

Active Bones

Orthopaedic Surgery and Sports Medicine
Teaching and Research Foundation Newsletter



otrfund.org

Fall/Winter 2022

Dear Readers:

Now that students are back in school even while we still battle Covid and its variants, I've noticed athletes are working hard to get into shape after missing past playing seasons or participating in shortened seasons. With that in mind, this issue focuses on getting and keeping athletes in shape and injury-free.

On page two, we look at the importance of not playing through pain and why many athletes choose to despite possibly making their injury worse. New research discovered the reasons and rationale that make it clear coaches, parents, physicians and schools have an important role to help prevent this detrimental mindset from developing

This season's National Football League training camp and pre-season previewed a new initiative called the Guardian Cap® to help reduce head injuries. Colleges and universities also tested the cap. It is too early for a consensus on whether all football teams—youth through professional—will continue to use it in the future. Initial feedback is mixed but research results show the Cap significantly helps. Read more about the Guardian Cap in our feature article on page four.

In Research Roundup, we feature new research on lab-made cartilage that has the future potential to be “a silver bullet” for those with failing joints. Fingers crossed as the human testing that is set to begin will provide the data we all want to see. Another new development is a device I recently patented. It is a glenoid implant for shoulder replacement surgery with replaceable articulating portions that is described further on page three.

Thank you for reading **Active Bones**.

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



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Research shows playing through pain is a learned behavior that starts at a very young age

Shake it off. Tough it out. It's nothing. You're fine. No pain, no gain. Get up, you are scaring your mother!

How many times have you heard those words or something similar in your lifetime? Probably every time you scraped your knee, got a "boo-boo" or even needed a stitch. After all, kids will be kids and encouraging them to endure some pain and adversity is appropriate in many situations.



According to Dr. Steven Chudik, orthopaedic surgeon and sports medicine physician for many area high schools and clubs, pain is a "warning" message sent to the brain by nerve endings called nociceptors that respond to tissue injury. "It's our body's way of telling us we've been injured," he explained. "Therefore, pain should not be ignored and athletes should not continue to play when they are experiencing pain," Dr. Chudik added and forewarned that "continuing to play through pain will typically make an injury worse, take longer to recover, and become more serious which may permanently affect an athlete's ability to return to sport."

Researchers from the University of Calgary, Alberta, Canada, surveyed 275 university students who participated in sports at different levels to understand if they choose to participate while injured and investigated what other factors influenced their decisions. They discovered more athletes than you'd think play through pain and for several reasons including:

- **Sports ethic** describes a culture where "real athletes" must make sacrifices for the game, strive for distinction, accept risks including playing through pain and refusing to accept limits in their pursuit of future playing possibilities.
- **Athletic identity** describes why athletes are more likely to "tough it out" and continue to play even when it can cause physical injury because they are not willing to stop and potentially lose their athletic identity.
- **Culture of risk** explains how athletes are conditioned to accept risk, pain and injury and believe in the importance of playing while injured and playing through pain. This culture is encouraged when the athletic community takes away a starting position or mocks an injured athlete who removes themselves from a game or competition and rewards and praises others who continue play through pain and injury.

