

# **Concomitant medial ramp lesions and lateral meniscal tears with anterior tibial subluxation in knee extension**

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**I have no COI with regard to our presentation**

# 【Introduction】

\* Anterior tibial subluxation (ATS) is seen in anterior cruciate ligament (ACL) injured knees in knee extension.

Almekinders LC, et al. Arthroscopy 2001

\* Preoperative ATS affects postoperative anterior and rotation stability and risks early graft failure.

Tanaka Y, et al. Orthop J Sport Med 2018

\* Preoperative ATS influenced knee stability after ACLR.

Takase R, Hatayama K, et al. ISAKOS 2019

# **【Purpose】**

The purpose of this study was to investigate the factors which are associated with preoperative ATS in ACL injured knees.

# **【Methods】**

## **\* The inclusion criteria**

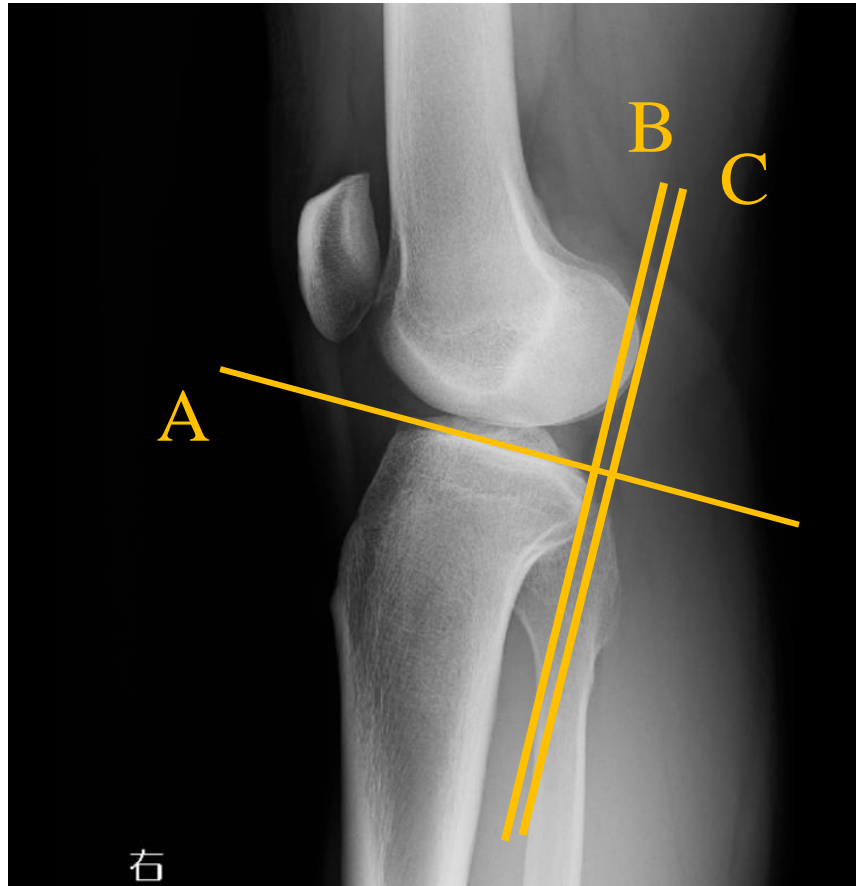
A total of 110 patients who underwent primary ACL reconstruction at our hospital from October 2017 to September 2021 were included (56 females, 54 males)

**\* The exclusion criteria :** Patients with ACL injury of contralateral knee

**\* Preoperatively,** all patients were taken lateral radiographs in full extension of both knees to evaluate ATS.

ATS was measured and side to side difference (SSD) was calculated.

