THE INVISIBLE EPIDEMIC

Shake it off—three words with serious implications for head injury victims, whether harm comes on the ball field, battlefield or simply out of left field. It's a troubling issue with an obscure, ubiquitous nature. New awareness and research thrusts concussions center stage, and optometry is poised to make a significant difference.

BY WILL PINKSTON
Derek Cunningham, O.D., knows a thing or two—make it three—about concussions, but not only from a clinical viewpoint; he’s experienced three “bad boys” himself.

A safety for the University of Waterloo, Dr. Cunningham wore the Warriors’ black and gold while playing Canadian Interuniversity Sport (CIS) football throughout his collegiate career. And it was while wearing his No. 12 uniform that Dr. Cunningham, AOA Sports Vision Section (SVS) immediate past chair, learned his first lesson in the school of hard knocks.

“There are some things you can help when it comes to concussions, and some you really can’t,” he says. “And this was probably the worst.”

Dr. Cunningham recalls making a play on the ball, mid-game, and sprinting down the sideline to pick up yardage before ducking out of bounds. That’s when the worst happened—an unsuspecting hit jostled him to the ground where his helmeted head struck a small concrete water barrier.

Stars popped in his vision, an aggressive headache set in and it seemed everything moved slower. It took a minute or two for him to collect himself, but when training staff looked him over and saw he could run the sideline without hesitation, Dr. Cunningham was back in the game.

“There really were no policies or guidelines that were well defined at that time,” he says. But all that has rapidly changed in the past 15 years. Concussions are a hot-button issue, not only in sports, but also in all walks of life, and optometry holds a critical spot on the multidisciplinary care team.

In the headlines
Awareness regarding concussions has risen dramatically through the years—an issue that piqued public interest in some of America’s favorite pastimes and dominated the media.

Exactly two decades ago, then-National Football League (NFL) Commissioner Paul Tagliabue dismissed the issue of player concussions, saying, “The problem is a journalist issue.” Ill-fated words, as the NFL would become the poster child of sports-related concussions. Star players became associated with career-ending head injuries—Steve Young and Troy Aikman—and others tragically remembered for what happened off the field—Dave Duerson and Junior Seau.

Lawsuits spurred change in professional sports. The NFL implemented rules to limit helmet-to-helmet contact and dangerous hits as did the National Hockey League. Major League Baseball banned “egregious collisions” at home plate, and Major League Soccer refined concussion protocols.

“We’re seeing the big business side saying, ‘Wow, we’ve got to protect our players,’ and that has had a trickle-down effect,” says Fraser Horn, O.D., AOA SVS chair. “Concussions’ side effects have a huge impact on performance, as well as life.”

As professional sports open up about concussions, the mentality has permeated down to collegiate and youth sports as well.

In May, the White House hosted the first-ever summit on sports-related concussions, where medical experts—including eye care providers and Steve Devick, O.D., representing optometry—discussed the prevalence of injury, and private sectors announced millions in research grants. Even President Barack Obama announced he might...
“TBI patients come to optometrists and we often are the only ones giving them advice, not only visual advice, but what can you do to get back to daily activities?”

Brenda Heinke Montecalvo, O.D., AOA Vision Rehabilitation Section chair
have had a mild concussion in youth football that went undiagnosed.

“We have to change a culture that says, ‘You’ve got to suck it up,’” President Obama remarked during the summit.

“Our society puts a lot of pressure on success, and, honestly, sometimes it’s to the detriment of our bodies,” Dr. Horn says.

The ‘bell-rung mentality’
Things have changed greatly since the early 2000s. Between 2009 and 2013, concussion laws, often referred to as “Return to Play” laws, were passed in all 50 states plus the District of Columbia. Generally, these laws mandate an athlete’s removal from play following a suspicious hit, and a minimum 24-hour “down” period before returning with permission from a health care professional. Often, the laws are in addition to bylaws passed by sports’ governing bodies or schools. All told, the laws prove positive, if athletes adhere to them.

“Back when I played, if you were seeing foggy and your head hurt, it was called ‘getting your bell rung.’ And as soon as you could run, you were back in the game,” Dr. Cunningham says. “But now it’s different with aggressive high school athletics. [Players think] the most important thing is not to tell the trainer anything. Athletes won’t tell because that limits their playing time.”

David Kirsch, O.D., Ph.D., who has worked with professional sports teams and the 2007 U.S. Olympic Team, says this area becomes even more sensitive when concussed athletes “doctor shop” for a practitioner to sign off on their returning to play.

