

Orthopaedic Surgeons Weigh In on eSports and Gaming-related Musculoskeletal Injuries

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EDITOR'S NOTE: This article concludes a two-part series on eSports gaming and related musculoskeletal injuries. Part one appeared in the May issue of *AAOS Now* and can be viewed online at www.aaosnow.org.

► Gaming is becoming commonplace not only amongst our youth, but amongst individuals of every age category. eSports, or electronic sports, is a form of sport competition and includes amateur as well as professional participants. It is estimated that hundreds of millions of players engage in daily virtual and competitive electronic gaming. In fact, several colleges in the United States have established varsity gaming teams and even offer eSport scholarships. The average eSport player sits in front of a computer anywhere from five to 10 hours each day.

Unfortunately, the uptick of gaming at recreational and professional levels has been accompanied by an increase in musculoskeletal complaints and overuse injuries. The most common complaints for eSport players include eye fatigue, back pain, neck pain, and hand and wrist injuries. Up to 40 percent of eSport athletes do not participate in any form of physical exercise.

Julie Balch Samora, MD, PhD, MPH, FAAOS, discussed clinical perspectives of eSports injuries and management with hand and sports orthopaedic specialists who have treated musculoskeletal conditions of amateur and professional gamers. The panel comprised Anthony E. Johnson, MD, FAAOS, of the Department of Surgery and Perioperative Care at the University of Texas at Austin Dell Medical School in Austin, Texas; Alan M. Reznik, MD, MBA, FAAOS, chief medical officer of Connecticut Orthopaedics, assistant professor of orthopaedics at Yale University School of Medicine, and a consultant; Philip Blazar, MD, FAAOS, section chief of hand and upper extremity service at Brigham and Women's Faulkner Hospital; Nina R. Lightdale-Miric, MD, FAAOS, director of the pediatric hand and upper extremity surgery program at Children's Hospital Los Angeles; and Dori Cage, MD, FAAOS, of Sharp HealthCare in San Diego.

Dr. Samora: Have you seen an uptick in gaming-related complaints in your practice?

Dr. Lightdale-Miric: Yes,

gaming-related complaints are being seen at increasing rates by pediatric hand surgeons.

Dr. Reznik: In sports medicine, we are less likely to see the hand-specific injuries, yet the results of the poor posture, core weakness, and deconditioning seem to be underlying many issues we see in gamers both within and outside gaming activities.

What are the most common diagnoses you see with gamers?

Dr. Cage: Tendonitis of the forearm muscles is by far the most common diagnosis. I also see back and neck pain, as well as shoulder pain due to poor ergonomics while gaming. Neck and back muscle pain, even radicular symptoms, occur from prolonged improper posture. Carpal tunnel syndrome is occasionally aggravated by gaming. The use of a phone for gaming is a common cause of thumb pain (due to tendonitis or joint aggravation) from holding the phone for long periods of time. I also see de Quervain's tenosynovitis.

Dr. Johnson: The most common are overuse injuries of the wrist and thumb, so much so that "gamer's thumb" (also known as de Quervain's tenosynovitis) is still very prevalent. In my former role, when the Nintendo Wii was still popular, we used to see ulnar-sided tendonitis that we called "Wii wrist"—this has since dissipated. Symptoms of gamer's thumb include thumb pain after playing video games, pain and swelling near the base of the thumb, wrist pain that may travel up the arm, thumb and wrist pain that gets worse with movement, and a catching or popping sensation when moving the thumb.

Dr. Lightdale-Miric: The most common presentations are tendonitis in the flexor or extensor compartment, diffuse ache and pain in both wrists, cubital and carpal tunnel syndrome, upper back and neck muscle pain, and fascial complaints.

Dr. Blazar: For most cases, it's in the category of tendonitis. The most common thing I'm seeing in gamers is a nonspecific diffuse process involving several areas of the individual's hand and wrist. I think there are also implications of the compulsive and social aspects of gaming.

Dr. Reznik: I'll see a couple of common findings: sway back, poor position, and a host of things related to deconditioning. Furthermore, the poor posture and lack of core strength feed into other orthopaedic conditions. We also see obesity and poor balance. If I ask a deconditioned child to stand on one leg and do a one-legged squat, they can't do it without tipping to the side. We also see children with thumb pain and adults with ulnar nerve irritation at the elbow. There are probably a number of people with brachial plexopathy caused by increasing thoracic kyphosis as a result of poor posture, neck strain, etc. I am concerned about a general sense of whether sleep habits have been disturbed: fatigability, poor sleep habits, and sleep deprivation may affect overall well-being. Some get sciatica from sitting in a chair for many hours on end. Biceps tendonitis is also possible, as well as eye strain.

What advice do you give to patients with gaming injuries/overuse symptoms? Are there ergonomic means to reduce injury?

