



# HOW THE NFL IS ADVANCING PLAYER HEALTH AND SAFETY



The National Football League is committed to advancing progress in the diagnosis, prevention and treatment of sports-related injuries, enhancing medical protocols, improving how the game is taught and played, and protecting NFL players' overall health, safety and wellbeing.

## PLAYER HEALTH AND WELLNESS

The NFL continues to make changes on and off the field to try to better protect the health and safety of every player.

## CARING FOR PLAYERS ON GAME DAY

On average, there are more than 30 healthcare providers at a stadium on game day to provide immediate care to players, including:

- » **Unaffiliated Neurotrauma Consultant:** Three credentialed neurotrauma consultants, who are unaffiliated with either team, staff the sidelines, monitor the broadcast of the game, and work with the team medical staffs to identify, screen for and diagnose concussions.
- » **Booth ATC Spotters and the Medical Timeout:** For all NFL games, two certified athletic trainers – retained by the league and unaffiliated with any NFL teams – observe the game from a booth above the field and monitor all camera views to identify potential injuries, especially concussions and other head and neck injuries. The booth ATC spotter has the authority to call a medical timeout to permit the medical evaluation of a player who may have suffered a concussion or head injury.
- » **Emergency Response Physicians:** In addition to each club's primary physician and trainers, the NFL and NFLPA require every NFL club to identify and retain at least two Emergency Response Physicians (ERPs) to be available to attend each of its home games. Each club must have one ERP present at every home game available to treat home and visiting team players.

## CONCUSSION PROTOCOL

NFL medical professionals follow the NFL Concussion Protocol when identifying, diagnosing and treating player concussions. The Concussion Protocol, first developed in 2011, is reviewed and revised by medical experts each year to ensure that it reflects the most up-to-date medical guidance.

To ensure club physicians' implementation of the protocol, the NFL and NFLPA developed an enforcement policy, which includes a process to investigate clubs that fail to follow the protocol and determine appropriate discipline - including fines and possible forfeiture of draft picks.

## RETURN-TO-PARTICIPATION PROTOCOL

The NFL and NFLPA, through their leading medical experts, established a five-step process that every NFL player diagnosed with a concussion must follow before being cleared to fully practice or participate in an NFL game. After a player goes through the process and is cleared for full participation by his club physician, he must also be cleared by an Independent Neurological Consultant, who is jointly approved by the NFL and NFLPA and who is not affiliated with any NFL club. Until a player is cleared by this independent physician, he may not return to contact practice or play in an NFL game.

## MEDICAL COMMITTEES

The NFL is advised by many of the world's preeminent experts in medicine and science. NFL medical committees frequently review player health and injury data and recommend policies, programs and protocols for the League. An overarching Health and Safety Committee – including chairs of the General Medical Committee, the Head, Neck and Spine Committee and the Musculoskeletal Committee—oversees committee efforts and facilitates collaboration among subject matter experts, team physicians and athletic trainers. The NFL also works closely with the NFLPA and its medical advisors on player health and safety issues. More information on NFL Medical Committees and their membership can be found [here](#).

## MEDICAL RESEARCH

The NFL supports preeminent experts and institutions in their research on the diagnosis, treatment and prevention of sports-related injuries and other issues affecting NFL players' health, safety and wellbeing.

- » **NFL Scientific Advisory Board:** In 2016, the NFL allotted \$40 million for medical research primarily dedicated to neuroscience. The NFL assembled a Scientific Advisory Board (SAB)—chaired by Peter Chiarelli, U.S. Army General (Retired)—comprising leading independent researchers, experts, doctors, scientists and clinicians to identify and support research proposals on the diagnosis, treatment and natural history of concussion and associated comorbid conditions.
- » In 2018, the SAB granted \$35 million in total funding to five projects for research being conducted by investigative teams related to the diagnosis, treatment, and natural history of concussion and associated comorbid conditions.
- » In July 2021, the SAB granted a four-year, \$4 million award to a team of medical researchers led by the University of Wisconsin who are investigating the prevention and treatment of hamstring injuries in elite football players.



