

# Higher signal intensity of repaired lateral meniscus on MRI indicates the risk of residual anterolateral knee laxity after ACL reconstruction

Daisuke Chiba, Yuji Yamamoto, Yuka Kimura, Eiji Sasaki, Takahiro Tsushima, Eiichi Tsuda, and Yasuyuki Ishibashi

Department of Orthopaedic Surgery, Hirosaki University  
Department of Rehabilitation Medicine, Hirosaki University



# Conflict of Interest

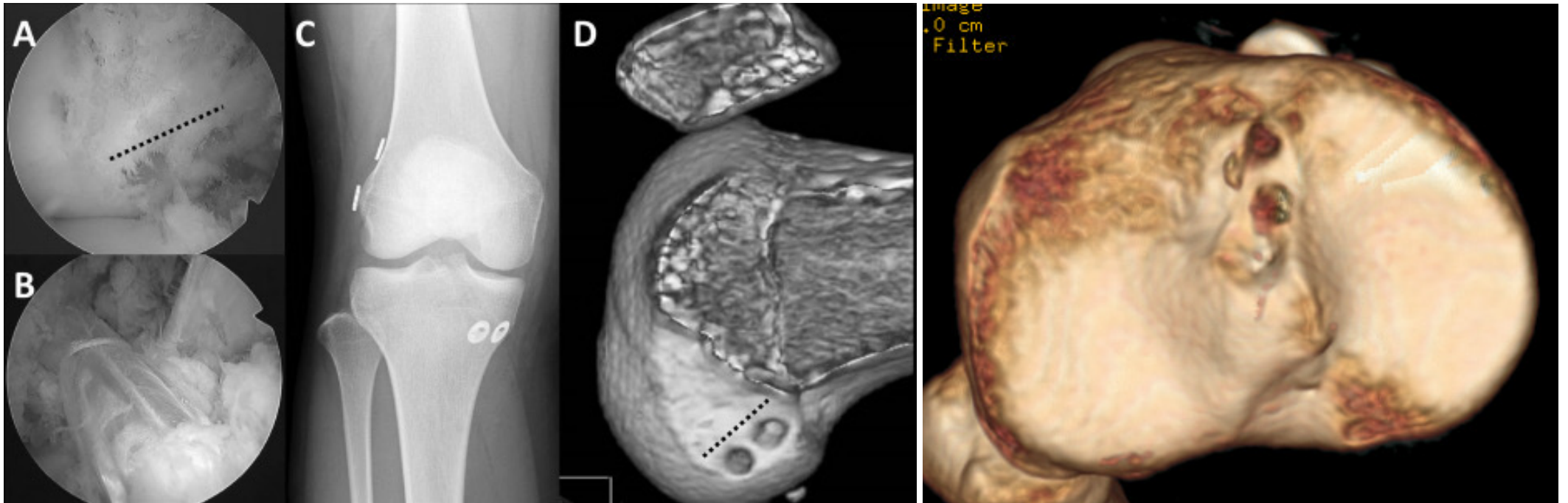
**Every authors has nothing to declare.**

# Purpose

**This study is aimed to evaluate the longitudinal relationship between the signal intensity (SI) of lateral meniscus repair (LMR) on MRI and Anterolateral knee laxity (ALLx) after ACLR.**

