or kicking movement. Powerful eccentric contraction of the hamstring muscle typically results in strain (tearing) at the muscle tendon junction with limited separation, bleeding and inflammation at the site. Several factors can make you more susceptible to this injury including inadequate warm-up, cold weather, muscle fatigue, poor flexibility and poor body mechanics. The other way people hurt their hamstring is overstretching it as the result of a fall. Overstretch injuries are less common but frequently more severe and may result in proximal avulsion (pulling off) of the hamstring tendons from the ischial bone of the pelvis.

When a hamstring is strained, you typically feel an immediate pain and sensation of tightness in the back of your thigh generally just below the buttock, but may extend down the leg or even behind the knee. Bruising, a large area of tenderness, limping while walking, or prolonged weakness suggest a more severe injury. “PRICE,” which stands for Protection, Rest, Ice, Compression and Elevation, is the first step to managing any hamstring strain. Hamstring strains at the muscle-tendon

Continued on next page

Hamstring injuries

Continued from page 1

junction respond well to simple, nonsurgical treatments. You should not stretch the injured muscle for the first six days and avoid intentionally heating it for three days. As with any injury, if it does not improve within a week, or if any of the symptoms worsen, you should be examined by an experienced medical professional. Proximal hamstring avulsions from the pelvic bone often require surgery within a few weeks. Delays in a diagnosis can result in retraction of the muscle, inability to primarily repair the tendon and permanent pain and hamstring dysfunction that prohibits running.

There are other nonsurgical methods that have been tried but are not supported by quality research. If you watch the news or follow injury reports on professional athletes, you certainly will hear about a variety of alternative treatment options used on professional athletes. These include steroid injections and platelet-rich plasma (PRP) injections. Steroid injections typically are not recommended and are controversial. It is not clear that PRP injections are of benefit in terms of faster return to play or to reduce the risk of re-injury. Other nonsurgical treatments including low-intensity, pulsed ultrasound, therapeutic laser and extracorporeal shockwave treatment are modalities that also are not supported by evidence-based research. The key to recovery is an accurate and timely diagnosis followed by proper treatment and physical therapy.

For hamstring muscle tendon strains, complete rehabilitation and careful progression through the three phases of rehab are crucial to reduce your risk of re-injury and ensure you fully recover before returning to running or sports. These phases consist of:

- **Phase 1**
  Focuses on protecting the injury and minimizing muscle atrophy. It can include activities like stationary bike, planks, bridges, and single leg balance. You must work in this first phase until you can walk and jog slowly without pain in addition to regaining 50 percent isometric strength.
- **Phase 2**
  Focuses on regaining strength throughout the entire range of motion. This phase includes activities like side shuffles, bridge walkouts, lunges, and single leg deadlifts. Progression to Phase 3 can occur once you are able to jog at a moderate speed pain-free and demonstrate full isometric strength.
- **Phase 3**
  Involves more dynamic activities and mimics sporting movement. Eccentric strength, which is controlled lengthening of a muscle, is a critical component of this final phase before returning to sports. Return to sports can be considered once you have full strength, full range of motion, no pain, and less than 10 percent difference in side-to-side hamstring strength.

Whether you have had a previous hamstring strain or not, the best thing you can do is try to prevent this disabling injury. In addition to a proper dynamic warm up prior to participating in running or sporting activities, hamstring stretching and eccentric hamstring strengthening have been proven to reduce the risk of a hamstring strain. Careful progression of eccentric strengthening with exercises such as the kneeling Nordic hamstring exercise (see next page) can help reduce the

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Hamstring injuries

Continued from page 2

risk for injury as compared to a standard strengthening program. This is a very challenging exercise and an appropriate progression typically involves two sets of five repetitions the first week, then slowly progresses to three sets of eight repetitions by the fourth week. **HOWEVER, performing this exercise in-season without sufficient pre-conditioning and time to recover (*more than two days) before t*he next competition, practice, etc., may over train the hamstrings and predispose them to injury.**

If you are looking to stay healthy and reduce your risk of injury (or re-injury) as you return to your favorite sport this spring, take care of your hamstring so that you can enjoy your activity all season.

