

High-grade anterior tibial subluxation after ACL reconstruction is associated with the posterior tibial slope, preoperative anterior tibial subluxation, and the duration of ACL deficiency.

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COI Disclosure

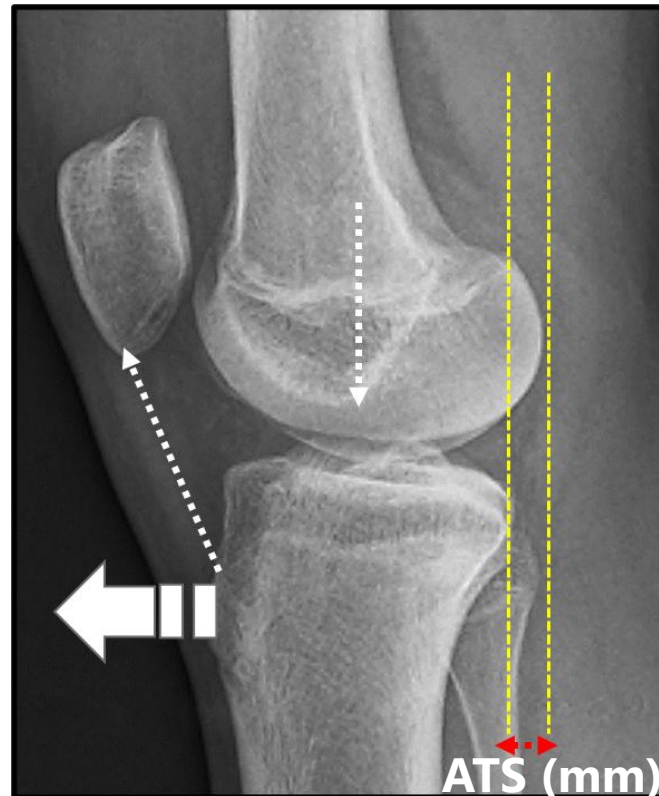
ISAKOS 2025

Ryo Kanto

There are no COI with regard to this presentation.

Introduction

**Excessive anterior tibial subluxation (ATS, >10mm)
has been recognized as a risk factor for graft failure
following anterior cruciate ligament reconstruction (ACLR).**



Bedi, KSSTA 2010

Grassi, AJSM 2019

Song, AJSM 2020

Purpose

To investigate the factors associated with increased ATS after ACLR.