# Subjects: 87 cases

## Anatomical DB-ACLR + LMR



Sasaki S, AJSM. 2016

# Evaluation of knee laxity

**□ 1 year after ACLR**

**Definition of ALLx:**

**≥ IKDC grade 1**

**Pivot-shift test**

# MRI-SI in LMR

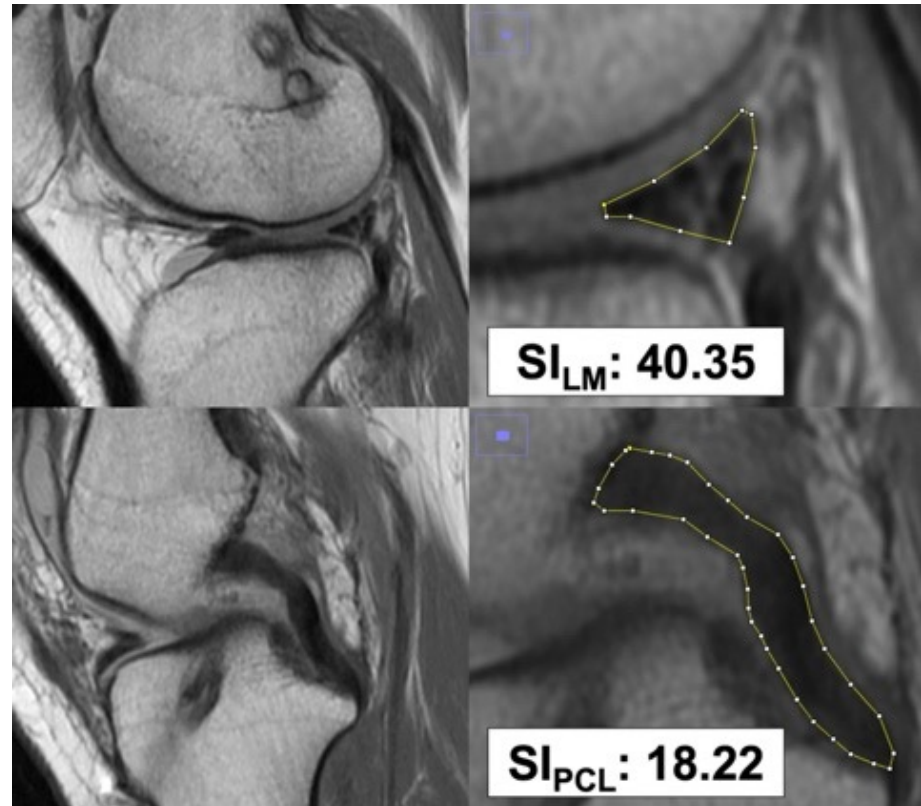
□ SI ratio: SIR (3M, 6M, 12M)

✓ **PDW**

Proton-density weighted image

✓ **T2W**

T2 weighted image



	Area	Mean	Min	Max
1	1610	40.352	12	83
2	8457	18.222	1	42

$$\text{SIR} = [\text{SI}_{\text{LM}}] / [\text{SI}_{\text{PCL}}]$$

$$\text{Ex. SIR} = 2.22$$

# Statistical Analysis

- Mann-Whitney U test
- Repeated measured ANOVA
- Logistic regression analysis
- ✓ Dependent variable → SIR
- ✓ Independent variable → Prevalence of ALLx

# Demographic data

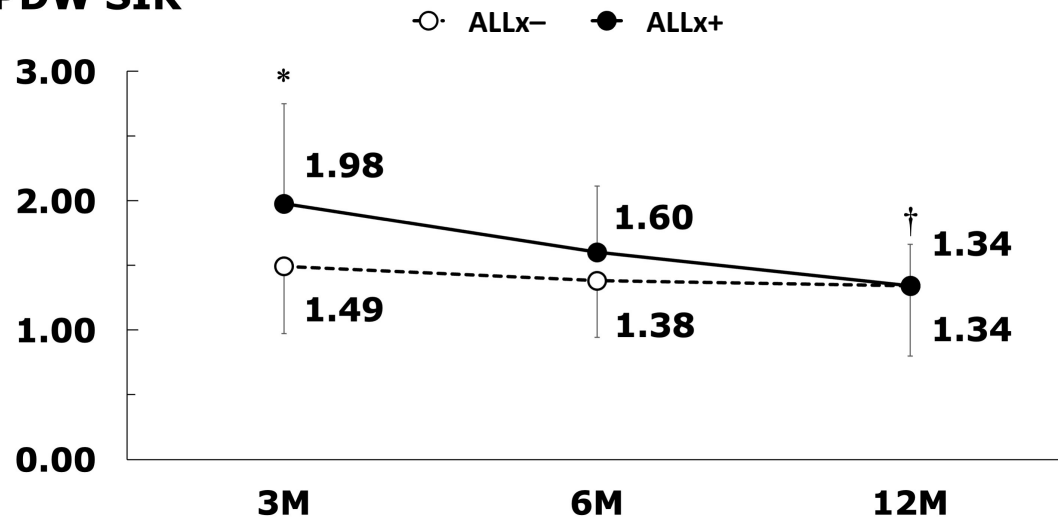
	ALLx – (N = 75)	ALLx + (N = 12)
Age	24.0 ± 11.0	20.8 ± 6.6
Height (cm)	165.6 ± 8.2	164.6 ± 5.8
Weight (kg)	64.3 ± 12.0	63.9 ± 13.8
BMI	23.6 ± 3.6	24.2 ± 4.7
Tegner activity score	6.7 ± 1.5	6.5 ± 2.0
Duration from injury to surgery	263.7 ± 1101.8	84.1 ± 105.4
<b>Side-to-side difference of KT-1000</b>	<b>0.5 ± 0.6</b>	<b>1.6 ± 0.9*</b>