Kneeling Nordic Hamstring*

Repetitions	Sets	Rest Time	Days per Week
5	2	1 minute	1



1. Begin in a kneeling position as shown above.
2. Have a partner hold both of your ankles firmly on the ground.
3. Place both your arms in front of your chest and slowly begin to lower your body to the ground. Do not allow yourself to drop. Lowering should be slow and controlled.
4. Keep your back straight and avoid bending at the waist.
5. **<u>USE YOUR ARMS TO PUSH YOURSELF BACK INTO THE STARTING POSITION.</u>**
6. Repeat exercise to complete repetition recommendations above.

Based on his research and expertise, Dr. Steven Chudik and his health performance team specially designed an in-season strength and conditioning program to help prevent ACL and hamstring injuries. It is simple but sufficiently efficient to fit into the regular season practice schedule. Incorporating plyometrics, agility, single leg strength, core and flexibility exercises into regular practice, better prepares athletes to compete at their best and helps minimize the risk for injury. Download a copy of this in-season program at: *http://www.otrfund.org/sports-performance-programs/.*

Girls, boys lacrosse moves from an emerging sport to fully sanctioned by IHSA

by Kurt Gengenbacher, PT, DPT, OCS, SCS

Photo by *DebWaltonPhotography.com*

The Illinois High School Association (IHSA) added boys and girls lacrosse as an official high school sport starting in the 2018-19 school year, and the inaugural state finals tournament will be hosted at Hinsdale Central High School from May 31 to June 2. The excitement is mounting as this sport has been growing in popularity in recent years. According to the IHSA, the sport had been on their "radar" for a number of years but it was more a matter of schools being able to grant field space for practice and games without overcrowding the existing spring sports. There also was the issue of cost.

During the first season under IHSA sanctioning, there will be 78 boys teams and 59 girls teams competing. Although the sport has become increasingly popular during the past 10 years in the Midwest, the sport actually dates back in America to around 1636 when a Jesuit missionary first documented the game. However, other documentation on the rules or strategy is nonexistent. Historians agree, though, the sport got its name from French settlers when they used the name for "a curved stick." Native Americans reportedly called the game "little brother of war" as it was played only by men. It wasn't until 1890 when girls in Scotland were introduced to the game. Eventually, it made its way back to the United States in 1926 where women learned to play in school. Since then, participation by both women and men has continued to grow along with affiliations to the National Collegiate Athletic Association (NCAA), the International Federation of Women's Lacrosse Association (IFWLA), the International Lacrosse Federation (IFL) and the Olympics. According to USA Lacrosse, more than 750,000 people in the United States played lacrosse last year.

Because the rules for boys and girls lacrosse differ, each has its own unique demands and can put stress on different parts of the body accordingly. Boys play with considerably more contact than girls. Because of this, they wear shoulder pads and full helmets and the game can look very similar to ice hockey. This increase in contact leads to a different set of likely injuries. In the boys game, the primary mechanism of injury is contact between two players and the primary injuries generally occur to the lower body and head. The most common injuries are ankle

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IHSA lacrosse

Continued from page 1

sprains and concussions, respectively. The most common fracture location is to hands or forearm due to stick-to-body contact. It is important to note that in recent years there has been a decrease in injuries. Some attribute injury rate decline to improvements in equipment and changes in rules.

The most significant difference between boys and girls lacrosse is that there is no physical contact allowed in girls lacrosse. Consequently, there is considerably less safety equipment with only an eye guard and mouth guard required. Although contact rules differ, knee and ankle sprains are common to both and also result in a longer recovery time. The most well-known knee sprain is an anterior cruciate ligament (ACL) tear which typically requires surgery and a minimum of four to six months rehabilitation. Proper training has been proven to reduce the incidence of ACL sprains (tears). Additionally, thorough warm-ups with good strength and conditioning can significantly reduce the risk for muscular strains that also can occur.

Dr. Steven Chudik gives a shout-out to all the lacrosse high school athletes and their opportunity to participate in this newly IHSA-recognized sport. In response, he and the Orthopaedic Surgery and Sports Medicine Teaching and Research Foundation (OTRF) have developed an in-season conditioning program for lacrosse to help improve performance and prevent injuries. Visit the OTRF website and download the program at *http://www.otrfund.org/sports-performance-programs/.*

Richmond Hill, Ontario, Canada, “Young Canadians” lacrosse team circa 1885.

