## Kinesiophobia and Pain Catastrophizing Leads to Decreased Return to Sport following Autologous Chondrocyte Implantation but Does Not Affect Return to Work

Jairo Triana, Naina Rao<sup>1</sup>, Michael Buldo-Licciardi, Ariana Lott, Nicole D Rynecki, Jordan Eskenazi<sup>2</sup>, Michael J Alaia<sup>3</sup>, Laith M Jazrawi<sup>4</sup>, Eric Jason Strauss, Kirk A Campbell

<sup>1</sup>NYU Langone, <sup>2</sup>NYU Langone Health, <sup>3</sup>NYU Langone Orthopedic Center, <sup>4</sup>Center For Musculoskeletal Care

INTRODUCTION: This study is to evaluate the effect of fear of reinjury on return to sport (RTS), return to work (RTW), and clinical outcomes following autologous chondrocyte implantation.

## METHODS:

A retrospective review of patients who underwent autologous chondrocyte implantation (ACI) with a minimum of 2-year clinical follow up was conducted. Patient-reported outcomes collected included the Visual Analog Scale (VAS) and Knee Injury and Osteoarthritis Outcome Score (KOOS). Kinesiophobia and pain catastrophizing was assessed using the Tampa Scale of Kinesiophobia-11 (TSK-11) and Pain Catastrophizing Scale (PCS), respectively. Patients were surveyed on their RTS and RTW status.

## **RESULTS:**

Fifty-seven patients (50.9% female) were included in our analysis. Twenty-two (38.6%) patients did not RTS. Of the 35 patients (61.4%) who returned, nearly half (48.6%) returned at a lower level of play. TSK-11 scores (p=0.003), PCS (p=0.001), and VAS pain scores (p<0.001) were significantly greater in patients that did not RTS compared to those who returned. All KOOS subscores analyzed were significantly lower (p <0.001) in patients that did not RTS compared to those who returned at the same level or higher. Of the 44 (77.2%) patients previously employed, 97.7% returned to work. Increasing TSK-11 scores were associated with lower odds of returning to sport (p=0.003). DISCUSSION AND CONCLUSION:

Fear of reinjury decreases the likelihood that patients will return to sport after autologous chondrocyte implantation. Patients that do not return to sport report significantly greater levels of fear of reinjury and pain catastrophizing, and lower clinical knee outcomes. Nearly all patients were able to return to work after surgery.

	Symp	toms	No Reta	Pain Im to Spor	Sport Return	Activity to Sport	9	CL.	
	16	34			7	29	35	33	
5	_						_		
D	_		_				_		
15	- 10								
20									
15									
30						1			
35				1				1	
40									

2 - 2	
A STATE OF THE OWNER	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Kon Only #1.6	Kan Pala
R=-0.45, p<0.001	$R = -0.27, \rho = 0.009$
£ 🛌 . £	
The Participan	A.C. COL
and a start of the start	
Kenigers	Kee Longton
BR=-0.89, p<0.001	R = -0.57, p < 0.001
1	and the first
and the second se	
for pain state	Nan Tak
R=-0.6, p<0.001	R = -0.41, p = 0.002
and predest	
and the second second	and the second sec
1.11	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
And and a second	hardener -

A R = -0.65, p < 0.001 R = -0.65, p < 0.001

Figure 2. Scatter plots depicting correlations of fear of reinjury (TSK-11) and pain catastraphicing (PCS) with patient reported outcomes. A. Rolationship between TSK-11 and KOOS B. Relationship between PCS and KOOS.

	All (s=57)	No Ratura to Sport (se-22)	Rotum to Sport #150	p-sala
4.09	100	38.6	62.4	
Aar	29.11 (9.25)	38,99 (833)	28.17 (9.8%	8.543
104E	25.66 (6.85)	2443(4.90)	26.58 (6.65)	8,316
Avangs Killew op (regel)	6.29 (1.55)	6.83 (2.46)	5.89 (2.59)	6.136
Ses. = (%)				
Fenale	29158.91	15 (58.2)	14(403)	£.072
Male	28(49.1)	7(01.6)	21(60.0)	
Sergery Type, n (%)				
ACI	33 (57.5)	13 (58.0	20(07.1)	1
MACI	24(42.1)	9 (83.5)	15 (42.8)	1
Highest Sport Level, n (%)				
Leines	45178.91	16172.71	29(82.9)	8.562
Collegiste Pro	12(21.1)	6(27.3)	6(03.0)	

-	ble		
Table 2. Outcomes 5	cores, Concenitant Procedur	es, and Losion Location by Rate	ara to Sport Status
	No Ratura to Sport	Ration to Soviet	a-value
8005			
Symptom	62.73 (20.46)	82.00 (15.87)	<3.000
hia	34.12 (16.63)	91.91(0.99)	-9.001
Sport/Ras	41.36(25.41)	15.86 (23.15)	-3.005
Q3L	34.38(22.47)	79.18 (25.83)	-8.601
TSE-11	36.59-(3.81)	22.00 (5.16)	0.865
PCS	9.41 (9.42)	2.83 (6.57)	0.801
YAS Pain	43.86-(36.51)	12.83 (18.95)	~8.000
Satisfaction	62.68 (35.39)	84.45 (22.54)	0.807
Size of defect, (an?)	3.64 (1.82)	3.28 (1.22)	0.855
Concomitant Precodures, a (%)			
110	17 (77.3)	13 (51.4)	0.895
MPER	2(93)	5(14.3)	0.847
Lateral Release	3(13.6)	2(5.7)	0.583
Cloudoplety	1 (4.5)	2(57)	1
MAT	114.55	0	0.815
Maniecectomy	1(4.5)		0.813
Lesion Location, n (%)			
LIC .	1(4.5)	5 (34.3)	0.485
MFC	21935	602.0	
Pada	13 (19.1)	17(81.6)	
Truckles	6(27.3)	7 (28.0)	

	No Return to Sport	Return to Sport Lower Land	Erium to Sport at Sumo Higher Level	p-value
	22	18	17	
Aw	38,99 (8,13)	30.11 (10.37)	2612(9.20)	6.284
104	2443(439)	28.3 (7.07)	23.97 (3.43)	8.054
Sex, a 1%è				
Fenale	15 (98.2)	7 (38.9)	7 (41.2)	6.116
Male	7(01.0)	11 (91.1)	10(08.8)	
N005				
Systematic	62.73 (20.40)	29.44-(19.8T)	H/101460	6.001
Pain	76.12 (16.67)	99.35 (10.6Z)	94.27 (5.88)	-0.00
Spon Rate	41.36(25.41)	62,78-05351	\$4.41(16.09)	-0.003
Q01.	34.38 (22.47)	60.42 (25.46)	865(0124)	-8.091
T9K-11	26,9913,811	23,22 (7,96)	20.71 (3.01)	8.005
PCS	9.41 (9.42)	2.61 (5.25)	3.06 (3.77)	8.004
VAS Pain	43.86 (25.51)	17.72 (34.89)	1.65 (9.59)	6.117
Saindaction	62.68 (35.39)	82.89 (22.35)	86.12 (24.12)	6.684
E0-E, body mass i	9.41 (9.42) 43.86 (35.51) 42.88 (35.39) (vs. 875: samehigher level ndex (30.06, lase njavy an de Eau, researchigher level	2.61 (5.25) 17.72 (34.86) 82.89 (32.37) p=0.625 d concentration exter	3.08 (3.77) 7.65 (9.59) 86.12 (24.12)	