【Method】

Study Participants

- Retrospective study
- 2016-2021
- ACLR 290 Knee



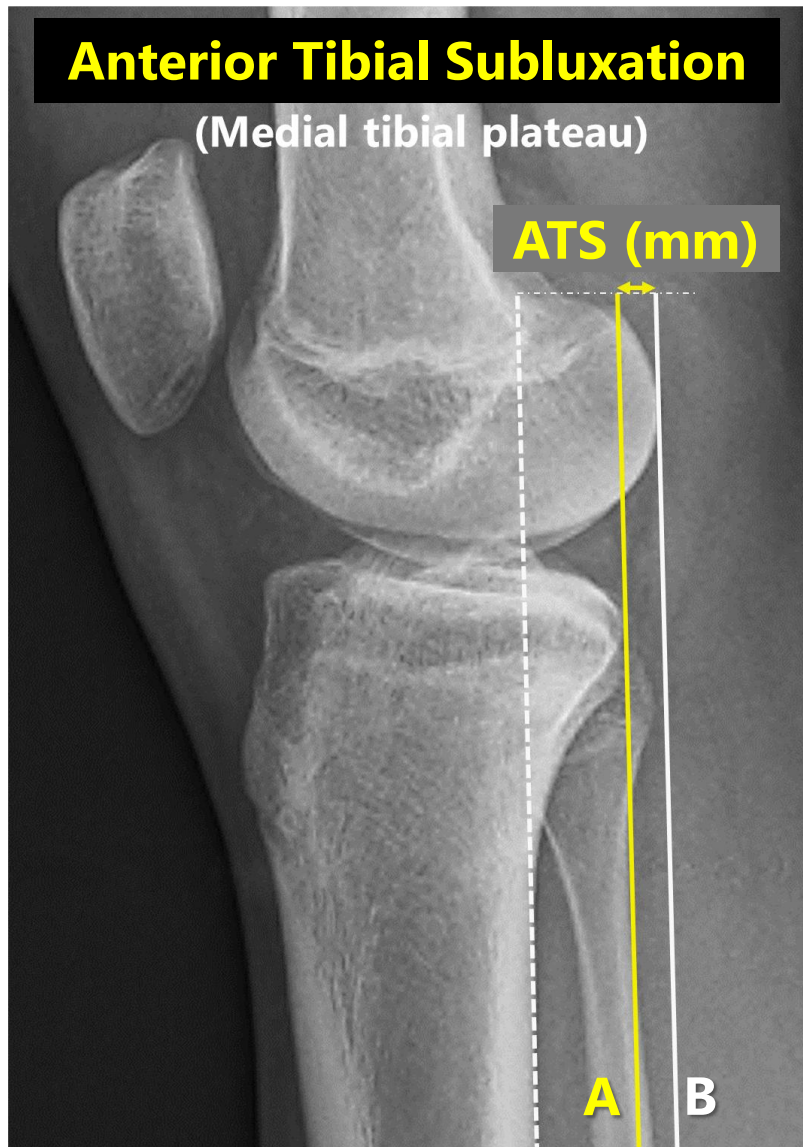
**Primary ACLR
196 膝**

Excluded (n=80)

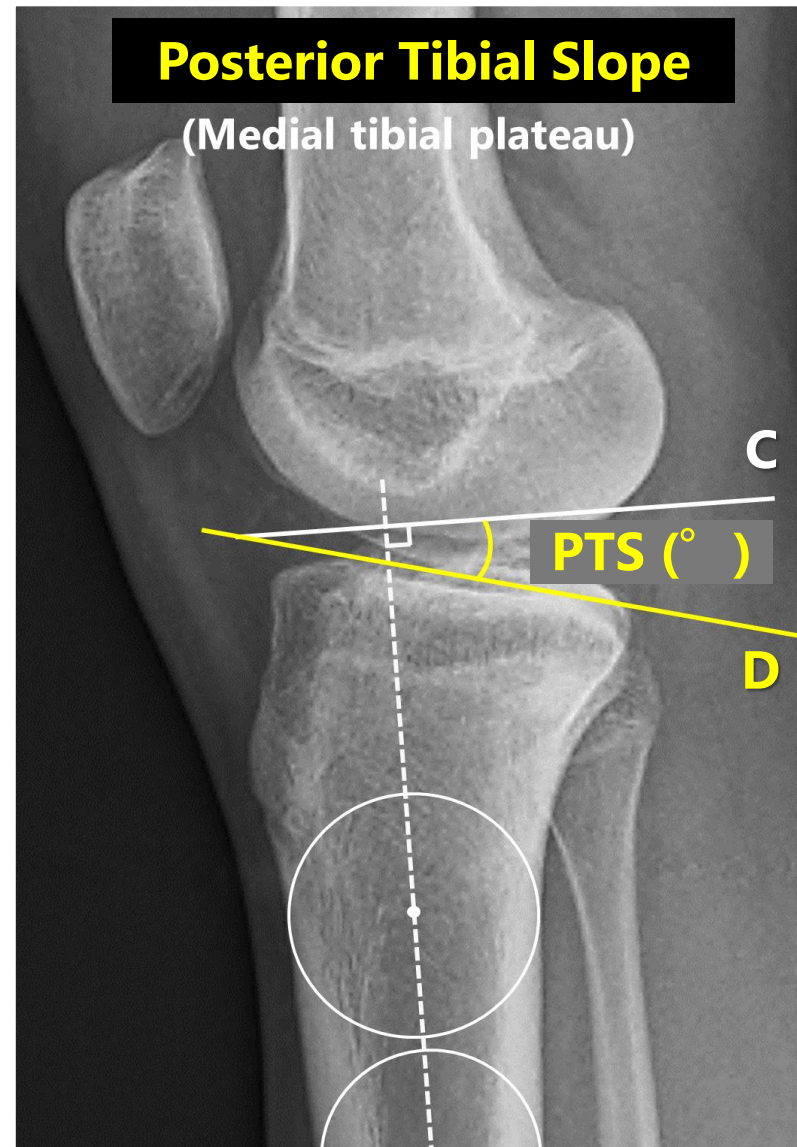
- Revision
- Concomitant lig. procedure
- Lack of data

