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# InMotion

A PUBLICATION OF THE AMERICAN ORTHOPAEDIC SOCIETY FOR SPORTS MEDICINE

SUMMER 2016



## Strong Hamstrings May Prevent Injury

By Alexander Golant, MD, and Kevin Jiang, MD

**H**amstrings are an important muscle group in the thigh, making your knees and hips function properly. They are heavily used in sports that involve running, jumping, squatting, kicking, and other strenuous movements. Thus, hamstring injuries occur frequently and in a wide variety of sports. In fact, a survey by NCAA found that this was the most common injury in collegiate athletes.<sup>1</sup>

Most hamstring injuries are sprains or partial tears and occur either in the muscle or at the muscle-tendon junction, typically during an activity that involves sprinting. An athlete may report sudden sharp pain in the thigh during sports activity, and may even recall hearing or feeling a “pop.” Symptoms include pain and stiffness in the back of the thigh. The injured athlete will typically walk with a stiff-leg, keeping the hip fully extended. Physical examination by a trained sports medicine professional should be performed as soon as possible, and additional assessment, such as ultrasound or MRI, may be ordered to help evaluate the exact location and severity of the injury.

A number of risk factors for hamstring injuries have been proposed, including inadequate warm-up, strength imbalance, lack of flexibility, weak core, as well as lower extremity muscle weakness and fatigue. The most significant risk factor for hamstring injury in sports is a previous history of such injury. The risk of recurrence

after a hamstring strain or tear has been shown to be as high as 31%. Consequently, a number of prevention programs have been designed, which focus on improving hamstring strength and endurance.<sup>2</sup> When properly implemented, these programs have been shown to be effective on both professionals and amateurs, with a decreased risk of first-time injuries and recurrences. These programs are considered most beneficial when started during the pre-season.

In summary, hamstring injuries are common in athletes, and need to be assessed early and with careful physical examination, as well as proper and timely imaging. Prompt initiation of conservative management allows most hamstring injuries to recover well, and enables athletes to return to sports participation within days to weeks, depending on injury severity. In addition, initiation of pre-season prevention programs focusing on hamstring strengthening may decrease the risks of injury during sports participation. More severe injuries, although rare, tend to occur at areas near the hip or the knee, and often require surgical repair.

### References

1. Dalton SL, Kerr ZY, Dompier TP. Epidemiology of hamstring strains in 25 NCAA sports in the 2009–2010 to 2013–2014 academic years. *Am J Sports Med.* 2015. 43(11): p. 2671-9.
2. van der Horst N, Smits DW, Petersen J, Goedhart EA, Backx FJ. The preventive effect of the nordic hamstring exercise on hamstring injuries in amateur soccer players: a randomized controlled trial. *Am J Sports Med.* 2015. 43(6): p. 1316-23.



# Wearable Technology

## From Weekend Warrior to Professional Athlete

By Evan Lambert and Jonathan F. Dickens, MD

Until recently, the average fitness enthusiast had only a scale and pedometer to track exercise progress. Advancements in wearable technologies now provide active individuals, coaches, and sports medicine professionals advanced measures for tracking exercise, performance, and health. Wearable technologies are accessible for everyone from the weekend warrior to professional athlete.

Entry level wearable technologies focus on basic fitness measures, including step counts, calories burned, heart rate, and activity time. These models can reveal helpful information on the user's basic health measures. For example, if their heart is consistently beating too quickly this may be a sign for the patient to see their doctor. Additionally, by providing information on calories consumed or burned, the devices provide information that can help users drop down to a healthy weight. These systems can be synced to personal computers or smartphones and allow for progress tracking and comparisons with others. Examples of models in this line include the Fitbit Zip, Misfit Flash, and the Jawbone UpMove.

More advanced devices offer many additional features. GPS watches and similar technologies allow consumers to track average/current speed, split/lap times, stairs climbed, route traveled, and even sleep quality/quantity, in addition to the



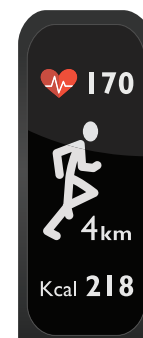
metrics reported by the entry level models. These additional measures help users track and attain fitness goals and make certain lifestyle tendencies evident, thus helping to facilitate changes in potentially detrimental habits. Furthermore, these additional measures may provide early indications of over training, which may prove detrimental to your training and overall health. Popular models include the Fitbit Surge and Blaze, Garmin Vivofit HR, and TomTom Spark.

Wearable technologies have recently been incorporated into garments. These advanced technologies utilize accelerometers, GPS, and gyroscopes. The Under Armour E39 shirt, a sensor-fitted shirt unveiled at the 2011 NFL Combine, tracked athletes' accelerations, G forces, heart rates, and breathing rates. Since the Under Armour E39 shirt was introduced, there has been an influx of sport-specific wearable technologies. Real-time assessments of athletes in their native environments provide coaches and sports

medicine professionals information on workout efficiency and injury risks. Major League Baseball recently approved the use of the Motus sleeve during game play. The sleeve utilizes accelerometers and force sensors to measure arm speed and slot angle and estimates strain of the elbow's ulnar collateral ligament (UCL) strain, which assists in avoiding injury and subsequent Tommy John surgery. Similarly, the Catapult OptimEye provides real-time analysis of jumping forces, turn rates, collision forces, and sprint efforts which can reveal trends that are indicative of future injury risks. This system is currently used by a number of MLS, NBA, and NFL teams and has helped reduce injuries.

