

Eyes on the field: Researchers use neuro-ophthalmologic principles to improve NFL officiating

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Credit: football wife from Pexels

Hamza Memon and Nicholas Panzo, students at Texas A&M University School of Engineering Medicine (ENMED), are leading an innovative

project at the intersection of sports and ophthalmology to improve National Football League (NFL) officiating. Rooted deeply in Houston's vibrant sports culture, these Class of 2026 students combine their interest in ophthalmology and their love for sports to contribute significantly to a project with the NFL.

The two students met during a summer engineering program and quickly bonded over their shared aspirations in sports and ophthalmology. This friendship led them to Dr. Andrew G. Lee, Chair of the Department of Ophthalmology at the Blanton Eye Institute, Houston Methodist Hospital. Under Lee's mentorship, Memon and Panzo immersed themselves in a novel project aimed at refining the skills of NFL officials through neuro-ophthalmologic training.

Their efforts have already produced results, with two significant articles published and more to come. The first study, featured in the [*Journal of Neuro-Ophthalmology*](#), presents a specially designed curriculum on neuro-ophthalmologic principles tailored for NFL officials.

The results were promising, showing a statistically significant improvement in officials' knowledge after training. This suggests a positive reception and willingness among NFL officials to incorporate these principles into their decision-making processes on the field.

The second manuscript, published in [*Vision*](#), provides a comprehensive overview of existing research on neuro-ophthalmology and its application in NFL officiating.

The study offers innovative recommendations on how officials can use 2D game data to create 3D simulations, thereby enhancing their training and on-field performance. In addition, the team has created weekly quiz questions that test officials' understanding of neuro-ophthalmology principles in relation to game play.

A memorable highlight was watching the Houston Texans clinch a 21-16 victory over the Arizona Cardinals in November 2023, all while analyzing the practical application of neuro-ophthalmologic [training](#) by NFL officials during the game.

The innovative initiative showcases the versatility and interdisciplinary skills of ENMED [students](#). It also demonstrates the potential for medical principles to improve sports officiating. Memon and Panzo have set a new standard for integrating medical and engineering knowledge in sports, offering a promising future where science and athletics can collaborate to ensure precision and fairness.

The team would like to acknowledge Walt Anderson, former NFL SVP of Officiating Training and Development, for his invaluable insights and support on this project. Anderson currently serves as the NFL Rules and Officiating Analyst.

More information: Nicole V. Carrabba et al, National Football League Game Officials Self-Rating of Knowledge in Neuro-Ophthalmic Principles and Practice: A Pilot Program to Improve Precision and Accuracy of Game Official Calls, *Journal of Neuro-Ophthalmology* (2024). [DOI: 10.1097/WNO.00000000000002129](https://doi.org/10.1097/WNO.00000000000002129)

Joshua Ong et al, Dynamic Visual Acuity, Vestibulo-Ocular Reflex, and Visual Field in National Football League (NFL) Officiating: Physiology and Visualization Engineering for 3D Virtual On-Field Training, *Vision* (2024). [DOI: 10.3390/vision8020035](https://doi.org/10.3390/vision8020035)

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