\*Mann-Whitney U test: P ≤0.05, ALLx – vs. ALLx +

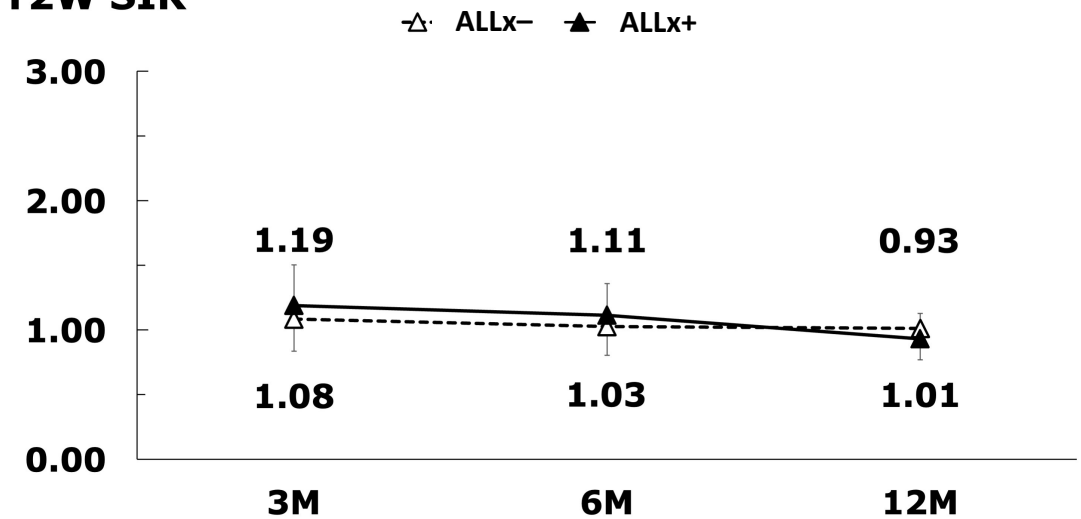


# SIR by ALLx +/-

PDW SIR



T2W SIR



\*Mann-Whitney U test:  $P \leq 0.05$ , ALLx - vs. ALLx +

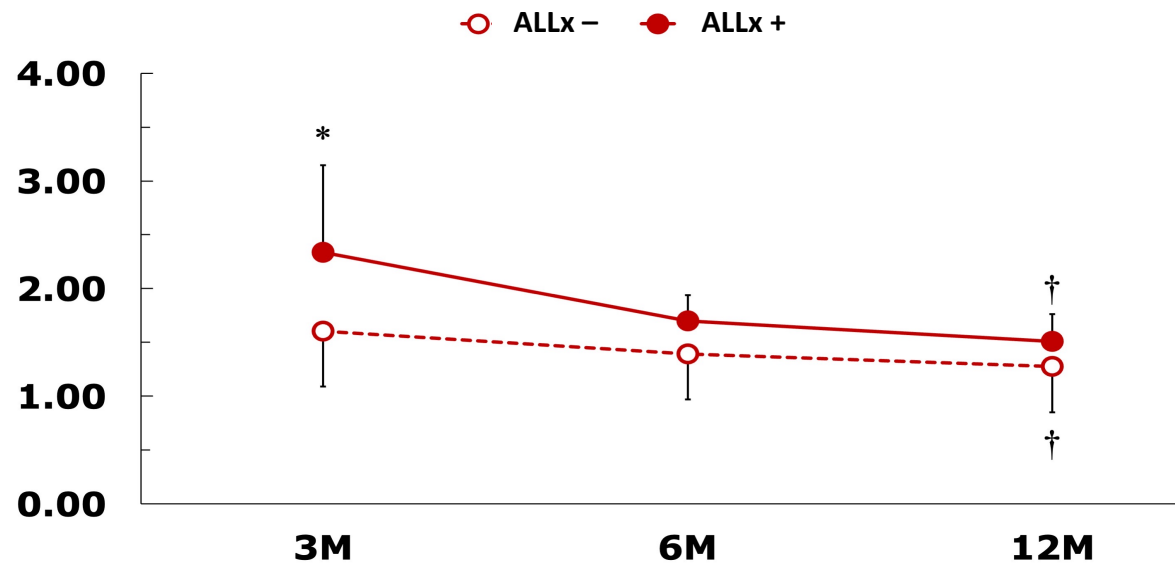