A flip flop by any name, shape or style is an accident waiting to happen

by Chris Carlson PT, MPT

Spring is finally here! After a long winter, we love to finally open the windows, put away the coats and air out the house. There also are a lot of people who wear different footwear once the warmer weather arrives. Snow boots are put away and their gym shoes come out of hibernation. However, people also bring out their flip flops. Flip flops are a physical therapist's nightmare.

I'm not referring to a structured sandal. A sandal with a supportive arch and multiple anchor points around the foot to keep the sandal securely on the foot works just fine. What I am referring to is the flip flop. It is basically a sole with small piece of rubber, leather, or plastic that runs between the big and second toes and across the forefoot to attempt to hold the sole in place. With most flip flops, you have to curl your toes to keep it on when you step and it is very easy to lose and fall off especially, if one attempts to run.

As you can see in the picture above, a typical flip flop is simply little more than a foam pad with rubber straps to hold the foot in place and often lacks arch support. And, despite the strap, the foot may not land on the pad correctly causing a possible fall or injury.

Without proper ankle and foot support, the ankle and foot are much more susceptible to injuries like sprains and strains. It is not uncommon for the foot to slide off the pad and to roll the ankle resulting in a painful ligamentous sprain or muscle strain. Another concern is developing plantar fasciitis or posterior tibial tendonitis. Additionally, prolonged walking and repetitively curling the toes to help keep the flip flop in place may result in fatigue of the very small, intrinsic foot muscles. With the open style of the flip flop, the foot also is more susceptible to toe and foot injuries such as lacerations and fractures from accidentally kicking something or from a heavy object falling on the unprotected foot.

Bottom line, save yourself a lot of trouble and leave this type of footwear for pools and showers rather than all-day footwear!

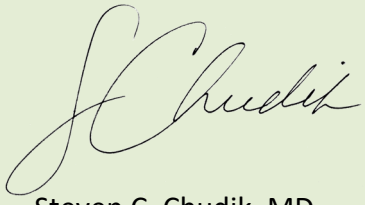
Orthopaedic Surgery and Sports Medicine Teaching and Research Foundation helps people stay fit and healthy

Steven Chudik, orthopaedic surgeon and sports medicine physician with the Steven Chudik Shoulder, Knee & Sports Medicine Injury Clinic, founded the Orthopaedic Surgery and Sports Medicine Teaching and Research Foundation (OTRF) in 2007. OTRF is a nonprofit, 501 (c)(3) organization dedicated to funding research and education for the purpose of keeping people active and healthy.

Dr. Chudik saw a growing demand by patients, athletic trainers and clinicians for up-to-date medical information and unbiased research on injury prevention—especially for children—as well as facts on arthritis and wear and tear on joints, cartilage, tendons, ligaments, etc. To fulfill these requests, OTRF produces and distributes this newsletter, shares information about health performance-related issues like nutrition and fitness, hosts athletic training educational programs, conducts seminars for healthcare providers and the community. Most important, OTRF funds unbiased research and development particularly in emerging areas such as arthroscopic and minimally invasive surgery for injuries to the meniscus, labrum, rotator cuff, ACL and cartilage.

However, none of this is possible without ongoing financial support. We are extremely grateful to all those who have contributed in the past. Many of the donations came from patients or their family members who benefited from Dr. Chudik's orthopaedic and sports medicine expertise. If you might be interested in helping us continue our educational programs and research, please visit our website, ***otrfund.org*** and click on the donation link. Or, if you prefer, email me at **contactus@chudikmd.com/**. Also, many companies sponsor programs that match their employees' charitable contributions. Some even match donations made by retirees and/or spouses. Matching gift programs are a great way to double your generosity. Regardless of the amount, every contribution helps make a difference to countless numbers of people helped by OTRF education and research.

Thank you for your interest in our newsletter, ***Active Bones***, and the ongoing work of OTRF.



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Monday Evenings

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Don't miss another issue of ***Active Bones***, an email newsletter from OTRF. Each issue contains information to help you stay healthy and live an active life with tips on injury prevention, sports conditioning, research and newsmakers.

Simply email us at: ***contactus@chudikmd.com*** to receive the next issue of ***Active Bones***.

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