## ADDITIONAL RESEARCH

The NFL has also allotted more than \$30 million to support brain injury research conducted by the Foundation for the National Institutes of Health (FNIH), Department of Defense, and Department of Veterans Affairs.

## MENTAL HEALTH AND WELLNESS

In collaboration with the NFLPA, the NFL fosters a positive culture around mental health by providing players and the NFL family with resources and tools to succeed, on and off the field, over the course of their lives.

## JOINT BEHAVIORAL HEALTH AGREEMENT

The Comprehensive Mental Health and Wellness Committee, which develops mental health and wellness programs and resources for players and the wider NFL family, requires each club to retain a Behavioral Health Team Clinician to support players' emotional and mental health and wellbeing.

## PAIN MANAGEMENT

The NFL-NFLPA Joint Pain Management Committee educates players and personnel on best clinical practices in pain management, awards grant funding for research to advance understanding of alternative treatments, and establishes club policies regarding pain management and the use of prescription medications by NFL players.

The Joint Pain Management Committee also focuses on finding alternatives to opioids for pain management. The Committee awarded \$1 million in research funding in February 2022 to two teams of medical researchers at the University of California San Diego and University of Regina to study the effects of cannabis and CBD on the performance and pain management of elite athletes. The Committee furthered its efforts in June 2023, awarding an additional \$526,525 in funding to researchers with the American Society of Pain and Neuroscience (ASPN) and Emory University. Their research will investigate the effects of cannabidiol (CBD) and non-invasive vagal nerve stimulation (nVNS) on alleviating concussion symptoms, and mindfulness-based intervention in sports medicine injuries, respectively.

## DIVERSIFYING SPORTS MEDICINE

As part of the NFL's overall commitment to ensuring that staff and leaders in the league office and at NFL clubs reflect the racial and gender makeup of America, leaders in NFL Player Health and Safety are working to diversify the pipeline of people interested in pursuing careers in sports medicine and, over time, to help diversify NFL club medical staff. These efforts include the league-wide expansion of the NFL Diversity in Sports Medicine Pipeline Initiative, which provides medical students from diverse backgrounds with the opportunity to complete a clinical rotation with NFL club medical staff. More information on diversity efforts in NFL Player Health and Safety can be found [here](#).

## MENTAL HEALTH RESOURCES

The league provides mental wellness benefits and resources to current and former players, including:

- » **Team Clinicians**, who are available to players at all team facilities for at least 8-12 hours per week. Six NFL clubs currently have full-time clinicians on staff.
- » **NFL Total Wellness**, which provides wellness resources to all members of the NFL family, including education at every stage of a player's career.
- » **The NFL Player Care Foundation**, which staffs licensed clinical social workers who provide expert consultation and help facilitate specialized treatment services for former players.
- » **NFL Life Line**, a free, confidential, and independently operated resource that connects current and former players with trained counselors who can help individuals work through personal or emotional crises 24 hours a day, seven days a week, 365 days a year.
- » **Cigna Work/Life Resources Benefit**, which provides active players and Legends—and their loved ones—with eight free, in-person or virtual counseling sessions per topic, per year and unlimited telephonic consulting.
- » **Additional mental health benefits for qualified members of the NFL Family**, including through the NFL Player Insurance Plan and the NFL Dedicated Hospital Network Program.

## EQUIPMENT, DATA AND INNOVATION

The NFL is championing new developments in engineering, biomechanics and material science to better understand the cause of injuries and protect against them. The league collaborates with the NFLPA and the world's foremost engineers and scientists as advisors.

## LEVERAGING DATA

Data is at the heart of the NFL's decisions about player health and safety.

