

Active Bones

Orthopaedic Surgery and Sports Medicine
Teaching and Research Foundation Newsletter



otrfund.org

Winter 2016

Dear Reader:

For most of you reading this, you probably already are preparing to start winter activities and sports. With that in mind, we decided to look at two injuries; cartilage injuries in the knee common to basketball players, and ankle sprains which are a reoccurring nemesis for volleyball players. The insight into the causes, treatments and rehabilitation will help keep you or your athlete off the bench this winter.

For those heading out to the slopes to ski, snowboard or hike, we are including an article about activities in high altitudes and how to recognize altitude sickness, treatment and suggestions to help you avoid this very serious condition. Even if you routinely travel to higher altitudes, your body needs to adjust. So, before you spoil your long awaited trip, check out our article. It can help you enjoy your entire trip, not just the beauty of the mountains from the lodge window.

Typically we have several articles in Research Round-Up, but this issue we decided to focus on what's new in wearable technology. Recently, several research papers were presented about wearable technology, but both very different. One focused on the struggle to lose weight wearing a fitness monitor. The other looked into why people stopped using their fitness devices. In the end, both groups recommended the need for more research. One group also recommended that manufacturers need to do more for those choosing to use a fitness tracking device. I agree, but also think that regardless if you wear a device or not, the important thing is to perform a moderate exercise routine that you can safely maintain to help you stay active and fit especially during the long winter months.

Last, I haven't mentioned this for a while, but I want to thank those who have contributed to OTRF and support the education and research we're doing to improve people's lives and surgical procedures. I founded OTRF in 2007 as a nonprofit 501 (C)(3) organization to provide reliable, unbiased information on orthopaedic injuries, surgeries, rehabilitation and research. I'm proud to say we are making a difference in people's lives and surgery outcomes. If you'd like to learn how you can help change lives for the better and include OTRF in your charitable giving, please contact me or visit the OTRF website where you'll find more information about donation opportunities. Thank you in advance for any amount you might wish to contribute to help us continue our mission.

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

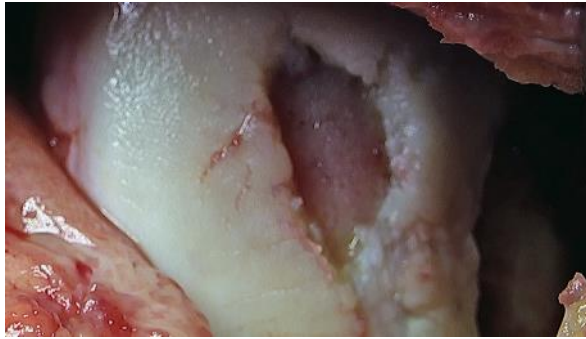


Glide, Not Grind: Cartilage Injuries in Basketball

by

Ronak M. Patel, MD, Hinsdale Orthopaedics

Cartilage is the smooth, white, shiny tissue on the surface of the end of our bones. It is at these surfaces where the bones articulate to form a joint; thus, the cartilage is specifically called articular cartilage. Some of the most important joints in our bodies are our knee



An arthroscopic view of an osteochondral injury to the medial femoral condyle of the knee. Top image shows the injury, preparation is occurring in the middle photo, and the bottom photo is after the osteochondral allograft transplant .

joints. The articular cartilage in our knees allows the bones to glide over each other with very little friction. However, with injury and/or normal natural degeneration, the cartilage can undergo wear and tear. Basketball players of all levels of competition put significant stress on their knees. Repetitive jumping, running, cutting and pivoting, particularly in sudden stop and go movements of basketball, can result in cartilage injury to the knee. Furthermore, in the setting of a torn ligament, cartilage injury is not uncommon in basketball players.

We grade cartilage injuries by the depth of the injury. Some cartilage injuries have no visible disruption, while other injuries are partial thickness and the most severe injuries are full thickness with exposed underlying bone. Unfortunately, articular cartilage does not have a blood supply and therefore does not have the ability to heal itself. However, not all cartilage injuries need treatment, but most cartilage injuries will increase in size with time. This is analogous to an untreated road pothole. You can repair the pothole, or do nothing and with time the pothole will continue to wear-and-tear and get bigger. Many small articular cartilage injuries do not cause pain or symptoms. A study done on professional basketball players demonstrated that nearly one-half had abnormal cartilage signal in their knees

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based on MRI testing, but did not have any pain or symptoms. Pain is usually the main symptom, but athletes also may present with swelling and mechanical symptoms of locking or catching inside their knees. Most patients with isolated cartilage injuries typically do not complain of instability.

