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New Treatment for ACL Repair?

By Kayleigh Sullivan, BS, and Brett D. Owens, MD

The anterior cruciate ligament (ACL) is an important stabilizing ligament in the knee joint that is commonly injured in athletes. Repair of the ACL has been attempted in the past with mixed results, primarily because this ligament does not always reliably heal. Since then, the orthopaedic community transitioned to reconstructing the ligament with a tendon graft to allow athletes to get back on the field. But what if the ACL could be reliably repaired with the help of some modern technology?

That is the question being asked by many researchers. Among them, Martha Murray, MD, from Boston Childrens' Hospital, who recently spearheaded a technique and product that allows for successful repair of a recently torn ACL. This technique is called the Bridge-Enhanced ACL repair (BEAR), which utilizes sutures and a special platform to promote ACL healing. The scaffold/platform is a special protein-enriched sponge that is placed in between the torn ends of the ACL. This sponge is injected with the patient's own blood, allowing a clot to form to begin the healing process. Using the stitches, the torn ends of the ACL can be drawn into the sponge and can reconnect to establish new, healed tissue. This tissue replaces the sponge over a period of 6–8 weeks. The early results of this technique are promising, however this work is still in the experimental phase undergoing FDA testing. The current trials are being performed at select centers by a small group of surgeons and patients can only get this treatment if they consent to being part of a clinical trial.

While this work is exciting and may someday change the way we fix the ACL-torn knee, the current standard of treatment is ACL reconstruction. This is one of the most common orthopaedic surgical procedures and its results are reliable. Only time and continued research efforts will tell if ACL repair offers similar reliability for athletes.

Stress Fractures in Basketball

By Grant Jones, MD

Stress fractures are common injuries seen in both male and female basketball players. One study demonstrated that 7 percent of women's basketball players at the WNBA combine had sustained at least one stress fracture.

Stress fractures can result in a significant amount of lost sports participation time and can often be season ending and, occasionally, career ending.

Unlike traumatic/acute fractures, these fractures develop over time as a result of overuse. Stress fractures often develop with a sudden increase in activity after a period of inactivity or decreased activity. Therefore, pre-training for events or gradual transition back to sport is recommended to help prevent these fractures. Stress fractures can also result from biomechanical abnormalities such as improper shoe wear; improper running, jumping, and landing techniques; the anatomy of the athlete; and inadequate muscle training. Evaluating these factors and the implementation of corrective measures by an athletic trainer, physical therapist, or personal trainer can be helpful for injury prevention.

Nutrition and general health can also play a role in the development of stress fractures. Basketball players, in particular, spend a lot of their training and practice time indoors, so they often do not get the adequate sunlight exposure needed to convert Vitamin D into its active form. Recent research has shown that players can be Vitamin D deficient which may lead to decreased bone density and a predisposition for fractures. Similarly, females with irregular or no menses and eating disorders can develop decreased bone density, again making them more likely to suffer from a stress fracture.

Stress fractures commonly involve the lower extremities in basketball players due to repetitive impact on a hard surface. Multiple types of stress fractures have been reported in basketball players, including fractures of the pelvis, hip, leg, knee, ankle, midfoot, and toes. A stress fracture of the weight bearing tibia bone of the leg is one of the most common types for basketball players. A player who develops a tibia stress fracture complains of a gradual onset of pain over the front, mid portion of the leg. This usually develops after a period of increased activity. An X-ray reveals the "dreaded black line" on the front part of the tibia bone.

Traditionally, treatment for this type of stress fracture has been a period of rest from activity, with the possible addition of a bone stimulator, for 3–6 months. Varying degrees of success for non-operative treatment have been reported in the literature from excellent results to high failure rates. Some physicians suggest being more aggressive in treating these injuries surgically with the insertion of a rod into the bone to take stress off of the fracture area. The surgery can be successful in curing the pain and healing the fracture, but it still may take the fracture up to 3–6 months to completely heal. There are also risks involved with this surgery, including knee and leg pain along with a non-healing fracture, and/or a complete fracture around the rod. The advantages and disadvantages of each treatment option should be thoroughly discussed with the team physician and orthopaedic surgeon before deciding on a course of treatment.

Basketball players spend a lot of time indoors, so they often do not get the adequate sunlight exposure needed to convert Vitamin D into its active form.

Are PRP injections a magic wand for fixing athletes?

By Lee Diehl, MD

We often joke that sports medicine is sometimes perceived as "sports magic" when it comes to helping athletes recover from injury or surgery more quickly. What if we could take some of your blood and inject it back into an area of injury—your muscle strain or arthritic joint—and bring about more rapid healing?