- » **Injury Data:** Throughout the year, comprehensive NFL player injury data is compiled and analyzed by IQVIA, an independent, third-party company that provides results to the league, the NFLPA and medical and football committees. The NFL then shares this data publicly each year. Guided by the experts at IQVIA, NFL medical committee members identify trends in how, where and when injuries happen, and assess how protocols and rules changes affect player safety. During the 2022 season, injuries were down 5.6% overall, including a 6.2% decrease for the preseason and 5.4% for the regular season.
- » **Electronic Medical Records:** Every club's medical staff has access to its players' complete NFL medical records via the Electronic Medical Record (EMR) system. Each player's medical records follows him from one club to another. Players may access their records via the EMR system. Third party epidemiologists and experts analyze data extracted from the EMR system to help the league make data-driven decisions on rules changes and permissible techniques used in play.
- » **Comprehensive Video Review:** Each season, biomechanical engineers complete a comprehensive video review of all reported concussions sustained in NFL games. The league shares the data with helmet manufacturers, designers, innovators, entrepreneurs, universities and others to stimulate new designs for protective equipment.

- » **Mouthguard Sensors to Measure On-Field Head Impacts:** In 2019, the NFL introduced a novel program in which NFL players wore mouthguards retrofitted with high-tech sensors designed to collect kinematic data, including impact speed, direction, force, location and severity. As of 2023, this program has expanded to include eight Division I Football Bowl Subdivision universities, with The University of Florida, The University of Georgia, The University of Pittsburgh and Vanderbilt University joining the program alongside the four initial participants: The University of Alabama, The University of North Carolina at Chapel Hill, The University of Washington, and the University of Wisconsin. Insights gleaned from the data collected help inform the NFL's approach to injury reduction and decrease head impacts overall.
- » **Taking Data to the Next Level:** In 2019, the NFL partnered with Amazon Web Services to transform player health and safety using cloud computing, machine learning and artificial intelligence. The NFL and AWS are developing tools to generate better insights into injuries, specifically the impact of game rules, equipment, and rehabilitation and recovery strategies. One of the partnership's primary goals is building the capacity to predict injuries before they occur.
  - The NFL and AWS are building the Digital Athlete, a virtual representation of an NFL player using actual NFL games and data that can run infinite in-game scenarios to understand the impact on player health and safety and ultimately attempt to predict and prevent injuries.
  - The NFL and AWS continue to encourage innovation with data challenges, incentivizing novel approaches that can provide more information regarding player health and safety. In 2022, the NFL and AWS awarded \$100,000 to the winners of its artificial intelligence competition, which challenged data scientists to teach computers to automatically detect players involved in head impacts from NFL game footage. In 2023, the NFL and AWS awarded \$100,000 to the top finishers of a competition in which data scientists from around the world built machine learning and computer vision programs to better measure and analyze the timing, duration and frequency of player contact during NFL games - an effort to identify which types of plays cause unnecessary contact, identify the positions that are more prone to injuries, and develop potential rules changes.

## USING DATA TO DRIVE RULES CHANGES

The NFL improves player safety by taking a data-driven approach to eliminating potentially dangerous tactics and reducing the risk of injuries. Over the past decade, these include rules changes that protect "defenseless" players and penalize dangerous techniques and other plays, such as using the helmet as part of a bull rush. Changes for the 2023 season include:

- » **Fair Catch on Kickoff:** The rule now puts ball in play at the receiving team's 25-yard line if there is a fair catch on a free kick (kickoff and safety kick) behind the receiving team's 25-yard line, which should reduce injuries while not changing the fundamentals of the kickoff itself.
- » **Impermissible Use of the Helmet:** Expanded the Impermissible Use of the Helmet, making it a foul for players to use their helmet to "butt, ram, spear" or make forcible contact to opponents' head or neck area in any way. This builds on the existing Impermissible Use of the Helmet rules which prohibits a player from lowering his head to initiate and make contact with his helmet against an opponent.

As the NFL learns more about player health and safety, the league evaluates and changes rules to evolve the game and try to improve protections for players. All changes made since 2002 [can be reviewed on the Player Health and Safety website](#).