# 【ATS measurement】



**A** : Medial tibial plateau

**B** : A line perpendicular to A and passing through the midpoint of the medial and lateral condyles of tibia

**C** : A line perpendicular to A and passing through the midpoint of the medial and lateral condyles of femur

**ATS** was measured the distance from **B** to **C**

**\* Patients with a SSD of 2mm or more were placed in ATS positive group**

## 【Evaluation items】

- \* Age, Height, Weight, Gender, Time from injury to surgery, Mechanism of injury
- \* Posterior tibia slope (PTS), Hyperextension angle from knee radiographs
- \* Anterior tibial translation using Telos Stress device at 20 degrees
- \* Meniscal tear in arthroscopy



# 【Result】

\* ATS positive group **40** patients (mean  $3.4 \pm 1.4\text{mm}$ )

\* ATS negative group **70** patients (mean  $0.6 \pm 0.9\text{mm}$ )

	ATS (+) (n=40)	ATS (-) (n=70)	P value
Age (y)	$27.2 \pm 12.1$	$30.8 \pm 14.0$	0.155
Height (cm)	$166.1 \pm 8.4$	$165.1 \pm 8.7$	0.631
Weight (kg)	$68.3 \pm 19.3$	$67.5 \pm 15.6$	0.824
Sex (Male / Female)	21 / 19	33 / 37	0.692

	ATS (+) (n=40)	ATS (-) (n=70)	P value
Time from injury (day)	$355 \pm 555$	$544 \pm 1511$	0.350
Time from injury 3M or more	19 (48%)	24 (34%)	0.223
Time from injury 6M or more	15 (38%)	14 (20%)	0.071
Mechanism of injury NC / C	32 / 7	46 / 24	0.080



# 【Result】

		<b>ATS (+)</b> (n=40)	<b>ATS (-)</b> (n=70)	<b>P</b> <b>value</b>
<b>PTS (°)</b>		10.0 ± 2.9	10.1 ± 2.5	0.928
Hyper extension angle (°)	Injured side	-5.7 ± 4.2	-4.4 ± 3.9	0.118
	Contralateral	-6.7 ± 3.7	-5.8 ± 4.1	0.237
<b>ATT (mm)</b>		<b>8.3 ± 3.7</b>	<b>5.9 ± 3.5</b>	<b>0.001</b>

	<b>ATS (+)</b> (n=40)	<b>ATS (-)</b> (n=70)	<b>P</b> <b>value</b>
Meniscal tear	31 (78%)	44 (63%)	0.139
Ramp lesion	15 (38%)	19 (27%)	0.288
MM tear (excluding ramp lesion)	10 (25%)	17 (24%)	1.00
LM tear	18 (45%)	31 (44%)	1.00
LMPRT	8 (20%)	10 (14%)	0.436

**ATS (+) group had a significantly greater SSD in ATT**

# 【Result】 Meniscal tears and Amount of ATS

	ATS (mm)
ACL injured without meniscal tear (n=35)	1.1 ± 1.5

**VS**

	ATS (mm)	P value
<b>Meniscal tear</b> (n=75)	<b>1.9</b> ± 1.8	<b>0.016</b>
<b>Ramp lesion</b> (n=34)	<b>2.2</b> ± 2.1	<b>0.016</b>
MM tear (excluding ramp lesion) (n=27)	1.7 ± 1.9	0.160
<b>LM tear</b> (n=49)	<b>1.9</b> ± 1.1	<b>0.021</b>
LMPRT (n=18)	2.1 ± 2.0	0.068

**The ATS was greater in Ramp lesion and LM tear group**

# 【Discussion】

## Factors associated with ATS

\* Anterior knee laxity

\* Meniscal tears

\* Steep posterior tibial slope

\* Hyperextension

\* Chronicity

\* Re-injury

## This study

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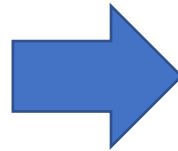
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	ATS (+)	ATS (-)	P value
ATT (mm)	<b>8.3</b> ± 3.7	<b>5.9</b> ± 3.5	<b>0.001</b>

	Ramp lesion	LM tear	ACL
ATS (mm)	<b>2.2</b> ± 2.1	<b>1.9</b> ± 1.8	<b>1.0</b> ± 1.5

• Preoperative ATS and Anterior knee laxity are risk factors for early graft failure

Tanaka Y, et al. Orthop J Sport Med 2018

• ATS is associated with chondral injuries and meniscal tears

Lucas SM, et al, Am J Sports Med 2017

# **【Conclusion】**

Anterior knee laxity and meniscal tears (ramp lesions, LM tears) affect preoperative ATS in ACL injured knees

# 【Reference】

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