The continued development of wearable technologies highlights the movement towards tailored athletic optimization with a focus on injury prevention. As these technologies continue to develop, they will become more accessible and their benefits will be realized by all active individuals.

**Additional measures help track and attain fitness goals. They make lifestyle tendencies evident, thus helping to facilitate changes in potentially detrimental habits.**





## The Olympics and the Zika Virus

By Roy Ruttiman, BS, MS, and Brett Owens, MD

This summer, athletes from more than 200 nations will gather on the world's largest sporting stage at the Olympic Games. Two years after hosting the World Cup, a comparable sporting event in both scale and spectator diversity, Brazil will be the host. Prior to the 2014 World Cup, concerns were raised about Brazil's preparedness as a host nation. Many cited the nation's ongoing anti-World Cup street protests, ill-equipped electrical infrastructure and transportation services, repeated delays in stadium construction, and health concerns related to mosquito-borne and airborne illnesses.

In 2014, the CDC recognized Dengue fever and H1N1 influenza as the most pressing health concerns and promptly issued health warnings to prospective tourists. Many of these same issues have resurfaced for this summer's Olympic Games. Yet, the emergence of Zika virus in South and Central America—Brazil being the epicenter of the outbreak—has taken center stage as the primary concern for natives, tourists, and athletes alike.

Zika fever, also known as Zika virus disease, is caused by the Zika virus and is primarily spread to humans through a bite from an infected mosquito. Zika virus may also be transmitted during blood transfusions, sex, and pregnancy. The symptoms of Zika fever are typically short-lived (3–7 days), mild and non-specific, consisting of fever, rash, joint pain, and red eyes (conjunctivitis). Due to the mild nature of the disease, individuals might not even realize they have been infected. Once infected, one will likely gain immunity to future infections. Zika fever is treated by rest.

**Traveling athletes and tourists should maintain awareness of the latest CDC recommendations in order to stay as safe as possible.**



The greatest concern with Zika virus is that transmission during pregnancy may result in microcephaly, a medical condition that features an undeveloped brain and an abnormally small head in the newborn. Accordingly, the CDC has issued travel advisories focused on protecting pregnant women or women who may become pregnant. Such women should avoid traveling to Brazil. Furthermore, men who have been in areas with ongoing Zika transmission should abstain from sex with a pregnant partner or use barrier contraception.

The International Olympic Committee has confirmed that this summer's games would neither be postponed nor cancelled. The Brazilian government has increased implementation of control strategies to protect both athletes and tourists. Additionally, Olympic athletes will be provided mosquito netting, insect repellent, and barrier contraception to lessen the likelihood of infection and transmission. The Zika outbreak has begun to slow as winter begins in the Southern Hemisphere and cooler temperatures limit the mosquito population. Traveling athletes and tourists should maintain awareness of the latest CDC recommendations in order to stay as safe as possible. Let the games begin!



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#### 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](mailto:lisa@aossm.org) or contact the Society at 847/292-4900.

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## Don't Skimp on Safety and Get Injured Skimboarding

By Lance LeClere, MD, and Clinton Ulmer, BS

Skimboarding is a recreational activity that is enjoyed at the beach or other areas of low-standing water. The skimboarder runs along with a thin board, drops the board parallel to the ground, and jumps on to hydroplane forward, and can reach speeds of 10–15 mph,<sup>1</sup> skimming over 1–2 inches of water or off the beach into an oncoming wave.

### Beginners should consider taking lessons to acquire basic fundamental skills and knowledge of the skimboarding “rules of the road.”

Since the rider is speeding along over packed, wet sand, a fall from the board may result in significant sprains or fractures. Published research studies demonstrate that the most common sites of injury are the ankle or wrist.<sup>2</sup> There are two common mechanisms of injury that occur as a rider falls off the board. The first is rotation on a stationary lower body part. This can result in ankle sprains, or in some cases, fractures. However, lower leg and knee injuries are also possible. The second is falling on an outstretched hand. A fracture of the wrist is the most frequent injury. However, elbow, forearm, and shoulder injuries have also been reported.<sup>2,3</sup>

Like most recreational or sport activities there is a risk of injury associated with

skimboarding and new and experienced skimboarders should be aware of the particular types of injuries that most often occur. Beginners should consider taking lessons in order to acquire basic fundamental skills and knowledge of the skimboarding “rules of the road,” including:

- Finding an optimal spot that isn't overcrowded when first trying to learn in order to avoid collisions with other riders
- Learning from an experienced skimboarder who can help you choose the right waves to ride
- Being aware of sun glare off the water and wearing sunglasses to protect eyes
- Making sure you are using the proper type of board
- Wearing protective equipment as you learn in order to prevent injuries

With proper training and attention to safety, skimboarding is an activity that can be enjoyed by beachgoers both young and old with a wide range of skill levels.

#### References

1. Tuck EO, Dixon A. Surf-skimmer planning hydrodynamics. *J Fluid Mech.* 1989.205:581-592.
2. Sciarretta KH, McKenna MJ, Riccio AI. Orthopaedic injuries associated with skimboarding. *Am J Sports Med.* 2009.37:1425-28.
3. Merriman D, Carmichael K, Battle SC. Skimboard injuries. *J Trauma.* 2008.65:487-490.