n = 196	Mean ± SD (median / range)
Age	25.8 years (20 / 13-79)
Sex	Female, 110 (56%)
Follow-up	22.4 months (17 / 12-70)
Graft	ST(G), 181 (92.3%)

Radiographic Assessment



ATS : AB (mm)



PTS : CD (°)

Dejour, J Knee Surg 2017

Dejour, KSSTA 2019

【Result】

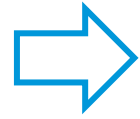
Clinical Characteristics

	n = 196	Mean ± SD (median / range)		
Pre-op, ATS (mm)		7.5	± 3.3	(8 / 0~17)
Post-op 1 year, ATS (mm)		4.6	± 3.2	(5 / 0~14)
PTS (°)		10.4	± 3.2	(10 / 3~21)
KT-1000, SSD (mm)		0.5	± 1.1	(0 / -3~4)
Time period from injury to surgery (mo)		9.3	± 20.1	(4 / 1-120)
Tegner activity scale		6.4	± 1.3	(7 / 3~9)
Lysholm score		93.3	± 7.9	(95 / 64~100)
Meniscal repair		82	(medial 58 / lateral 24)	
Partial meniscectomy		23	(medial 13 / lateral 10)	

SSD: side to side deference, PTS: posterior tibial slope, ATT: anterior tibial translation

Predictors of high-grade post-op ATS

Post-op ATS



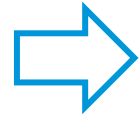
Low grade (≤ 5 mm) / High grade (> 5 mm)

Univariate Analysis

	Post-op ATS ≤ 5 (n = 140)		Post-op ATS > 5 (n = 56)		P value
Pre-op ATS	5.1	± 2.4	10.8	± 2.0	0.001
PTS	9.3	± 2.6	13.6	± 2.8	0.001
KT-1000, SSD	0.3	± 1.0	0.9	± 1.0	0.011
Time period from injury to surgery	8.6	± 20.4	17.7	± 20.7	0.029
Lysholm score	93.9	± 7.2	90.7	± 9.7	n.s.
Graft, ST/G	132	(94%)	47	(83%)	n.s.
Meniscal repair	60	(43%)	20	(36%)	n.s.
Partial meniscectomy	17	(12%)	6	(11%)	n.s.