†Repeated measured ANOVA:  $P \leq 0.05$ , 3M vs. 12M

# PDW-SIR by ALLx +/-

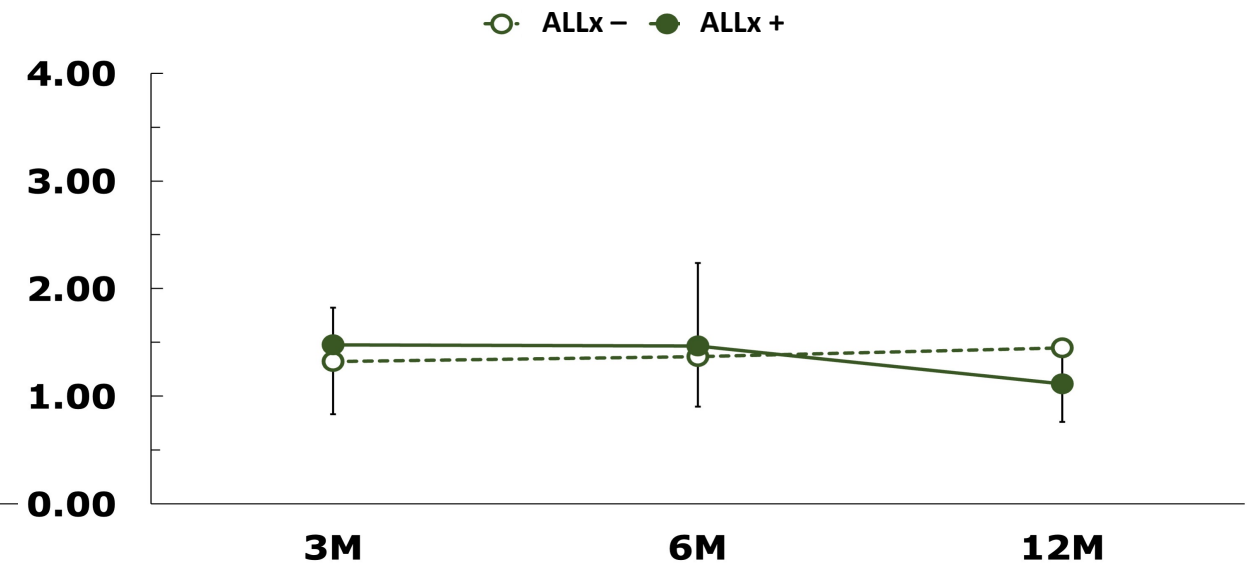
Younger population ( $\leq 22$  years old)  
Total Number = 53, ALLx = 7 (13.2%)

Older population ( $>22$  years old)  
Total Number = 34, ALLx = 5 (14.7%)

