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Morphologic features of the proximal tibia in middle-aged women with early knee osteoarthritis from Iwaki cohort study

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COI Disclosure

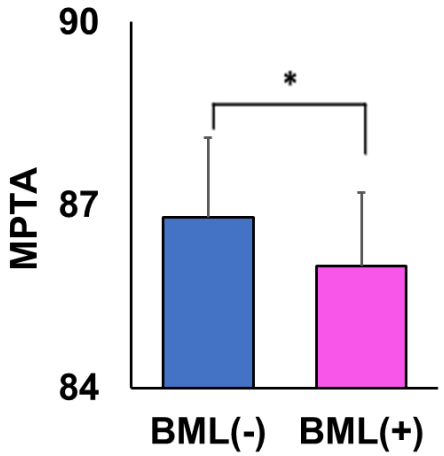
Presenting author: Ishibashi KH

The author has no conflict of interest to disclose with respect to this presentation.

Bone marrow lesions (BML) in early knee osteoarthritis (EKOA)

Presence of BML is associated with knee pain in EKOA

Ota S, et al. Sci Rep 2021



Greater medial proximal tibia angle (MPTA) is a risk of BML even in those without radiographic abnormalities

Ishibashi K, et al. KSSTA 2020

Association between 3-dimensional (3-D) morphology of proximal tibia and BML is unclear

Purpose

To compare 3-D proximal tibial morphology and MRI findings between non-OA and EKOA from an epidemiological study

Subjects

Iwaki Health Promotion Project 2017 or 2019: n=1,902

1.5 T; ECHELON RX, Hitachi

Exclusion

40y.o.>
Male: 867
No MRI: 543
No radiography: 1

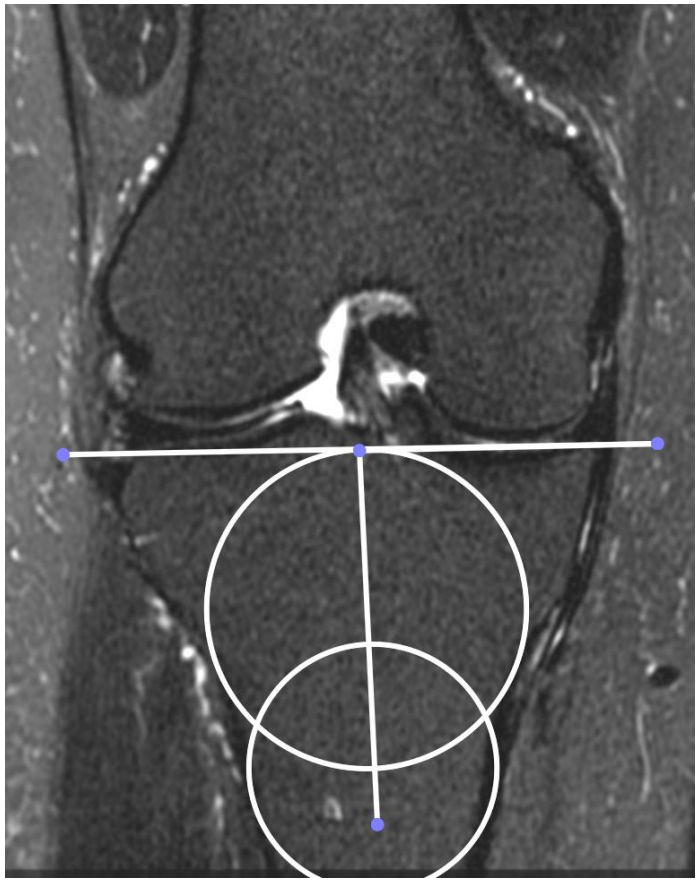
Knee injury: 7
Rheumatoid arthritis: 9
Radiographic OA: 115
Incomplete data: 1

