

otrfund.org

Winter 2021/2022

Dear Readers:

Last year when I wrote my message for this newsletter, I was optimistic and hoped the COVID-19 pandemic would be under control. Thankfully vaccinations are helping, but as a surgeon and team physician, COVID remains a concern. With vaccinations now available for virtually everyone, my hope for the new year is that we're back to normal and COVID is at last controlled. I miss seeing everyone's face.

In this issue of *Active Bones*, we 're looking at what's up with all the hamstring injuries that seem to be increasing in nearly every sport. Hardly a week has gone by where one or more professional athlete hasn't been sidelined with a hamstring injury. Unfortunately, injury prevention measures for the hamstring muscle group haven't been developed like other injuries such as ACLs. However, the National Football League recently announced new initiatives the organization is funding to hopefully produce credible solutions. Meanwhile, we decided to review the research and recommendations from sports medicine physicians, athletic trainers and physical therapists on hamstring injury prevention and management.

I am honored to share with you a significant achievement for OTRF and me. I'll let you read about our accomplishment and not spoil it for you.

We've included some interesting new studies in our Research Roundup segment you may want to try. I've been told by many people this is your favorite feature so we are going to make an effort to include more of these articles in future issues.

Thank you for reading Active Bones.

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







The hamstring is comprised of three muscles—the biceps femoris (long and short heads), the semitendinosus, and the semimembranosus. All but the short head of the biceps originate on the lateral ischial

What's up with all the hamstring injuries in sports?

For decades, sports medicine physicians, coaches, athletic trainers and researchers have been trying to prevent hamstring injuries. Yet despite their efforts, they remain the most common injury for missed playing time by professional football players and baseball players. In the National Football League (NFL), hamstring injuries comprise 75 percent of the reason for a player on the disabled list. In Major League Baseball (MLB), hamstring injuries reached an all-time high this year up 193 percent compared to the same time in 2019, and that was just through May. Some have speculated that downtime because of COVID-19 is a major contributor, but hamstring injuries are not a new phenomenon. In fact, in July the NFL Scientific Advisory Board provided the University of Wisconsin with a four-year, \$4 million award to study the prevention and treatment of hamstring injuries for elite football players. The award is part of the League's multi-year effort to better understand and prevent lower extremity injuries including hamstrings.

"At the League, we recognize the significant burden hamstring injuries have on our elite athletes year after year and have dedicated resources to analyzing the

occurrence and type to lower extremity injuries to better identify ways we can further reduce them," said Dr. Allen Sills, NFL Chief Medical Officer.

Lead researcher at the University of Wisconsin believes it will take a study of unprecedented size and scope to truly understand and reduce hamstring injuries. "Thanks to the NFL's commitment and funding, our multi-disciplinary team of researchers can now undertake an innovative, data-driven approach to this study and assist sports medicine clinician in advancing strategies for injury prevention and interventions to return athletes to sport quickly and with reduced risk for re-injury," he said.

The NFL-funded research is not the first to look into hamstring injuries in professional athletes. Researchers at Henry Ford Hospital in Detroit published their findings in 2019 from prospective

Continued on page 2



Hamstring injuries

Continued from page 1

data on hamstring injury trends in major and minor league baseball in the *Orthopaedic Journal of Sports Medicine* journal. Every MLB and minor league (MiLB) team's injury data was recorded in the MBL Injury Tracking System from 2011 through 2016.

During that seven year period, the researchers found there were 2,633 hamstring strains in professional baseball with 441 occurring in the MLB and 2,192 in the MiLB. This represents a marked increase in the MLB from one injury every 39 games



in 2011 to one injury every 30 games in 2016. In the MiLB it equates to one injury every 35 games in 2011 compared with one injury in 30 games in 2016. Of the 2,633 injuries, 1,986 (74 percent) were partial hamstring tears, 624 (23.7 percent) hamstring strains and 23 (0.9 percent) were complete tears. The researchers also noted that 72 MLB and 311 MiLB hamstring injuries were recurrent, 15 MLB and 85 MiLB injuries were season ending while nine MLB and 11 MiLB injuries required surgery.

Other notable findings researchers learned was that April and May accounted for 40 percent of all MLB hamstring injuries compared with other months. Infielders suffered the most injuries with pitchers leading the list at 457 and base running, specifically to first base, was cited as the reason for other position player injuries.

