



Reader Response to:

Migraine and other neurologic conditions in retired NFL players.

We read with great interest Randolph Evans' recent article in *Practical Neurology*.¹ Dr. Evans stated that his cohort was a "biased, nonrandom sample seen as part of an evaluation for possible compensation and are probably not representative of all retired NFL players," and that further studies would be of "high interest."

We believe that your readers would be interested in the results of an earlier study reported by our group in which a convenience sample of 45 retired NFL players underwent comprehensive neurologic, neuropsychologic and neuro-radiologic evaluations.² A comparison of the results seen in

these two studies is given in the Table, where a number of similarities and differences can be seen. Our cohort was recruited randomly from a list of retired players provided by the NFL Players Association as part of a study. Our evaluations were performed between 2007 and 2009, before there was a legal settlement between the NFL and retired players (effective date January 7, 2017). In contrast, Evans' group was part of evaluating players for possible financial compensation by the NFL. Presumably, Evans' evaluations were all performed in 2017.

Evans reported that 92% of his cohort had migraines compared to 33% in our sample ($P < .0001$). Our sample had a

TABLE: COMPARISON OF RETIRED NFL PLAYERS SIGNS AND SYMPTOMS
Stats from comparison of proportions (https://www.medcalc.org/calc/comparison_of_proportions.php)

	Casson et al ²	Evans ¹	Significance
NFL players			
Sample period	2007-2009		
Sample size (n)	45	50	
Average age (years)	45.6	45.5	NS
Age range (years)	30-60	31-78	
Average years of NFL experience	6.8	8.3	NS
Number of concussions in NFL	6.9	13	NS
Headaches	54%		
Migraines	33%	92%	$P < .0001$
Episodic	29%	56%	$P < .01$
Chronic	4%	36%	$P < .0001$
Depression	42%	78%	$P < .0005$
Depression on Beck Diagnostic Inventory II	33%		
Anxiety	40%	86%	$P < .0001$
PHQ anxiety subtest	7%		
Chronic non-headache pain	47%	88%	$P < .0001$
Essential tremor	4%	22%	$P < .011$
Parkinson's disease	none	2%	
Nocturnal enuresis		78%	
Urinary-fecal incontinence	0%		
Benign prostatic hypertrophy	13%		
Erectile dysfunction	7%		



significantly lower rate of reported migraines. Evans reported that 78% of his cohort reported nocturnal enuresis on the Clinical Dementia Rating (CDR) worksheet. We did not utilize the CDR in our study. However, as part of the comprehensive neurologic history obtained from every subject, we asked if the subject ever experienced urinary or fecal incontinence. In addition, as part of the comprehensive review of systems, which was part of the medical history obtained from each subject, we specifically asked about any urological symptoms or conditions (see Table). None of our subjects reported urinary incontinence.

Despite similar average ages and similar exposures to NFL football, there are statistically significant differences in the prevalence of migraine headaches, depression, anxiety, chronic non-headache pain, essential tremor, and nocturnal enuresis between our two cohorts. Whether these differences are related to the different settings under which the subjects came to be evaluated (ie randomly recruited as part of a study vs self-referred for evaluation for possible financial compensation under the terms of a legal settlement) is not known. We agree with Evans that further clinical studies of retired NFL players are needed.

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Author Response

I appreciate the comments and table from Drs. Casson and Viano and concur both studies reported results from convenience samples. There are a number of methodologic issues with both studies, as discussed in the articles.

Both studies found an increased prevalence of migraine compared to the 1 year prevalence of 12% in adult men and an increased prevalence of depression compared to the general population. Drs. Casson and Viano did not find an increased prevalence of essential tremor, Parkinson's disease, or nocturnal enuresis.

We all agree that further study of a randomized sample of the approximately 22,000 retired NFL players would be of great interest. Given their prior study and work with the NFL and the NFL Players Association, Drs. Casson and Viano in cooperation with a neuropsychologist may wish to consider such a study as discussed in my article. Perhaps more feasibly, you might consider a study with permission from all parties of the approximately 20,000 players in the Baseline Assessment Program and Monetary Award Fund program who are being evaluated by neurologists and neuropsychologists. ■

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1. Evans RW. The prevalence of migraine and other neurologic conditions among retired National Football League players: a pilot study. *Practical Neurology*. 2017;16(9):21-25. Corrections in *Practical Neurology*, 2018; 17(1):8.

2. Casson IR, Viano DC, Haacke EM, Kou Z, LeStrange DG. Is there chronic brain damage in retired NFL players? *Neuroradiology, neuropsychology and neurology examinations of 45 retired players*. *Sports Health*. 2014; 6(5):384-395.