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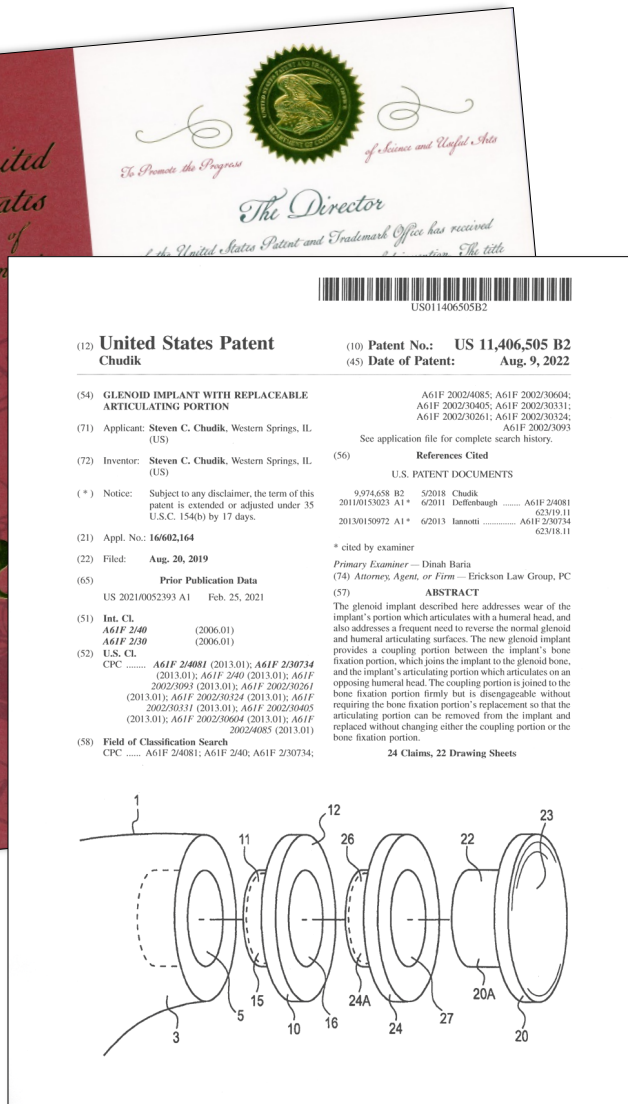
Shoulder surgery pioneer, Dr. Steven Chudik, awarded seventh patent

The United States Patent and Trademark Office granted Dr. Steven Chudik with the Shoulder, Knee & Sports Medicine Injury Clinic, Westmont, Western Springs and Downers Grove, Ill., a seventh patent; US 11,406,505 B2, for a Glenoid Implant with Replaceable Articulating Portion.

Dr. Chudik's implant design addresses three of the biggest limitations with shoulder arthroplasty (shoulder replacement)—wear, loosening of the glenoid (shoulder socket) implant, and rotator cuff failure. His glenoid implant design allows for a long lasting fixation to the glenoid bone. It also has exchangeable parts to address glenoid wear and permit conversion to a reverse shoulder replacement if the rotator cuff wears out.

"This patent represents an exciting innovation that has the potential to dramatically improve the limitations of current shoulder replacement implants," Dr. Chudik explained.

Plaques of Dr. Steven Chudik's six earlier patents, left, are on display in his Westmont, Ill. clinic.



Don't play with pain

Continued from page 2

Additionally, the research revealed a majority, approximately 70 percent of athletes, were willing to play while injured across all levels and all types of sports. Demographically, more women than men were willing to play injured and athletes with a coach or trainer played more compared to those without.



“The willingness of athletes to play through pain is influenced by different members of the athletic community such as coaches, officials, teammates, parents, and the sponsoring institutions,” Dr. Chudik explained. “Additionally, multiple studies confirm that once the sports ethic is fully internalized, it becomes difficult to implement successful strategies for injury reduction/prevention unless we are able to reach them at an early age,” he added.

So how can that be accomplished? From an orthopaedic specialist's point of view, Dr. Chudik recommended several ideas such as:

- Spread the word that playing through pain results in worsening of injuries and delays in diagnosis and treatment which compromises recovery, health and return to sport.
- Understand how sport ethics, athletic identity, culture of risk, and the influence of others encourage athletes to play through pain and risk their health and ability to play sports.
- Develop strategies to prevent this indoctrination into a culture where playing with pain is acceptable.
- Recognize that the influence of all those involved from coaches, officials, teammates, parents, professionals, sponsoring institutions and the media begins during early childhood development and support future research to help determine when the sports ethic is internalized.
- Send a clear and better message of health over competition with our words and our actions, particularly at school where children first begin to interact with their peers in various forms of competition.

Guardian Caps debut in NFL training camps, preseason

Perhaps you are just hearing about the National Football League's (NFL) latest player safety initiative—the Guardian Cap®—a removeable cap that fits over football helmets to help reduce head injuries.

Approved in March by the League, all offensive linemen, defensive linemen, tight ends, and linebackers were required to wear the Guardian Cap during training camp and to the second preseason game. According to Dr. Allen Sills, the NFL's chief medical officer, the decision was made to evaluate the Guardian Cap during training camp when hits to the head typically are greater in number because of drills versus an actual game. In a release by the NFL, this is not the first time the cap has been worn, but was the first time it was mandated for key player positions.



