

The Snuffbox: The Effect of Smokeless Tobacco Use on Scaphoid Fracture Healing

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INTRODUCTION: Smoking has been demonstrated to be a risk factor for nonunion of scaphoid fractures, but it is unclear if chewing tobacco confers similar risk. The purpose of this study was to evaluate rates of bone-related complications after nonsurgical management of scaphoid fractures in smokeless tobacco users compared to matched controls and compared to smokers.

METHODS: A retrospective cohort study was conducted using a large insurance database. For patients who underwent nonsurgical management of scaphoid fractures, 212 smokeless tobacco users and 6,048 smokers were matched 1:4 with controls (n = 848 and 24,192, respectively), and 212 smokeless tobacco users were matched 1:4 with 848 smokers. Rates of bone-related complications within 2 years of initial injury were compared using multivariable logistic regression.

RESULTS: From weeks 12 through 104 following initial injury, compared to controls who do not use tobacco, the smokeless tobacco cohort demonstrated significantly higher rates of nonunion (5.7% vs. 2.7%, OR: 2.07). Compared to controls who do not use tobacco, the smoking cohort demonstrated significantly higher rates of nonunion (4.3% vs. 2.6%, OR: 1.91), repair of nonunion (1.5% vs. 0.9%, OR: 1.87), and 4 corner fusion and proximal row carpectomy (0.3% vs. 0.1%, OR: 3.17). Smokeless tobacco use was significantly underdiagnosed in the adult male population of unilateral scaphoid fractures with two years of follow up found in the database (372 of 25,704, 1.45%) relative to Centers for Disease Control estimates for adult male smokeless tobacco use (4.5%) (p<0.001).

DISCUSSION AND CONCLUSION: Given the higher rates of nonunion diagnoses following nonsurgical management in this population, surgeons should consider asking all patients with scaphoid fractures if they use smokeless tobacco or smoke and consider adding this to the patient's intake history to further identify patients at risk for nonunions. Tobacco cessation counseling is indicated for all tobacco users, including smokeless with scaphoid fractures.

Table 1: Demographics of smokeless cohort versus matched controls, smoking cohort versus matched controls, and smokeless cohort versus matched smoking cohort

	Controls for Smokeless (n=848)				Smokeless (n=212)				Controls for Smoking (n=24,192)				Smoking (n=6,048)				Matched Smokeless (n=548)				Matched Smokers (n=2112)									
	n	%	count	p	n	%	count	p	n	%	count	p	n	%	count	p	n	%	count	p	n	%	count	p						
Female	432	50.9	432	<.001	106	50.0	106	<.001	12096	49.9	12096	<.001	3024	50.0	3024	<.001	274	50.0	274	<.001	700	50.0	700	<.001	1752	50.0	1752	<.001		
Age (years) Mean ± SD	43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2	
Female	85	39.9%	21	0.0001	1108	45.7%	2329	0.0001	69	32.5%	21	0.0001	43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2		43.2 ± 18.2	
IELT (years) SD	5.8 ± 4.3		4.4 ± 4.1	<.001	8.8 ± 3.8		8.0 ± 3.8	<.001	4.2 ± 3.8		4.3 ± 4.1	<.001	4.3 ± 4.1		4.3 ± 4.1		4.3 ± 4.1		4.3 ± 4.1		4.3 ± 4.1		4.3 ± 4.1		4.3 ± 4.1		4.3 ± 4.1		4.3 ± 4.1	
Obesity	289	34.1%	73	0.0001	848	34.8%	1358	0.0001	206	97.0%	52	24.5%	31.8%		52	24.5%	31.8%		52	24.5%	31.8%		52	24.5%	31.8%		52	24.5%	31.8%	
Diabetes	289	34.1%	73	0.0001	848	34.8%	1358	0.0001	206	97.0%	52	24.5%	31.8%		52	24.5%	31.8%		52	24.5%	31.8%		52	24.5%	31.8%		52	24.5%	31.8%	
Hypertension	417	49.2%	124	0.0001	848	34.8%	1358	0.0001	451	53.2%	128	60.2%	31.8%		128	60.2%	31.8%		128	60.2%	31.8%		128	60.2%	31.8%		128	60.2%	31.8%	
CCPD	289	34.1%	59	0.0001	848	34.8%	1358	0.0001	211	98.6%	58	28.0%	31.8%		58	28.0%	31.8%		58	28.0%	31.8%		58	28.0%	31.8%		58	28.0%	31.8%	
Chronic Kidney Disease	147	17.1%	29	0.0001	848	34.8%	1358	0.0001	63	29.8%	28	13.2%	31.8%		28	13.2%	31.8%		28	13.2%	31.8%		28	13.2%	31.8%		28	13.2%	31.8%	
Chronic Heart Disease	211	24.9%	39	0.0001	848	34.8%	1358	0.0001	148	70.0%	39	18.4%	31.8%		39	18.4%	31.8%		39	18.4%	31.8%		39	18.4%	31.8%		39	18.4%	31.8%	
Rheumatoid Arthritis	22	2.6%	5*	<.001	848	34.8%	1358	0.0001	13	6.1%	13	6.1%	31.8%		13	6.1%	31.8%		13	6.1%	31.8%		13	6.1%	31.8%		13	6.1%	31.8%	