Predictors of high-grade post-op ATS

Post-op ATS



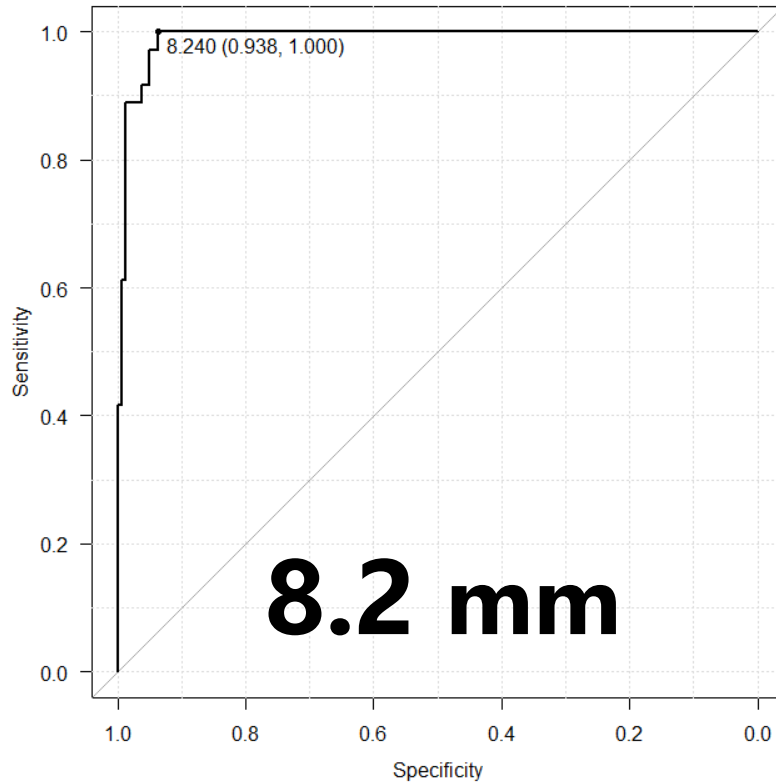
Low grade (≤ 5 mm) / High grade (> 5 mm)

Multivariate Logistic Regression Analysis

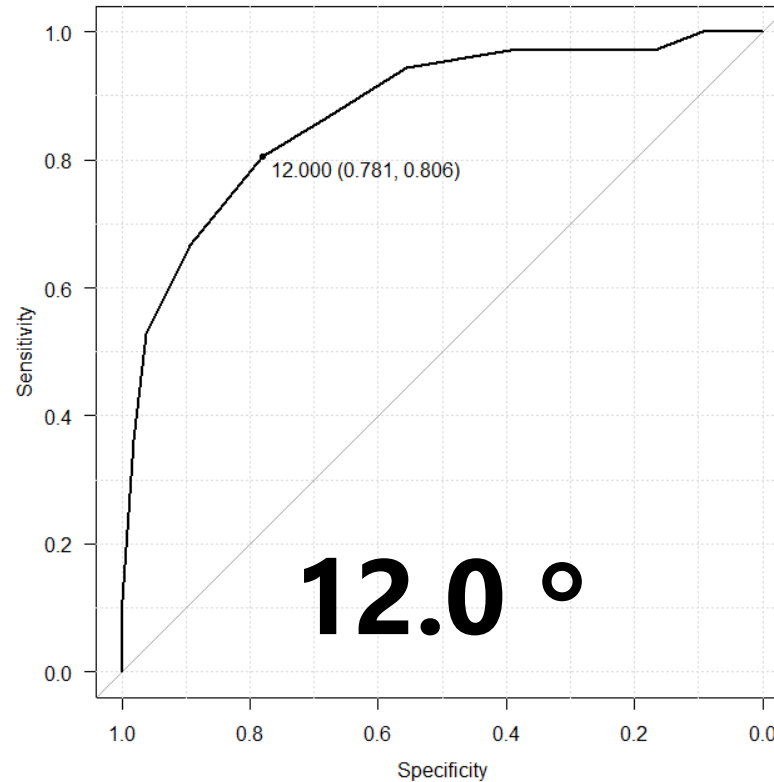
	Estimate	95% CI	P value
Pre-op ATS	0.071	0.056~0.085	0.001
PTS	0.017	0.004~0.031	0.013
KT-1000 SSD	-0.004	-0.04~0.04	n.s.
Time period from injury to surgery	0.006	0.002~0.01	0.001

ROC curve analysis (Cutoff value)