Dr. Cage: I emphasize proper posture and ergonomics. I try to explain that just like any sport, it is important to use the proper posture and muscles and to be in shape. Core strengthening is key to preventing overuse injuries.

Dr. Lightdale-Miric: Similar to overuse injuries in other sports, technical and positional evaluation of their gaming area or control design is the best place to start. How and where are they playing? And what could be altered to improve their endurance and ergonomic redesign before they experience tendonitis symptoms? In addition, in adolescents, their age may be a factor. In the middle of a growth spurt or with elastic hormones common in puberty, adolescents become increasing loose-jointed and may be more susceptible to tendonitis. They may benefit from core strength, postural support devices or training, and/or occupational therapy for gradual increase in forearm strength with careful attention to their tendonitis symptoms and flexibility.

Dr. Johnson: As with all injuries, the best treatment is prevention. Be reasonable with the duration of gaming. Unfortunately, in our current climate of social distancing, gaming is going to be

the major outlet for young people, so this may fall on deaf ears. Playing for a shorter duration and taking frequent breaks are main strategies for prevention.

Dr. Blazar: Reducing playing time is commonly effective for many people. Modifications can make a difference; for example, does everything have to be done with the right hand or in the same position? Can you use a different type of mouse or device? For people who are reluctant to reduce gaming time, can they take a 10-minute break in the middle of playing and get up and then come back to it? Simple things like that will make a big difference. For those with worse pathology, I will recommend limiting the amount of playing; the messaging can be a bit nuanced. Sometimes a wrist splint will allow them to continue to be active in the way they choose and will allow them to be less uncomfortable while doing it.

Dr. Reznik: I would suggest compensatory exercises; for example, for poor posture, back extension, rhomboids, and core exercises. Avoid exercise that makes the posture worse; for example, pectoralis exercises like bench press and only abdominals without the balancing antagonists. Tight hamstrings can also increase pelvic tilt when sitting, causing a flattening of the lumbar spine that also increases kyphosis, so hamstring stretching may help. Often, I recommend physical therapy and evaluation for all exercises, including balance training. If someone has ulnar nerve compression of the elbow, you may give them a protective pad to keep them from leaning on it. For people with acute inflammatory tendonitis, you might use anti-inflammatories. For de Quervain's, if it's severe, you might give a cortisone injection. I would also prescribe alternative physical activity and, like the other panelists noted, cutting the number of gaming hours down.

How would you guide parents on setting limits?

Dr. Cage: As a doctor and parent of three sons, I would encourage some physical exercise daily and frequent breaks to prevent eye strain and overuse injuries. On the computer or phone, put a timer on every hour to remind the gamer to take a break.

Dr. Lightdale-Miric: I tell patients that *everyone* has an overuse limit. People

can't hold even a single penny in an outstretched hand for very long before their arm gets tired. It can be frustrating when you hit your limit or get sidelined by pain or injury. Don't play through pain, or it will worsen and be harder to recover from. Step back and evaluate what you can change about your gaming environment to set yourself up for as long endurance as possible. Regular rest intervals, core strength, and idealized posture while gaming are typically the solution. Consider your head, neck, elbow, forearm, wrist, thumb, and finger alignments while gaming.

Dr. Blazar: I will make it clear to the parent that this injury may be related to the gaming. I don't feel like these injuries cause growth disturbances, so I don't feel like I need to push the parents in the way I would for other issues. For example, with baseball pitchers, there is consensus that the parents need to be involved in setting pitch limits per week. I don't think gaming leads to the same medical orthopaedic consequences. If they choose not to make changes, the kid is going to be sore but will likely not sustain any true physical damage.

Dr. Reznik: It's really the same discussion as with physical sports.

Should we be more proactive in the medical community to guide the public? For example, should we create public service announcements?

Dr. Lightdale-Miric: The definition of "sport" is changing. Orthopaedic surgeons are specialists supporting the health of muscle and bone in *all* of our patients.

Dr. Blazar: I'm torn on this. Because I don't think we are causing long-term damage, I don't think it has the same urgency.

Dr. Reznik: The answer should be yes, because we are in a public service business. We advocate for good health for the children and adults we see for all other sports injuries. It's within reason for us to have public service materials that address the issue of kids doing too much gaming. As orthopaedic surgeons and providers of musculoskeletal care, it is important to understand the new "sport" of gaming, whether or not we perceive it as the "traditional"

definition of a sport. There is no question that gamers are at risk for musculoskeletal impairment and overuse injuries. As Dr. Johnson suggests, we should focus first and foremost on prevention amongst our patients. We should encourage appropriate posture and ergonomics, recommend gamers

take "rest" breaks, and promote exercise and core strengthening to enhance general overall health.

References for the studies cited can be found in the online version of this article, available at www.aaosnow.org.

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