PDW  $\leq 22$  years old



PDW  $>22$  years old



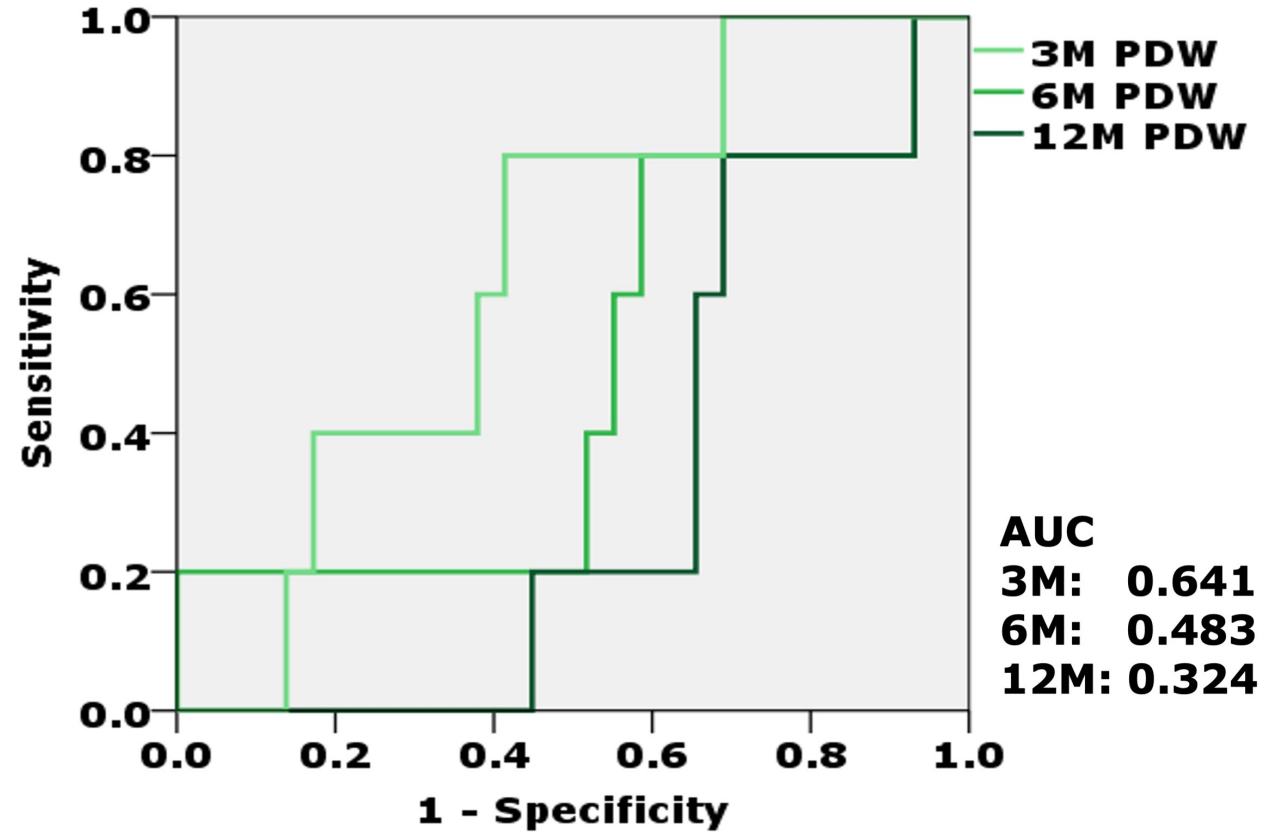
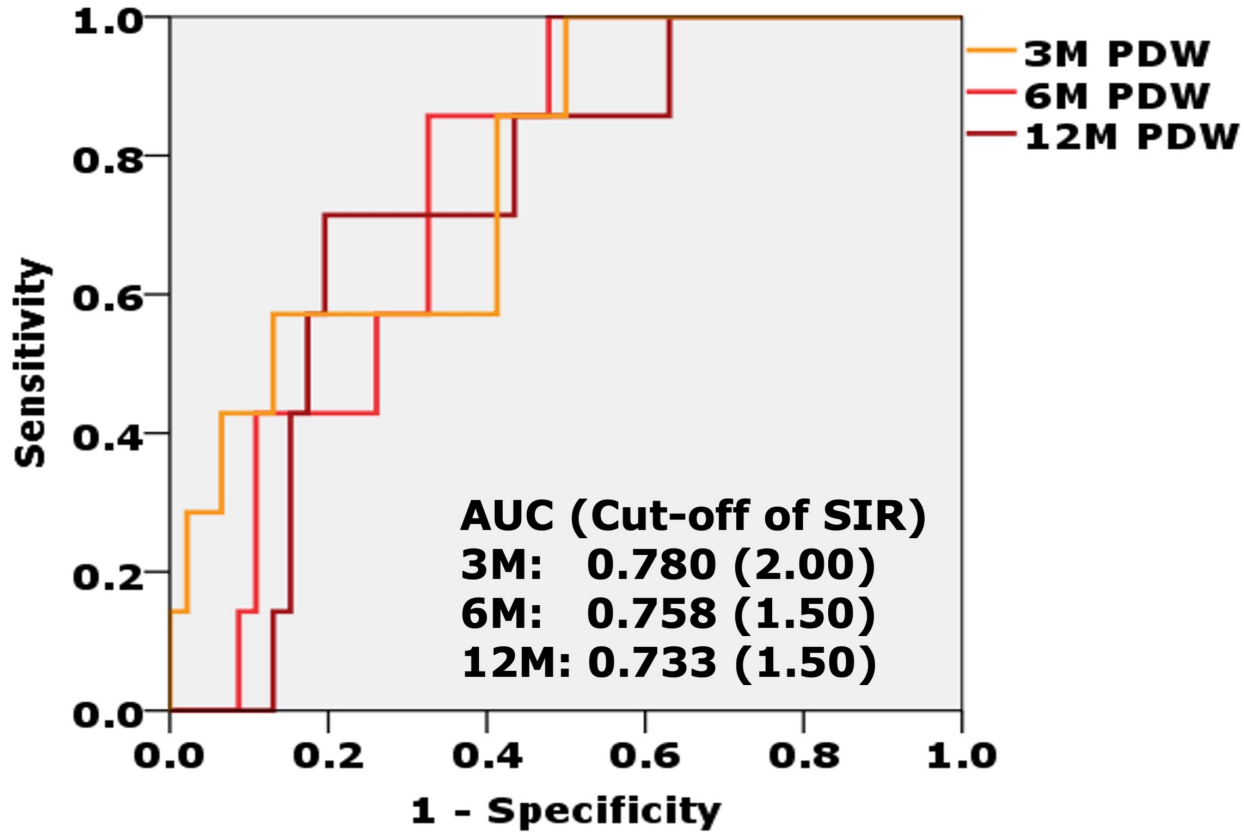
\*Mann-Whitney U test:  $P \leq 0.05$ , ALLx - vs. ALLx +