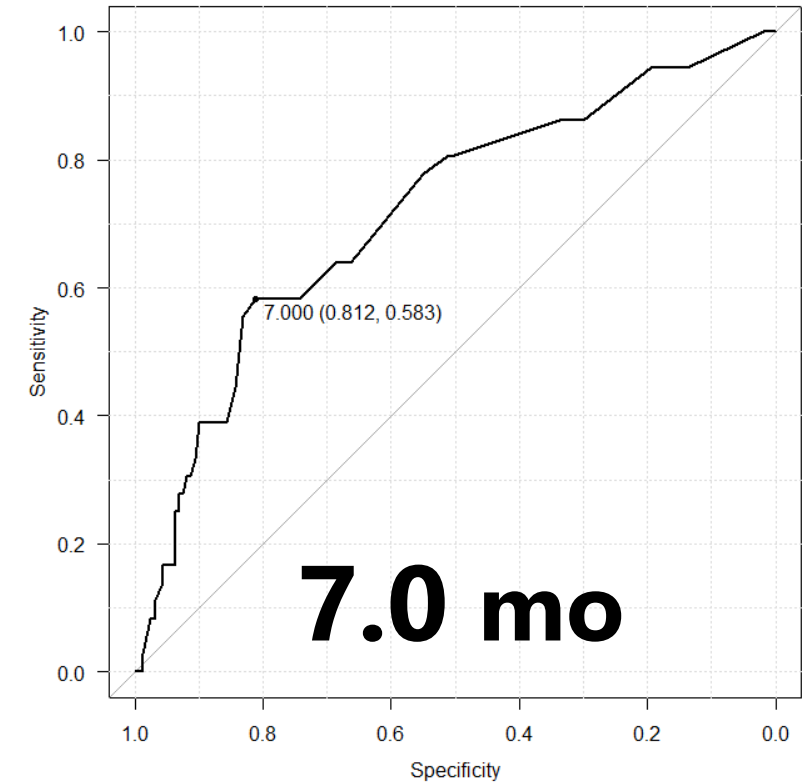
Pre-op ATS



PTS



Time period from injury to surgery



Pre-op ATS (cutoff value >8.2 mm), PTS (cutoff value >12°), and the time period from injury to surgery (cutoff value >7 months) were significantly associated with the high-grade post-op ATS.

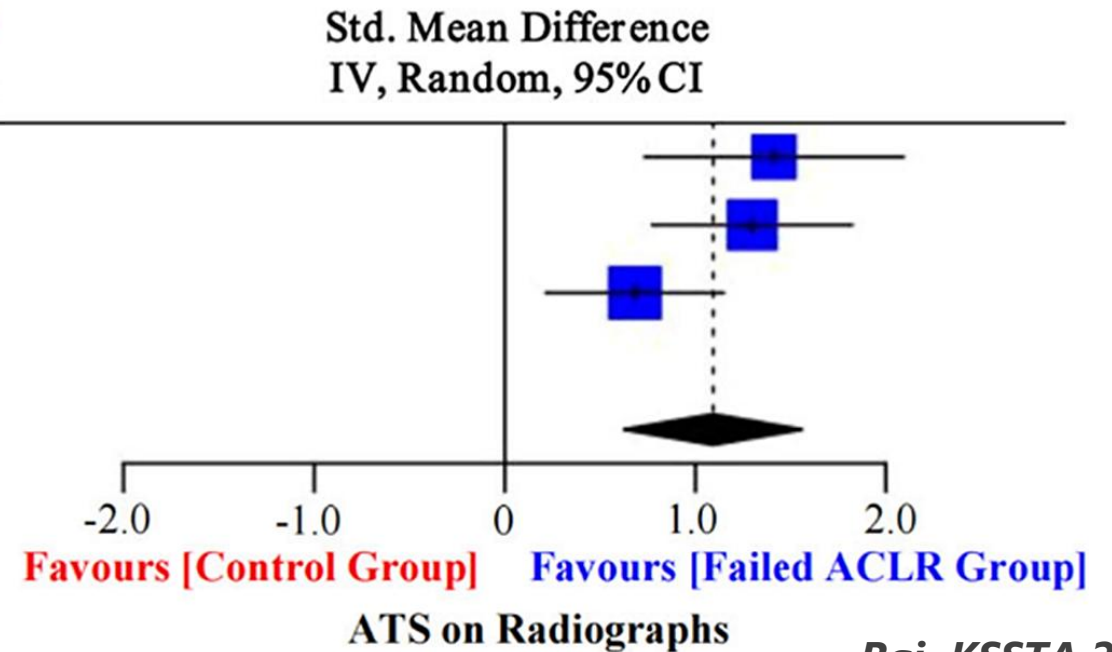
【Discussion】

■ Increased ATS is predictive risk factor of ACL graft failure.