Resembling what many refer to as a "turtle shell," the Guardian Cap® is a removeable covering that attaches to football helmets to help reduce head injuries.

The Guardian Cap was developed in 2010 by Erin and Lee Hanson, owners of The Hanson Group LLC, to address the clear need to advance the standard football helmet. They utilized their more than 20 years in the material science business to engineer, patent, and manufacture the Guardian Cap.

Based on NFL laboratory research, the Guardian Cap reduced head trauma by at least ten percent if worn by one player, but as much as 20 percent when both players wear the Cap. Dr. Sills shared early preseason results that wearing the Guardian Cap made a significant difference for player's health and safety.

"The position groups required to wear Guardian Cap saw a reduction of more than 50 percent in concussions versus a previous three-year average," Dr. Sills explained. "These results are great news, but we know our work doesn't stop here. We'll continue to collaborate with manufacturers, medical and engineering experts to keep improving our protective equipment and advance player safety," he added.

However, not all players and coaches agree to the inconsistent use.

Arizona Cardinal's defensive lineman J.J. Watt said in a news report he disagrees with the use only in practice games "So let's keep it safe sometimes," he questioned

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Guardian Caps

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Similarly, New York Jets head coach Robert Saleh voiced concerns. “I do think because of the soft blow, it’s kind of leading the players to use their heads a little bit more. Anybody who has played football knows the first time you take your helmet off or you hit with the helmet or you have a collision, there’s a shock,” he explained. “What exactly are we trying to accomplish using them only in practice?” he asked.



According to Dr. Sills, “Everything is on the table in terms of the potential future use of the caps further into the preseason or during practices in the regular season. We will continue to compile data and match it with feedback, as well as information from sensor and video data for a more comprehensive look at the outcomes before deciding,” he added.

“The Guardian Cap is an interesting concept and will be of benefit especially in the youth leagues with children and their developing brains,” said Dr. Steven Chudik with the Shoulder, Knee and Sports Medicine Injury Clinic in Westmont, Western Springs and Downers Grove, Ill. “However, with a safer helmet, it is still imperative to teach kids proper tackling techniques to avoid not only head injuries, but also neck injuries which are associated from hitting with the head,” he cautioned.

Exercise program helps prevent youth sports injuries

Whether you're the parent, coach or lucky to have both titles, as adults it is our job to make sure these budding athletes learn proper technique, and build muscle and strength throughout the season to help prevent injuries and damage to their growth plates.

However, young athletes do not have the same capacity to build muscle mass and strength as older athletes. Therefore, it is important to use age-appropriate exercises. The Orthopaedic Surgery & Sports Medicine Teaching & Research Foundation (OTRF), developed a general exercise program consisting of warm-up, finishing and conditioning exercises that can be used for all youth sports. For a PDF of this program go to <https://www.otrfund.org/sports-performance-programs/> and select the Youth Fitness program. OTRF also has many other sports performance programs available on that page you can download.



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Incorporate an easy, fun exercise program into youth sports to help prevent injuries

More than 3.5 million youth (ages 14 and younger) receive medical treatment for sports injuries each year. The Center for Disease Control estimates about one-half of these injuries are preventable. Since children's bodies are still growing, they are more susceptible to injury. They even can damage their growth plates and affect their growth process. As adults, it is our job to help prevent youth injury by teaching proper technique and building muscle strength throughout the in-season. With proper warm-up, finishing and conditioning exercises, we can help prevent injuries and keep our children healthy and active.



Young athletes do not have the same capacity to build muscle mass and strength as older athletes, but warm-up, finishing and conditioning exercises can improve overall performance and decrease the risk for injury. Even the youngest athletes can benefit from exercises before practices and competitions to dynamically warm up the different muscle groups in preparation for strenuous activity. A regular schedule of finishing and conditioning exercises following practice and games can maintain strength, balance, agility, core strength and conditioning while in-season and decrease the risk of injury.

