

**Title:**

**Documented Cannabis Use is a Risk Factor for Nonunion after Nonoperative Management of Scaphoid Fractures: A Retrospective Review of 159,998 Patients**

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**\*We would like our abstract to be considered for the H. Kirk Watson MD Founder's Award**

## **Abstract:**

**Introduction:** Our purpose was to study the association between cannabis and nonunion in the scaphoid fracture population. Previous literature shows that cannabis may have an impact on bone mineral density. We hypothesized that documented cannabis users are at greater risk for nonunion after sustaining a scaphoid fracture that is managed non-operatively.

**Methods:** This is a retrospective, matched cohort study using the Pearl Diver dataset (2010-2020). All patients above the age of 18 who sustained a scaphoid fracture treated non-operatively were identified. Patients were divided into three groups: non-cannabis/non-tobacco users, cannabis only users, and tobacco only users. Statistical matching was then done to arrive at three matched cohorts, which controlled for age, gender, and comorbidities. Nonunion rates at six months, one year, and two years after fracture diagnosis were determined. Multivariate analysis was done to assess whether documented cannabis and tobacco were independent predictors of scaphoid nonunion as well as surgical intervention for a scaphoid nonunion.

**Results:** A total of 145,467 patients who sustained scaphoid fractures were non-cannabis/non-tobacco users, 13,132 patients were tobacco only users, and 1,399 patients were cannabis only users. Amongst the matched cohorts, overall nonunion rates were 7.7% for the non-cannabis/non-tobacco group, 11.8% for the tobacco only group, and 10.1% for the cannabis only group ( $p=0.0013$ ). After performing multivariate analysis, cannabis only users (OR: 1.44,  $p=0.0107$ ) and tobacco only users (OR: 1.62,  $p=0.004$ ) were associated with a greater risk of scaphoid nonunion at six months, one year, and two years after index fracture diagnosis (Table 1). Tobacco use ( $p<0.0001$ ) and cannabis use ( $p=0.0018$ ) were also independently predictive of a surgical intervention for scaphoid nonunion (Table 2).

**Conclusion:** After controlling for age, gender, and comorbidities, documented cannabis use was an independent predictor of scaphoid nonunion at six months, one year, and two years after index fracture diagnosis. Further, cannabis use was also found to be associated with an increased risk for surgical intervention for nonunion. Our results suggest that just as we provide greater attention to scaphoid fracture patients who use tobacco, it may be clinically prudent to apply similar attention to patients who use cannabis.

**Tables:**

**Table 1.** Results of multivariate analysis: Assessing if cannabis users and tobacco users are associated with an increased risk for scaphoid nonunion at 6 months, 12 months, and 2 years after initial fracture diagnosis.

	<b>OR (95% CI)</b>	<b>P-value</b>
<b>Nonunion at 6 months</b>		
Non-users (Referent)	-	-
Tobacco Only	1.68 (1.27,2.25)	<b>0.0004</b>
Cannabis Only	1.45 (1.08,1.96)	<b>0.0151</b>
<b>Nonunion at 12 months</b>		
Non-users (Referent)	-	-
Tobacco Only	1.65 (1.26,2.18)	<b>0.0003</b>
Cannabis Only	1.45 (1.09,1.92)	<b>0.0107</b>
<b>Nonunion at 2 years</b>		
Non-users (Referent)	-	-
Tobacco Only	1.62 (1.24,2.13)	<b>0.004</b>
Cannabis Only	1.44 (1.09,1.90)	<b>0.0107</b>

**Table 2.** Results of multivariate analysis: Assessing if cannabis users and tobacco users are associated with an increased risk for subsequent surgery for scaphoid nonunion at 6 months, 12 months, and 2 years after initial fracture diagnosis.

	<b>OR (95% CI)</b>	<b>P-value</b>
<b>Surgery for Nonunion at 6 months</b>		
Non-users (Referent)	-	-
Tobacco Only	2.43 (1.52,3.98)	<b>0.0003</b>
Cannabis Only	2.14 (1.32,3.54)	<b>0.0025</b>
<b>Surgery for Nonunion at 12 months</b>		
Non-users (Referent)	-	-
Tobacco Only	2.43 (1.59, 3.80)	<b>&lt;0.0001</b>
Cannabis Only	2.01 (1.28, 3.18)	<b>0.0025</b>
<b>Surgery for Nonunion at 2 years</b>		
Non-users (Referent)	-	-
Tobacco Only	2.52 (1.65, 3.93)	<b>&lt;0.0001</b>
Cannabis Only	2.05 (1.32, 3.24)	<b>0.0018</b>