Study	Control Group			Failed ACLR Group		
	Mean	SD	Total	Mean	SD	Total
Tanaka, et.al. 2018	2.40	1.80	65	4.90	1.40	11
Ni, et.al. 2020	4.10	3.10	50	8.30	3.40	25
Ye, et.al. 2022	8.90	2.20	56	10.70	3.30	28
Total (95% CI)			171			64

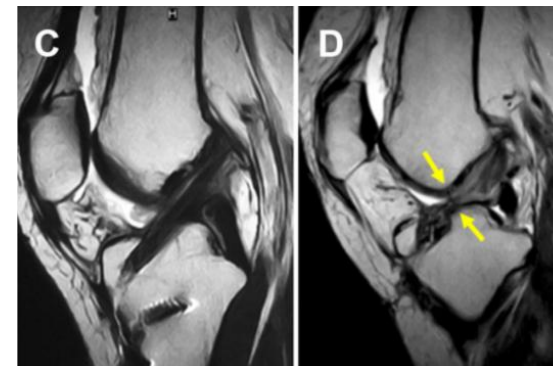
Heterogeneity: $\text{Tau}^2 = 0.09$; $\text{Chi}^2 = 4.35$, $\text{df} = 2$ ($p = 0.114$); $I^2 = 54\%$

Test for overall effect: $Z = 4.59$ ($p < 0.001$)