The remaining item the researchers reported was time lost as a result of hamstring injuries. According to their findings, a mean of 14.5 days were missed. Overall, one-half of the hamstring strains in both the MLB and MiLB resulted in more than seven days of time lost and 71 MLB and 22 MiLB players missed more than 30 days.

Although the data in the study pinpointed areas of concern with regard to an increase in hamstring injuries, the researchers noted that much more needs to be studied including location and temperature, as well as data from spring training which wasn't part of their study possibly reflecting an underreporting of recurrent injuries. It also did not provide enough data to help determine injury prevention recommendations.

While the research studies cited in this article examined hamstring injuries in football and baseball, hamstring injuries also are a significant contributor to lost playing time in soccer,

Continued on page 3



Hamstring injuries

Continued from page 2

track, basketball, rugby and lacrosse. Countless research has been done on athletes in these sports without arriving at a consensus for a cause or treatment

In the July 1992 issue of the *Journal of Orthopaedic Sports Physical Therapy*, researchers reviewed clinical and animal research literature concerning the role of strength, flexibility, warm-up and fatigue in hamstring muscle injuries and presented an evaluation and rehabilitation suggestions to help prevent hamstring muscle injuries.

The authors recommendations based on their findings include:

Preseason and rehabilitation screening

During preseason screening and rehabilitation following hamstring muscle injury, clinicians should consider the influence of hamstring strength, flexibility, warm-up and fatigue on muscle performance noting more research concerning these factors is needed.

Muscle strength

Imbalance may be a factor contributing to hamstring injuries. Hamstring muscles are subjected to high forces during both open and closed kinetic chain activities of sprinting. Since the ability of connective and muscle tissue to absorb force is directly proportional to both passive and active components, it is logical that a stronger hamstring muscle group can absorb greater forces. However, the inability of research to consistently demonstrate a significant relationship between hamstring strength and injury may be due to methodological differences or confounding variable. Therefore, further research clarifying the relationship of hamstring strength to hamstring muscle injury is needed. Specifically, prospective research comparing hamstring and quadriceps concentric and eccentric strength indices to one another and to body weight measures is needed.

• Flexibility

Several studies investigated the relationship between hamstring flexibility and hamstring injury both supporting correlation and dismissing any association. However, the authors noted multiple instances that a less flexible extremity existed prior to hamstring injury and also observed evidence of inflammation and adhesion that occur following hamstring muscle injury. Furthermore, calcification within the hamstring muscles following muscle strain has been documented on C.A.T. scans (computed tomography) leading to the thought that loss of hamstring flexibility is "a possible sequelae to hamstring muscle injury." Therefore, the importance of hamstring flexibility in recovery after a hamstring injury can't be overemphasized.

Continued on next page



• Warm-up

Not surprising the authors found numerous studies where athletes most often suffered a hamstring injury early in practice often when sufficient warm-up was not done. Additionally, lab tests on rabbits demonstrated that a preconditioned (exercised) muscle required significantly more force to failure than the muscles that were not exercised. Therefore, the authors concluded a warm-up period prior to participation may prevent injury to the musculotendinous unit by increasing its elasticity and force absorption capability.

• Fatigue

The authors also found athletes suffered hamstring injuries late in a game because of muscle fatigue. The role of muscle fatigue and injury is extremely difficult to study in the field so researchers using an animal model were able to test the role of muscle fatigue and eccentric muscle contraction in muscle injury. The anterior tibialis muscle was electrically stimulated under isometric, concentric, and eccentric contractions (1,800 contractions over 30 minutes). The authors reported tears in myofibrils only in the eccentric exercised group. During the fatigue protocol, the authors reported no significant muscle injury occurred in the concentric or isometric exercised groups. The damage seen to the muscles was similar to that seen in human muscles following exhaustive eccentric contraction leading the authors to suggest further research is needed concerning fatigue and hamstring muscle injury in athletes.

• Prevention Recommendations

- A comprehensive approach should be used and incorporated into preseason screening and evaluation procedures.
- Measure and maintain hamstring strength and flexibility.
- Traditional hamstring stretching exercise of bringing the head/chin toward the knee in a seated or standing position was found to be inadequate. Clinicians need to teach good flexibility/warm-up activities and monitor whatever exercise is used to ensure hamstring length improves.
- Any protocol that addresses hamstring rehabilitation should consider the dynamic role of the hamstring muscle group during sprinting, high speed isokinetic concentric and eccentric protocols, stretching performed before and after activity, and that a warm-up period of functional activities prior to maximal sport activities is recommended.
- Avoid over training and fatiguing the hamstring muscles prior to competitions.