†Repeated measured ANOVA:  $P \leq 0.05$ , 3M vs. 12M

# ROC curves of PDW

**≤22 years old**

**>22 years old**



# Logistic regression analysis

**Patients  $\leq 22$  years old, Total Number = 53, ALLx = 7 (13.2%)**

Independent variable: Prevalence of ALLx  
 Dependent variable: PDW-SIR

		B	P-value	OR	95% CI	
$SIR_{3M} \geq 2.00$	Crude	2.19	0.013	8.89	1.58,	49.91
	Adjusted	2.33	0.025	10.24	1.34,	78.18
$SIR_{3M} \geq 2.00 + SIR_{6M} \geq 1.50$	Crude	2.64	0.004	14.00	2.28,	85.94
	Adjusted	2.81	0.011	16.56	1.93,	142.34
$SIR_{3M} \geq 2.00 + SIR_{6M} \geq 1.50 + SIR_{12M} \geq 1.50$	Crude	2.80	0.008	16.50	2.10,	129.63
	Adjusted	3.16	0.014	23.57	1.87,	296.27

B: Regression coefficient, OR: Odds ratio

# Conclusion

- Higher SI of LMR indicated the higher odds of ALLx after ACLR + LMR in younger population.
- Higher SI of LMR is associated with LM incomplete healing and dysfunction.

*Thank you for your attention!!*

