

## The Epidemiology of Navicular Injuries at the NFL Combine

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**Introduction/Purpose:** Navicular injuries are documented to have the potential for significant impairment of foot function. Regardless of treatment choice, these injuries can result in persistent pain, advanced osteoarthritis, and chronic dysfunction. A clearer understanding of their prevalence in collegiate athletes as well as their impact on their NFL career would help team physicians better counsel players and their teams, and perhaps also aid in defining optimal treatment. The purpose of this study was to 1) determine the epidemiology of navicular fractures in players participating in the NFL combine, 2) define positions that might be at higher risk for sustaining this injury, and 3) evaluate the impact of navicular injuries on NFL draft position and NFL game play compared to matched controls.

**Methods:** Data was collected from the NFL combine website on all participating players who had sustained a navicular injury before entering the NFL between 2009 and 2015. Medical records, imaging, and treatments were reviewed on all individuals who met these criteria. The epidemiology of navicular injuries was determined by evaluating the number of injuries, surgeries, games missed, position played and draft position of each player. Available exam and imaging findings were reviewed for each player. Players from 2009 to 2013 with a navicular injury were compared to matched controls. Control groups consisted of players who missed less than 2 games in college, played the same position, and did not have a previous surgery. NFL performance outcomes were evaluated through analysis of draft position, career length  $\geq 2$  years, and number of games played and games started within their first 2 years. All NFL performance data was obtained from STATS.com. Odds ratios were calculated using logistic regression to assess the risk of sustaining a navicular injury by position. Two-sample, two-tailed T-tests were computed to assess games missed in college and draft position in players with a navicular injury and NFL career consisting of games played, and started in the NFL in the first 2 years of their career versus control players.

**Results:** A total of 2285 foot players participated in the NFL combine between 2009 – 2015. There were 15 navicular injuries (14 players) with an incidence of 0.6% of NFL football players participating in the combine during this time frame. Defensive backs had a statistically significant increased odds ratio (Odds ratio = 3.0,  $p=0.03$ ) of sustaining a navicular injury, however only 3 defensive backs had a navicular injury. Three players had nonunions or a refracture and 2 players required a revision surgery. Fifty-seven percent of players with navicular injuries (72.7% of fractures) were undrafted versus 30.9% in the control group ( $P<0.001$ ). Twenty-nine percent of players with navicular fractures played 2 years in the NFL compared to 69.6% in the control group ( $P<0.01$ ).

**Conclusion:** While only a small percentage of players at the NFL combine had a navicular injury, there was a significant increase in percentage of players undrafted and a decreased percent of players who played two years in the NFL when compared to controls. This demonstrates the detrimental effect this injury may have to a player's career.

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