## GUARDIAN CAPS

The 2022 preseason was the first time the NFL mandated the use of Guardian Cap, a helmet shell add-on device that is worn over the helmet, for certain positions during every preseason practice up to the second preseason game. The first year of the mandate exceeded expectations, with position groups required to wear the Guardian Cap during the preseason seeing a 52% reduction in concussions, compared to a three-year average for the same positions. The concussion rate for players who wore the Guardian Cap for the mandated period did not increase after the mandate ended, and there was no significant change in concussion rates for the positions that did not wear the Guardian Caps. For the 2023 season, the mandate has been expanded throughout the preseason for all helmeted practices and into the regular season for contact practices.

## THE ENGINEERING ROADMAP

Since 2016, the NFL has allocated more than \$60 million to the creation and funding of the Engineering Roadmap.

It's a comprehensive effort—funded by the NFL and managed by Football Research, Inc. (FRI)—to improve the understanding of the biomechanics of head injuries in professional football and to create incentives for helmet manufacturers, small businesses, entrepreneurs, universities and others to develop and commercialize new and improved protective equipment, including helmets.

- » **The NFL Helmet Challenge:** In 2019, the league launched the NFL Helmet Challenge to stimulate the development of a new helmet that outperforms all helmet models currently worn by NFL players. In 2020, the NFL and Football Research, Inc. awarded \$1.37 million to help four teams create their helmet prototypes to be submitted as part of the challenge. In 2021, \$1.55 million in grant funding was awarded to three teams - Impressio, Kollide, and Xenith - to advance their innovative designs and technologies and to help get their projects on the field as soon as possible. Today, the awardees are working to further develop their prototypes, all of which drew recognition from the NFL Head Health Tech Helmet Challenge Committee, which includes experts in biomechanics and sports equipment safety, including engineers, scientists, and researchers.
- » **HeadHealthTECH Challenges:** HeadHealthTECH Challenges attracted innovative grant proposals from institutions, individuals and corporations interested in designing the next generation of protective equipment. The Challenges are operated and managed by Duke University's Clinical and Translational Science Institute, which provides constructive feedback for all applicants. The NFL and FRI have awarded grants totaling nearly \$3 million to help advance the development of 17 new technologies.
- » **1st and Future:** From 2016 to 2021, the NFL hosted a start-up competition at the Super Bowl to drive innovation in athlete safety and performance. Innovators and entrepreneurs share technologies to improve player health and safety, including protective equipment, medical devices, sensors and training devices. 1st and Future includes an Analytics Competition that enables data scientists to analyze NFL game data and propose new ideas for reducing injuries.



## EQUIPMENT TESTING AND EVALUATION

The NFL and NFLPA work together to evaluate the performance of protective equipment and to ensure players are informed about that performance and the latest advances in equipment technology when making decisions about their helmets, cleats and other equipment.

- » **Quarterback-Specific Helmets:** The NFL and NFLPA announced earlier this year that a quarterback-specific helmet will be available in the 2023 season for the first time. Nearly half of all quarterback concussions occur when their helmets hit the ground, and the quarterback-specific model is designed to reduce the severity of those impacts.
- » **Helmet Poster:** Each year, the NFL in collaboration with the NFLPA, through their respective appointed biomechanical experts, coordinate extensive laboratory research to evaluate which helmets best reduce head impact severity. The results are shared with NFL players, in addition to club medical, training, coaching and equipment staffs on a poster to help inform equipment choices.
- » **Cleat Poster:** The NFL Musculoskeletal Committee and the NFLPA coordinate extensive research on athletic shoe safety and performance to determine which cleats best permit release from turf during potentially injurious loading. The results are shared with NFL players, in addition to club medical, training, coaching and equipment staffs on a poster to help inform equipment choices.

## SHARING PROGRESS

The NFL is committed to sharing its progress in health and safety across all levels of football, with other sports around the world and for the benefit of society at large. This includes publishing peer-reviewed research, convening leaders in sports medicine for important conversations, sharing data and crowdsourcing new ideas.