Table 2: Fracture patterns of smokeless cohort versus matched controls, smoking cohort versus matched controls, and smokeless cohort versus matched smoking cohort

	Controls for Smokeless (n=848)				Smokeless (n=212)				Controls for Smoking (n=24,192)				Smoking (n=6,048)				Matched Smokeless (n=548)				Matched Smokers (n=2112)						
	n	%	count	p	n	%	count	p	n	%	count	p	n	%	count	p	n	%	count	p	n	%	count	p	n	%	count
Scaphoid Fracture Pattern	111	13.1%	30	0.0001	183	8.7%	407	7.7%	699	11.8%	29	13.7%	0.53	111	13.1%	30	0.0001	183	8.7%	407	7.7%	699	11.8%	29	13.7%	0.53	
Nonunited Distal	98	11.1%	21	0.0001	138	6.5%	324	5.4%	503	8.3%	21	9.6%	0.08	98	11.1%	21	0.0001	138	6.5%	324	5.4%	503	8.3%	21	9.6%	0.08	
Nonunited Middle	39	4.6%	5*	<.001	50	2.4%	119	2.3%	94	1.6%	5*	0.9%	0.02	39	4.6%	5*	<.001	50	2.4%	119	2.3%	94	1.6%	5*	0.9%	0.02	
Nonunited Proximal	40	4.7%	14	0.0001	137	6.5%	324	5.4%	496	8.2%	37	6.7%	0.02	40	4.7%	14	0.0001	137	6.5%	324	5.4%	496	8.2%	37	6.7%	0.02	
Displaced Distal	54	6.3%	12	0.0001	183	8.7%	407	7.7%	647	10.7%	46	8.4%	0.45	54	6.3%	12	0.0001	183	8.7%	407	7.7%	647	10.7%	46	8.4%	0.45	
Displaced Middle	13	1.5%	5*	<.001	22	1.0%	139	2.7%	854	14.1%	5*	0.9%	1.00	13	1.5%	5*	<.001	22	1.0%	139	2.7%	854	14.1%	5*	0.9%	1.00	
Displaced Proximal	216	25.5%	126	0.0001	1484	70.0%	3318	63.1%	481	79.7%	126	59.0%	0.22	216	25.5%	126	0.0001	1484	70.0%	3318	63.1%	481	79.7%	126	59.0%	0.22	

5 means patient identifier, the PseudoR software only displays exact patient counts when there are at least 5 patients. If there are fewer than 5 patients, the default number is automatically displayed as "5*", but when the PseudoR software calculates statistics, it utilizes the actual number of patients rather than the automatically displayed "5*"

Table 3: Complications of smokeless cohort versus matched controls, smoking cohort versus matched controls, and smokeless cohort versus matched smoking cohort

	Controls for Smokeless (n=848)				Smokeless (n=212)				Controls for Smoking (n=24,192)				Smoking (n=6,048)				Matched Smokeless (n=548)				Matched Smokers (n=2112)							
	n	%	count	p	n	%	count	p	n	%	count	p	n	%	count	p	n	%	count	p	n	%	count	p	n	%	count	p
Complication	23	2.7%	12	0.0001	626	29.5%	263	12.4%	1391	22.9%	30	5.5%	11	2.0%	13	2.4%	1391	22.9%	263	12.4%	1391	22.9%	30	5.5%	11	2.0%	13	2.4%
Nonunion	14	1.7%	4*	<.001	222	10.5%	89	4.2%	187	3.1%	4*	0.7%	0.04	14	1.7%	4*	<.001	222	10.5%	89	4.2%	187	3.1%	4*	0.7%	0.04		
Repair of nonunion	5*	0.6%	1*	<.001	24	1.1%	9	0.4%	317	5.3%	5*	0.9%	0.03	5*	0.6%	1*	<.001	24	1.1%	9	0.4%	317	5.3%	5*	0.9%	0.03		
4 Corner / PRC	5*	0.6%	1*	<.001	24	1.1%	9	0.4%	317	5.3%	5*	0.9%	0.03	5*	0.6%	1*	<.001	24	1.1%	9	0.4%	317	5.3%	5*	0.9%	0.03		
DRS	5*	0.6%	1*	<.001	24	1.1%	9	0.4%	317	5.3%	5*	0.9%	0.03	5*	0.6%	1*	<.001	24	1.1%	9	0.4%	317	5.3%	5*	0.9%	0.03		

5 means patient identifier, the PseudoR software only displays exact patient counts when there are at least 5 patients. If there are fewer than 5 patients, the default number is automatically displayed as "5*", but when the PseudoR software calculates statistics, it utilizes the actual number of patients rather than the automatically displayed "5*"