Additionally, most youth sports are coached by parents whose knowledge and experience with exercise physiology, strength or conditioning is limited, so they welcome some direction on in-season conditioning activities. Therefore, Dr. Steven Chudik, orthopaedic surgeon, sports medicine physician and founder of the Orthopaedic Surgery and Sports Medicine Teaching and Research Foundation (OTRF), along with Larana Stropus, MS, ATC, and Keith Tesch, CSCS, OTRF, developed a general exercise program consisting of warm-up, finishing and conditioning exercises designed to be used for all youth sports.

This in-season program consists of a 15-minute warm-up with 14 exercises to be done before every practice and game. They are easy for youngsters to understand and allows them to learn proper body position and technique. It is important they do these exercises to warm-up each muscle group and get the blood flowing throughout the body. This warm-up allows the body to prepare for the strenuous activity that accompanies practicing and playing and helps prevent an injury. The program also includes five finishing exercises to be done after practice and games for conditioning. These help athletes of all ages build strength and have fun in the process. Studies show that often times older athletes' injuries are due to micro-injuries that occurred when they younger. With this exercise program, we can work to prevent those micro-injuries, along with more serious injuries and keep young athletes healthy and in the game.

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Research Roundup

Lab-made knee cartilage could be key to treating knee pain and stiffness

Photo courtesy of Duke University



More than 850 million people suffer from the progressive wear and tear of cartilage known as osteoarthritis. Until now, modified activities, oral pain medications, injections and knee replacements were the only options. However, researchers recently announced the development of a gel-based knee cartilage substitute, hydrogel, which is stronger and more durable than the real thing.

According to their report published in the *Journal of Advanced Functional Materials*, this new hydrogel is made with water-absorbing polymers that can be pressed and pulled with more force

than natural cartilage, and is three times more resistant to wear and tear. The research team has previously made hydrogels, but this one is the first one they feel is strong enough for knees that absorb the force of two to three times a person's body weight with each step.

"It's really off the charts in terms of hydrogel strength," the researchers reported. "Natural cartilage can withstand 5,800 to 8,500 pounds per inch of tugging and squishing, respectively, before reaching its breaking point. This new hydrogel is 26 percent stronger than natural cartilage in tension—the equivalent of suspending seven grand pianos from a key ring and 66 percent stronger in compression which equates to parking a car on a postage stamp," they explained.

To create this new hydrogel, the team took thin sheets of cellulose fibers and infused them with a polymer called polyvinyl alcohol—a viscous substance consisting of stringy chains of repeating molecules that forms a gel.

"The cellulose fibers act like collagen fibers in natural cartilage," a researcher explained. "They give the gel strength when stretched and the polyvinyl alcohol helps it return to its original shape. The result is a Jell-O®-like material that is 60 percent water that is supple yet surprisingly strong," he added. Currently, the implants made of the new hydrogel are being tested in sheep. "If everything goes according to plan, a clinical trial in humans could start in April 2023," said the lead researcher said.

"This could be an amazing scientific discovery" proclaimed Dr. Steven Chudik, orthopaedic surgeon and sports medicine specialist with the Shoulder, Knees and Sports Medicine Injury Clinic in Westmont, Western Spring and Downers Grove. "If this artificial cartilage replacement material is as durable as the biologic "real thing," it may be the solution we are looking for," he added.

With regards to the new hydrogel, Dr. Chudik explained there are other issues to consider including:

- Biocompatibility,
- Ability to shape it to reproduce the surface dimensions of our joints,
- Finding a safe way to implant it with minimal surgical morbidity,
- Obtaining long lasting durable, but possibly exchangeable fixation to the end of the bones in our joints.



Orthopaedic Surgery & Sports Medicine Teaching & Research Foundation

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Sports Medicine Injury Clinic

Monday
Evenings

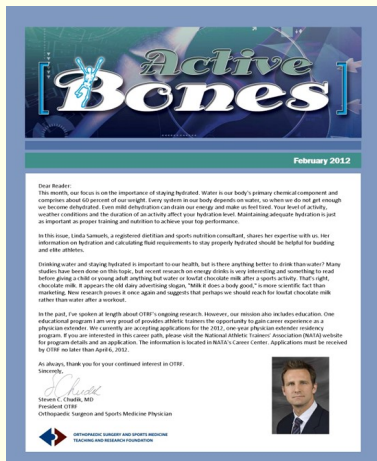
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for an appointment

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.

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