An already tenuous ethical dilemma is compounded, for example, when the athlete in question comes from an economically disadvantaged background, and playing in a particular game is critical to collegiate or professional aspirations.

If coaches are looking for a new mantra, Dr. Kirsch recommends: “When in doubt, sit them out.” There’s no magical sideline test that can diagnose concussion with 100 percent accuracy, and it’s better to

70% The number of male sports–related TBI emergency department visits that are between 10 and 19 years of age, according to the CDC.

HARD
COMPETITION

National surveillance data of 9 high school sports found the rates of TBI highest in football at 0.47 per 1,000 athlete exposures, and girls’ soccer at 0.36 per 1,000. Common playground activities, bicycling and basketball also topped the list, according to the CDC.
Play it safe. Concussions need to be a clinical diagnosis.

“It takes a team approach with neurology, physicians and optometrists to diagnose and treat concussions,” Dr. Kirschen says. “It’s a multifaceted disease that requires a clinical diagnosis. This isn’t like a broken bone. It’s what’s inside the head, and you must probe that from the outside in many different ways.”

Visual proficiency
Sports are only the smallest tip of the iceberg when it comes to minor traumatic brain injury (mTBI) and TBI, but garner the greatest amount of public attention. In fact, it’s the routine, everyday events—and not the dramatic—that account for the vast majority of TBI-related emergency department visits.

Falls were the leading cause of TBI in the United States between 2006 and 2010—about 40 percent of all reported cases—followed by unintentional blunt trauma (15 percent) and motor vehicle crashes (14 percent), according to the Centers for Disease Control and Prevention (CDC). But now a new patient population group has presented itself that brings its own unique challenges.

Americans have spent more than a decade at war—one whose telltale carnage from improvised explosive devices has left a signature imprint on soldiers. More than 300,700 service members have been diagnosed with TBI worldwide since 2000, according to the Department of Defense’s Defense and Veterans Brain Injury Center. And with medical advances helping bring the nation’s heroes home, health care has unprecedented insight into TBI.

Andrew Morgenstern, O.D., subject matter expert for Booz Allen Hamilton assigned to the Vision Center of Excellence at Walter Reed National Military Medical Center, notes that various studies suggest anywhere from 30 to 75 percent of soldiers with TBI have an associated vision dysfunction, many commonly diagnosed with convergence insufficiency, saccadic issues, ocular alignment and visual memory issues.

Not only is it difficult to encourage service members to seek diagnosis and treatment—Dr. Morgenstern says there’s a social stigma attached to TBI as a perceived weakness in this “alpha male” setting—but there also are new factors to consider as veterans leave service.

“These patients are now presenting to civilian doctors so it’s important for the civilian doctor—the AOA member—to be aware of these injuries,” Dr. Morgenstern says. “In the ’80s, you would never ask a patient, ‘Did you serve in Vietnam?’ but now it’s a different story because of the nature of injuries. So many more people survive this war, which means more people to care for, and the nature of these injuries can create a new population of patients in an age category we’ve never seen before.”

Mitchell Scheiman, O.D., dean of research at Salus University, says data of returning soldiers finds a high prevalence of mTBI/concussion-related vision conditions, including convergence insufficiency (reported in about 40 percent of soldiers), accommodative insufficiency (about 30 percent) and saccadic eye movement problems (about 20 percent).

The data proved useful as a springboard for further research, because until recently, Dr. Scheiman explains, data regarding children’s concussions was lacking. But a new study at the Children’s Hospital of Philadelphia (CHOP) has changed that.

Tracking 100 youth routinely seen in the “Minds Matter” sports medicine department at CHOP, Dr. Scheiman and colleagues conducted vision examinations with interesting results. The study found 65 percent of the group had sports-related concussions, and 69 percent were diagnosed with one or more vision problems. The most common problems: accommodative disorder (51 percent), convergence insufficiency (49 percent) and saccadic dysfunction (29 percent).

“Interestingly enough, it was very similar [to the military data] and maybe even a little higher,” Dr. Scheiman says. Furthermore, 46 percent had a combination of disorders; 70 percent of subjects had a medical diagnosis of vestibular dysfunction; and 54 percent had both vision and vestibular dysfunctions.

Crucial to the data is how concussions are commonly handled. Dr. Scheiman says many MDs focus on vestibular rehabilitation in their patients, a process completed by physical therapists. In order to administer vestibular rehab, patients

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must be able to hold their eyes steady and have normal focusing and eye teaming skills; however, many concussed patients report double or blurry vision. As a result, such patients may struggle with vestibular therapy, and physical therapists have started referring patients back to optometrists for rehabilitation.