It is intriguing to think that such a minor procedure, which has minimal known risk and requires no hospitalization, could speed up or improve the natural healing process returning athletes to the activities they love. People are increasingly familiar with the term platelet-rich plasma (PRP), but what do we really know about it and how it works?

Platelet-Rich Plasma (PRP)

Human blood is made up of several components, including cells and plasma. The watery part of blood is called plasma and contains important proteins. Some of these proteins stick together to form a platform/scaffold during blood clotting. This gel or scaffold can then bridge the gap in damaged tissue to provide binding for other cells to stick to and ultimately support healing. Cells in blood include red cells that carry oxygen, white cells that fight infection, and platelets that help with blood clotting. Platelets clump together and work along with the other "scaffold" proteins in plasma to form blood clots after injury. During clot formation platelets release growth factors which stimulate many beneficial processes for healing.

Platelet-rich plasma is made by taking a sample of whole blood and spinning it in a centrifuge. The first spin separates the red blood cells from the plasma containing the platelets, white cells, and clotting factors. A second spin then separates out the white blood cells leaving behind plasma where the platelets are concentrated. This platelet-rich plasma, with all of its helpful growth factors, can then be injected to improve healing.

When we look at the evidence associated with using PRP the results are mixed. For instance it does seem to help reduce the pain from tennis elbow when compared to steroid injection, but has not proven to significantly help treat Achilles tendinitis. Similarly some studies have shown improvement with the symptoms of knee arthritis, but other studies have not shown a significant benefit.

The types and concentration of growth factors vary between people and between different blood draws in the same person. We don't really know which factors are the most important and we don't know if a single injection is enough, or if we need to do a series. Currently, there are few reported complications, but there may be more if usage becomes widespread. Finally, it's still considered experimental and not covered by most insurance plans, so people must pay out-of-pocket for the treatment.

The magic of using a person's own blood, which contains a wonderful abundance of growth factors, to help heal or speed up recovery, is an exciting prospect. Researchers have a lot of work to do to understand where and when PRP is most useful, and how to deliver it cost-effectively in order to realize all the theoretical benefits to enhance tissue healing.

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Keep Rowing Injuries at Bay

By Jonathan F. Dickens, MD, and Evan Lambert, BS

Rowing is a total-body exercise that improves cardiovascular health, muscular strength, and endurance. These gains are accomplished without high impact. Despite the low impact nature of rowing, injuries are frequent, especially in novice rowers who may overtrain or employ poor rowing technique. As with all exercise programs "too much, too soon, too fast" is a recipe for disaster and rowing is no exception. Overtraining can lead to a myriad of injuries and as rowing is a full body workout, these injuries can occur almost anywhere.

The most common rowing related injury is low-back pain. As rowers drive through each stroke, 225 pounds of force are exerted on the spine. These forces are increased by muscle fatigue, and as they get more tired they don't perform as well. Athletes can minimize their injury risks by keeping training periods to less than 30 minutes, strengthening their hip flexors and core muscles, and performing a regular stretching program.

A number of less common, but more severe and detrimental spinal injuries can result from rowing, including vertebra fractures, which can be extremely painful, but will typically improve with rest, muscular strengthening, and stretching. However, if this injury goes untreated the affected vertebra can slip forward ("spondylolisthesis"), which can compress the spinal cord and cause shooting pain or numbness down the legs. Herniated inter-vertebral discs result from similar mechanisms and present with similar signs and symptoms. If you feel pain in your back, it is important to be seen by a sports medicine professional for a proper diagnosis.

The ribs are also commonly injured during rowing. Muscles pull on the ribs with each stroke, which may cause the ribs to move and bend. This movement and bending can lead to stress fractures.

The forearms and wrists are also vulnerable to overtraining injuries often from inflammation of the tendons. Inflammation of the muscle and tendons can lead to significant levels of pain and difficulty with grip strength.

The vast majority of rowing related injuries respond to conservative treatments, including ice, non-steroidal anti-inflammatory drugs (NSAIDS, e.g., ibuprofen), and rest. The best treatment for an injury however is prevention. Proper form and workout periods of less than 30 minutes will allow athletes to obtain the cardiovascular and musculoskeletal benefits and mitigate their risk for injury. Remember, to start with low resistance on the equipment and build up gradually with time and training.

About AOSSM and *In Motion*

As a world leader in sports medicine education, the American Orthopaedic Society for Sports Medicine (AOSSM), we have designed the publication to highlight relevant information for multiple age groups from exercise and rehabilitation to nutrition and psychology.

This important educational tool is published quarterly and distributed electronically.

AOSSM members can add their practice name and logo to *In Motion*. Personalizing *In Motion* is an easy way to get pertinent, patient-friendly sports medicine information to your patients with just a click of a mouse. For more information, please e-mail Lisa Weisenberger at lisa@aossm.org or contact the Society at 847/292-4900.