Symptomatic cartilage injuries, or rather pain that can be attributed to cartilage injuries of the knee, can be treated initially with conservative management. This can be in the form of rest, icing, anti-inflammatories, steroid injections, gel type injections, PRP (platelet rich plasma) injections, stem cell injections and bracing. If conservative options fail, surgical techniques

are available to restore the articular cartilage surface and reduce pain. Focal or localized cartilage injuries are different from wide spread articular cartilage degeneration of the knee that is attributable to osteoarthritis. A full of evaluation is made to ensure that the overall alignment and integrity of the knee, as well as the femur and tibia bones, are normal. Furthermore, we make sure the surrounding ligaments and meniscus are intact. Also of importance is the underlying bone at the site of a cartilage injury. If the bone is damaged, then it too needs to be treated, as well as the cartilage, because the bone provides support for the cartilage. Bone and cartilage transplants can be done from either a cadaver graft, or from an insignificant area of the knee.

Traditional cartilage restoration techniques stimulate the underlying bone to create a healing response. This is known as abrasion arthroplasty, or microfracture, and it leads to the formation of a scar type of cartilage to fill the defect. It is not as robust or resilient as normal articular cartilage. This procedure typically is used for small cartilage lesions. Other cartilage restoration techniques are more technically demanding and recommended for larger injuries. There are many different types of procedures available depending on the size, location, degree and age of the injury. Additional procedures can be performed to correct alignment and restore ligament stability. If the underlying bone also is involved, bone and cartilage transplants can be done from either a cadaver graft, or from a less significant area of the athlete's knee. For pure cartilage injuries, a sample of the athlete's knee cartilage can be taken through an initial, simple arthroscopy and grown in a lab. The patient's own cells are then injected into the cartilage injury site. This procedure is called autologous chondrocyte implantation. Other techniques similar to this have grown in popularity, but rather than a patient's own cells they are composed of minced juvenile cartilage tissue.

Most cartilage procedures require six weeks of nonweightbearing to protect the repaired injury and four to six months of physical therapy. Recovery and return to basketball typically can take about one year. Typically, in-season injuries initially are treated conservatively, if possible. After failure of treatment, or in the off-season, cartilage restoration techniques can be attempted. Continued innovation and research in cartilage restoration have allowed us to treat basketball players and get them back to playing. Further research and advancement continues to help us better restore these injured cartilage surfaces.

High altitude activities: beware of altitude sickness

by

Chris Carlson, PT, MPT

Winter is here and with it comes many activities and sports. Snow skiing is among the most popular. According to the National Ski Areas Association, 15 million people in the U.S. hit the slopes annually. Although skiers may make plans to visit their favorite resort for the slopes and amenities,



many won't give much thought about participating in activities at high altitudes and what precautions they need to take to prevent injury and illness.

Altitude sickness has been reported at elevations as low as 800 feet above sea level. Chicago sits about 577 feet above sea level, but has seven buildings taller than 900 feet. The important thing to remember about exercising in a high altitude location is the higher you ascend, the more the barometric air pressure decreases and the amount of oxygen available to your body makes it more difficult to breathe. The top of Mount Everest, for

example, is 29,199 feet tall and only has 30 percent atmospheric pressure, therefore a decreased oxygen availability as compared to seal level.

Altitude sickness is the reaction your body has to a lower oxygen availability while at increased elevations. It requires you to breath more heavily and frequently to obtain sufficient oxygen. When you breath more, you breath out more carbon dioxide (CO₂) creating what is called a respiratory alkalosis and it takes time for our kidneys and bodies to metabolically adjust. This can have a physiological effect on a multitude of body organs and systems such as the cardiopulmonary system and nervous system. Not everyone has the same reaction and research is inconclusive why some people are more susceptible to altitude sickness than others. Therefore, it is important to monitor your own symptoms and adjust your activities accordingly.

Some of the more common mild signs and symptoms of altitude sickness include, but not limited to:

- Throbbing headache
- Decreased appetite
- Nausea and/or vomiting
- Weakness and fatigue
- Disturbed sleep and/or poor sleep
- Dizziness
- Confusion, disorientation
- Blue/gray lips or fingernails

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Symptoms of severe altitude sickness can include:

- Bubbling sound in the chest
- Worsening breathlessness
- Coughing up pink, frothy liquid
- Clumsiness and/or difficulty walking
- Confusion leading to unconsciousness

In rare cases, altitude sickness can cause fluid in your lungs or swelling of the brain. These are very serious conditions and require immediate medical attention.

Treatment

If you experience any of the previously mentioned symptoms, you should descend to an altitude of at least 1,640–3,280 feet, or lower than your present altitude. You can take acetaminophen (Tylenol) to help the headache, but DO NOT take sleeping pills or other central nervous system depressants for insomnia because they suppress breathing. If your symptoms don't subside, or continue to worsen, descend another 1,000 to 2,000 feet immediately and contact a medical professional for evaluation and treatment. Physicians may prescribe Acetazolamide (Diamox) to speed acclimatization, prochlorperazine (Compazine) for nausea, supplemental oxygen and even time in a hyperbaric chamber for significant cases of altitude sickness.