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As ongoing research into the field of concussions and TBI continues, it’s clear the territory is one that is best crossed in a multidisciplinary approach. There’s an opportunity for each specialty to add their knowledge for patients’ comprehensive care, says Steven Galetta, M.D., chair of the Department of Neurology at New York University (NYU) Langone Medical Center.

“A combination of factors—optometric measures, imaging markers or blood measures, for instance—highlighted by each discipline might provide a guide for consideration before additional activities.

Testing the waters

Accurately diagnosing concussions at the onset could help prevent additional injury. Here, too, optometry has provided answers.

In May, a Mayo Clinic study validated the vision-based King-Devick Test (K-D Test)—King-Devick Test, LLC, was founded by Dr. Devick, company CEO—for concussion detection in youth athletes. The test was found to accurately detect reported and unreported concussions, and is touted for its ease of use because nonmedical staff can administer the test to determine removal from play.

In sports, sideline concussion testing had not employed a visual test; however, the K-D Test is being looked at as one that could be added to the current battery of tests, Dr. Galetta says.

The K-D Test compares rapid-recall performance in athletes immediately following injury with a pre-season baseline. Athletes read single-digit numbers on cards, and a longer post-injury time than baseline constitutes removal from play.

Leonard Messner, O.D., executive director of the Illinois Eye Institute (IEI), who specializes in neuro-ophthalmic disorders, says the time required to do the K-D Test is being downward in youth athletes up to puberty, and for that reason, an accurate baseline must be gathered annually.

“Optometrists are frontline doctors in this effort,” Dr. Galetta says. “They need to be involved in the evaluation, education and research of concussion. Eye doctors have played a significant role, but we need mass involvement by this group of doctors to move this effort forward. We need more involvement in people who really understand eye movement, because it’s not as simple as some might think.”

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of the brain, there is a logical reason for optometry to be extensively involved, Dr. Messner says. That’s why the IEI and Illinois College of Optometry, in conjunction with NYU and Boston University, have partnered in the Visual Structure & Functional Abnormalities with Contact Sports Athletes (VICTORS) Study to look at visual structure and function in contact sport athletes.

These athletes undergo tests including OCT scans, low-contrast acuity measurements and the K-D Test to compare data with similar age-match norms to see if there are differences in the populations.

“Optometrists are vision specialists. Vision is affected with concussion, so it’s logical that optometrists should be on the front line as it relates to the diagnosis and ultimately the management of concussion,” Dr. Messner says. “Looking at vision-related screening tests, these are probably the most effective ways of diagnosing concussion, and the data clearly points that way.”

Comprehensive care
Increased awareness of TBI prompted the AOA Vision Rehabilitation Section (VRS) to publish the Brain Injury Electronic Resource Manual (BIERM) earlier this year. The BIERM is intended for primary care optometrists as a reference for the examination and treatment procedures not commonly performed during a routine examination, but beneficial for patients with TBI. A second volume is in development that will focus on management of brain-injured patients over time.

Brenda Heinke Montecalvo, O.D., AOA VRS chair and BIERM co-author, says the manual helps optometrists diagnose and prescribe with the goal of improving TBI patients’ daily function. In more severe cases, the general optometrist will intervene by working with the rehabilitation team and providing or referring for more formalized neuro-optometric rehabilitation (NOR).

“The NORA approach includes all aspects of optometric care, including managing dry eye, modification of refractive prescription, assessing binocular and spatial perceptual dysfunctions, and providing low vision rehabilitation and optometric vision therapy as needed.”

Dr. Montecalvo explains that implementing NOR is a process that involves TBI-minded preparations to make patients more comfortable, and a thorough approach that involves comprehensive testing, including automated visual fields and sensory/motor and perceptual evaluations.

Moving forward
The days of CIS football are long behind Dr. Cunningham—an experience he easily recalls in his work with professional and NCAA sports teams, as well as in his work with the Sports Vision Section. And, so too, Dr. Cunningham can take the not-so-fond memories to provide care for an emerging set of patients increasingly looking at optometry for aid.

“More and more we’re in lecture halls and presenters ask, ‘Who has had concussion symptoms?’ and almost everyone will raise their hands,” he says. “This is something optometrists are going to be interested in, one way or another, as we go forward.”

Will Pinkston is a content producer for the AOA, based in St. Louis.

The AOA Brain Injury Electronic Resource Manual (BIERM) is available to all members at aoa.org/tbi.