Bai, KSSTA 2025

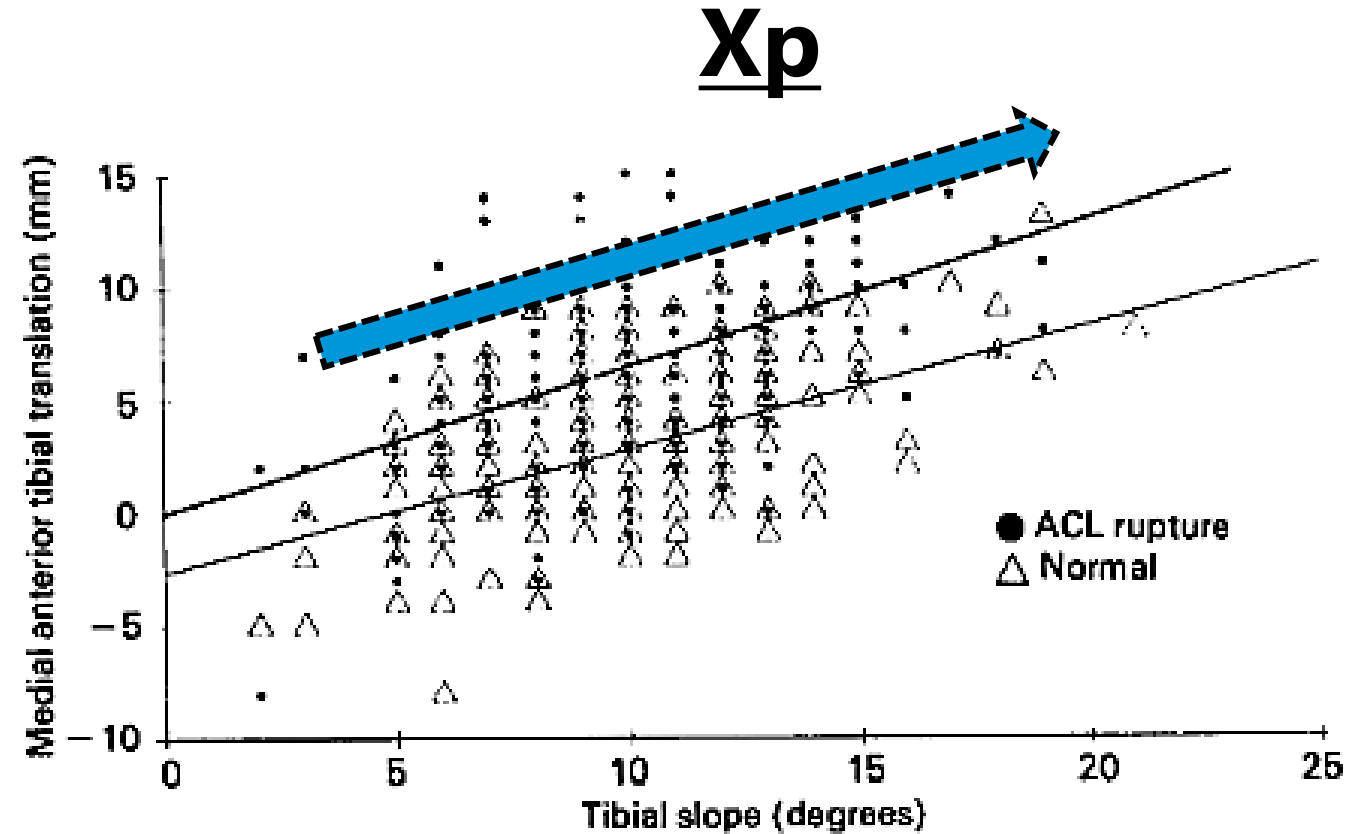
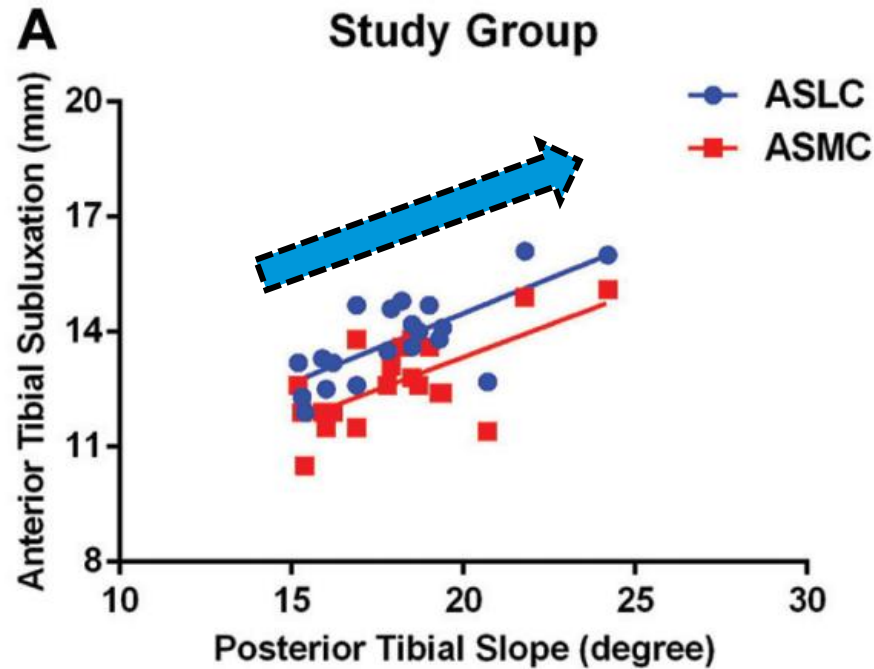
■ ATS may lead to excessive graft stress in the early postoperative phase.



Tanaka, OJSM 2018

Steeper PTS may predispose the knee to increased ATS

MRI



Dejour, JBJS 2022

Song, AJSM 2020

PTS ↑ → ATS ↑

Conclusion

High-grade post-op ATS is associated with a steep PTS ($> 12^\circ$) , increased preoperative ATT (> 8.2 mm), and chronic ACL deficiency (> 7 months).