Prevention

Altitude sickness is preventable. Physical conditioning has no bearing on whether you can be affected. Your body needs time to adjust to high altitude and low oxygen. Avoiding intense physical exercise the first 24 hours is advisable. Other recommendations include:

- Check with your physician before traveling to make sure your heart and lungs can tolerate the altitude change. If you've experienced problems in the past, ask your physician for strategies to prevent or treat symptoms.
- Drink plenty of water and avoid alcoholic beverages and consume a high-carbohydrate diet.
- Consider carrying supplemental oxygen in case of an emergency, or for use if symptoms develop.
- If mountain climbing or hiking, ascend gradually with adequate stops to acclimate once you are higher than 8,000 feet above sea level.
- If altitude sickness develops, descend to a lower altitude.

If you engage in high elevation activities this winter, use common sense, monitor your body for signs or symptoms of altitude sickness and maintain good hydration. Don't ignore symptoms and seek medical attention early. Using good judgment and taking proper precautions will help ensure you and your traveling companions enjoy your winter activities.

Volleyball ankle injuries need “RICE”

by

James Wolf, PT, DPT

Inversion ankle sprains are the most common injury in volleyball. They often occur while landing from a jump on an opponent's foot, or taking a bad step while trying to change directions. Inversion ankle sprains involve the foot turning inwards relative to upper leg, sometimes rolling entirely over on the front and outside portion of the foot. Pain and swelling near the outside part of the ankle is the most frequent symptom. An inability to walk, pain further up the leg, severe tenderness to touch, or bruising may indicate a more serious ankle injury such as a fracture or high ankle sprain (syndesmotic injury) and requires medical evaluation by a physician.



After a simple, low-grade ankle sprain, the immediate treatment is “RICE” which is short for **Rest, Ice, Compression and Elevation**. This is most important for the first two to three days following an injury to reduce pain and swelling. The earlier you start RICE treatment, the better. Begin basic range of motion exercises—such as ankle circles—right away. The next phase of rehabilitation involve strengthening and balance training. The final steps of an ankle injury recovery includes slowly progressing back to running, jumping and cutting movements before returning to full sport participation. If symptoms persist or increase with attempted rehab or return to volleyball, return to your RICE treatment and consult a medical professional to be evaluated.

Unfortunately, recurrence of inversion ankle sprains are common in volleyball. However, proper rehabilitation that includes balance training has been proven to reduce risk of re-injury. Lace-up ankle braces have been shown to reduce re-injuries. Proper footwear and playing surface, as well as completing a thorough warm-up before playing, can help reduce your overall risk of ankle injury. If managed properly, most ankle injuries recover fairly quickly returning athletes to the sport in about one to three weeks with very few long-term issues.

Research Roundup

Wearable technology not a good “fit” for all

For several years, smart technology has allowed many people to track everything from physical activity to sleep and everything between. But, does this technology really help? Two recent studies evaluated the effectiveness of technology and what happens when we stop wearing the technology.

Researchers hypothesized wearable technology would be a better diet aid than standard behavioral weight loss intervention and discovered just the opposite. Their findings, published in the *Journal of the American Medical Association*, revealed that after tracking two groups for a two-year weight loss study, weight change varied greatly among the 471 adult participants. The group who wore fitness trackers (enhanced intervention group) lost an average of 7.7 lbs. compared to the 13 lbs. lost by those not wearing a tracker (standard intervention group). Both groups received standard tips about nutrition and physical activity. Both groups had significant improvements in body composition, fitness, physical activity and diet with no significant difference between groups.



According to the lead researcher, their study surprisingly demonstrated no advantage in wearing a fitness monitoring device to provide feedback on physical activity when compared to participants following standard behavioral weight loss approaches.

So, that raises the question whether should people bother with fitness trackers?

Researchers from the University of Washington sought to find an answer by studying 141 individuals who stopped using their Fitbit™ wristband monitors. The results surprised the research team.

“People felt guilty when they abandoned their health tracking devices,” explained the lead research author. “Half of the participants described feeling guilty about their lapsed use, and nearly all of those said they would like to return to activity tracking. About 15 percent said they perceived no value from tracking and found it annoying or struggled to connect the data to behavior change and three percent said they had learned enough. The remaining 32 percent reported mixed feelings.”

Researchers also found that lapsed users responded differently to seeing their old Fitbit data presented in new ways such as visualizations showing which days they were active or displayed their entire activity record. “Most people preferred social comparison that made them look better than their peers such as ‘you walked more than 70 percent of most people’ over the more negative statement of ‘30 percent of people walked more than you.’”

Based upon their findings, the researchers said more research needs to be done because the “one-size-fits-all design” approach misses opportunities to support different types of users and help them maintain and track their chosen physical activity.



Orthopaedic Surgery & Sports Medicine Teaching & Research Foundation

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