OTRF Clinical Athletic Training Program receives accreditation



The Orthopaedic Surgery and Sports Medicine Teaching and Research Foundation (OTRF) founded by Dr. Steven Chudik in 2002 received accreditation for its post-professional clinical residency program for athletic trainers, an accomplishment only a handful of other programs nationwide have achieved.

According to Dr. Chudik, the accreditation process requires several years of documentation and demonstration of educational measurements and benchmarks with didactic and clinical components. "To say I am thrilled to have achieved

this goal would be an understatement," said Dr. Chudik. "Every athletic trainer who participated in the OTRF program can take pride in this accomplishment and their contributions," he added.

The CAATE also is responsible for accreditation of baccalaureate and post-baccalaureate degrees that lead to the eligibility of sitting for the Board of Certification (BOC) examination which is required to practice as an athletic trainer. There are more than 350 of these programs nationwide.

The OTRF Clinical Athletic Trainer Program is a 13-month paid residency that prepares athletic trainers for careers in clinical orthopaedic settings. "Our program allows certified athletic trainers to expand their education, improve their clinical evaluation skills, first assist in the operating room, increase their knowledge as allied healthcare professionals and make an immediate impact to an orthopaedic practice," Dr. Chudik explained. "During the CAATE accreditation visit the committee shared the OTRF program provided a number of original educational elements they want to consider including in requirements for all programs," he added.

Applications for the OTRF Clinical Athletic Training Program will be accepted for 2022-2023 from December 1, 2021 to March 1, 2022. For additional information visit *https://www.OTRFund.org/* and to learn more about the athletic trainer experience visit *https://www.youtube.com/watch?v=OdkpqVTmP2I/* to watch a video overview of the program.

Research Roundup

Order matters when it comes to cardio, strength exercise routine



With winter not far off many of us are thinking about moving our workout routines back inside. However, this year you may want to change things up a bit to get the most out of your weight training. According to the American Council on Exercise, the order in which you do cardio and strength training exercises can impact your fitness goals. To help you determine how to build your routine, the Council offered these tips:

- If your goal is build endurance, do cardio exercises first.
- If your goal is burning fat and losing weight, do strength training first.
- If you want to get stronger, do strength training first.
- On upper-body strength training days, it doesn't matter which you do first.
- On lower-body strength training days, lifts weights first.
- If your goal is just general fitness, do either first, but maybe start with the one you like least.

Don't drink for a energy boost. Climb some stairs

Many people rely on caffeine for a morning or afternoon energy boost. However, researchers at the University of Georgia found a slow to moderate walk up and down stairs for ten minutes provides more energy than 50 milligrams of caffeine—about the same amount in a can of soda.

The study published in the journal *Physiology and Behavior*, followed female university students who slept less than 45 hours per week (about six-and-a-half hours a night). The students were divided into three groups—stair walkers, one 50 mg caffeine pill per day and the control group who took a placebo once a day. Results showed taking the stairs energized the women better than the caffeine.

The researchers acknowledged that using exercise as a method to boost energy was not a new idea and is supported by other research, but rather an idea of conveniently incorporating exercise into a workday in order to improve focus and motivation.

The study also referenced research supporting caffeine's benefits although it's also been found more than moderate amounts (approximately 300mg, or one to two cups of coffee) tend not to help, and in fact, can be detrimental to your performance.

So, the next time you're tired and need pick-me-up, hit the stairs, not the coffee machine.





Orthopaedic Surgery & Sports Medicine Teaching & Research Foundation

1010 Executive Court, Suite 250, Westmont, IL 60559

Sports Medicine Injury Clinic

Monday Evenings

Call 630-324-0402 for an appointment

Sign Up Today!

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



chudikmd.com to receive the next issue of *Active Bones*.

OTRF Board of Directors Steven C. Chudik, MD, SSC Blair Ciecko Kurt Gengenbacher, PT, DPT, OCS, SCS John McClary, CPA

Brent Smith, MS, ATC Keith Tesch, CSCS, CNT Lark Welch, MS, ATC, CSCS

> **Publisher** Dr. Steven Chudik

1010 Executive Court, Suite 250 Westmont, IL 60559 Email: contactus@chudikmd.com

www.otrfund.org

© 2021 Orthopaedic Surgery and Sports Medicine and Research Foundation. All rights reserved.