Females（40 y.o.≦）without radiographic evidence of KOA n=359

Divided into non-OA and EKOA groups, according to Luyten's criteria

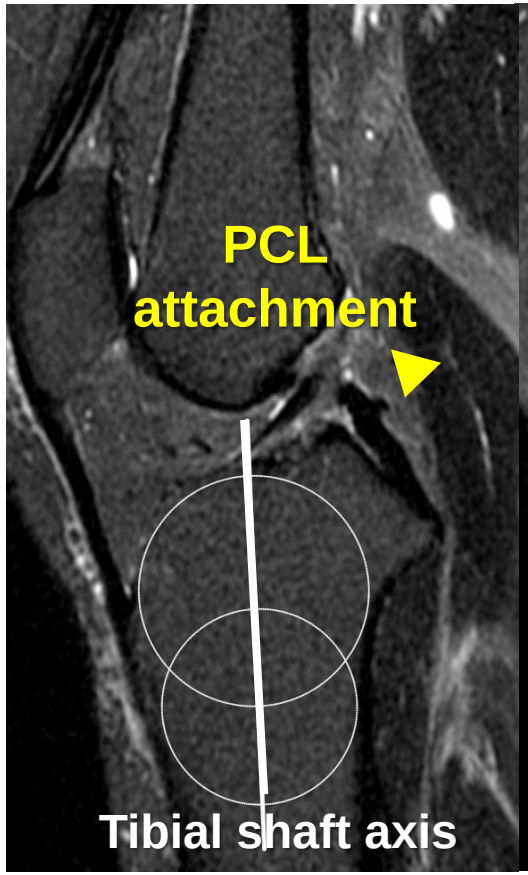
Measurement of MPTA and PTS

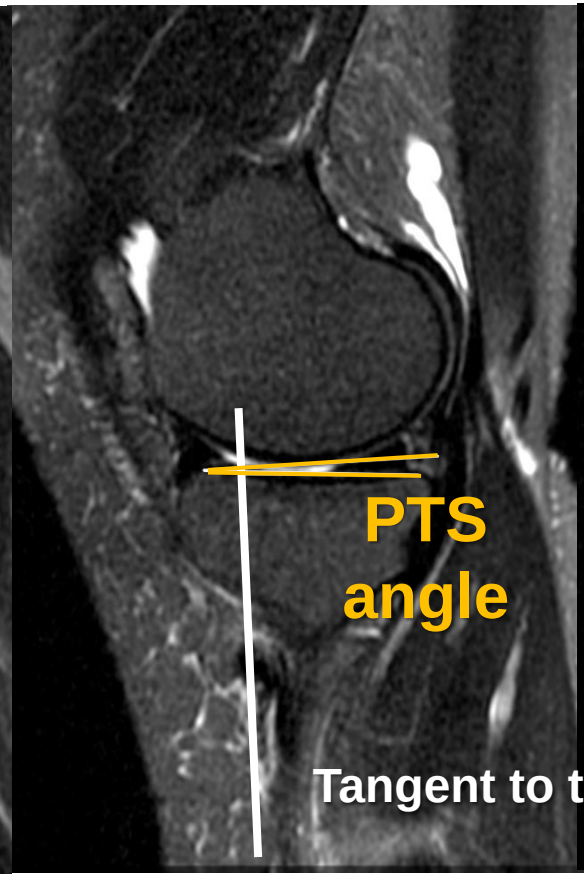
MPTA



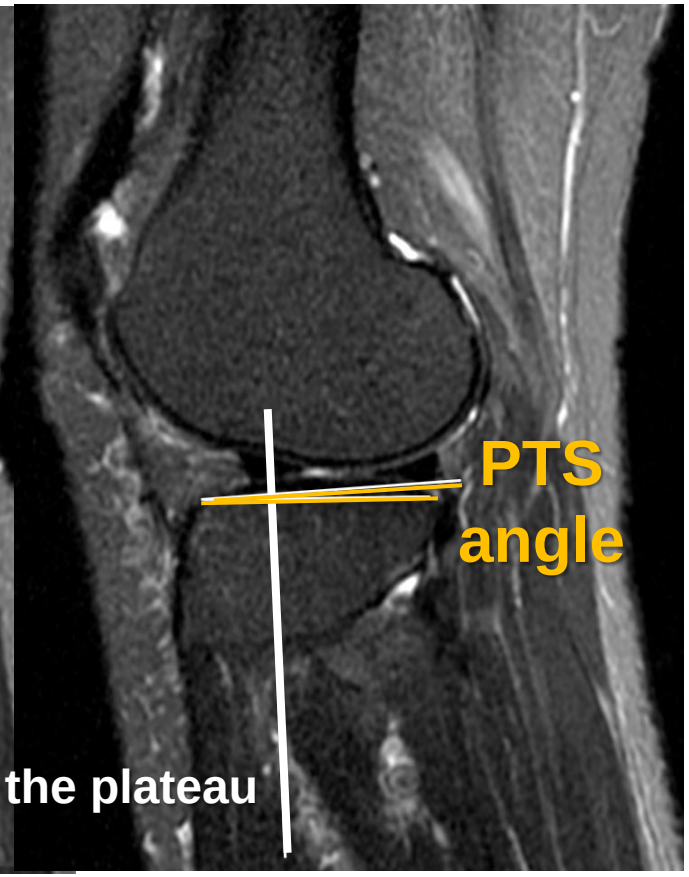
Coronal view

Medial PTS





Lateral PTS



Sagittal view

Hudeck R, et al. Clin Orthop Relat Res 2009

Statistical analysis

Comparing demographic data between the two groups

Mann-Whitney U test, Chi-square test

Comparing MPTA and PTS among age groups

Analysis of variance and Tukey test

Correlation between MPTA/PTS and BMD

Spearman's correlation coefficients

Relationship between MPTA/PTS and BML

Logistic regression analysis

Dependent variable: BML (+)
Independent variables: Age, BMI, BMD, pathological findings, MPTA, PTS, lifestyle habits

Participants' demographic data

	Non-OA (n=305)	EKOA (n=54)	p-value
Age (y.o.)	50.5±11.8	55.9±9.6	0.002
BMI (kg/m^2)	21.8±3.1	22.5±3.2	0.101
BMD (g/cm^2)	0.619±0.102	0.612±0.093	0.509
Cartilage	124 (40.7%)	32 (59.3%)	0.011
BML	79 (25.9%)	24 (44.4%)	0.005
Attrition	15 (4.9%)	8 (14.8%)	0.006
Meniscus	29 (9.5%)	15 (27.8%)	<0.001
Effusion	70 (23.0%)	23 (42.6%)	0.002

Mann-Whitney U test, Chi-square test

EKOA group: significantly older with higher %. of all MRI pathological findings.

Factors related to BML

	Non-OA (n=305)			EKOA (n=54)		
	B	p-value	Odds	B	p-value	Odds
Age	0.05	0.026	1.05	0.46	0.018	1.59
BMI	0.03	0.60	1.03	0.04	0.85	1.05
BMD	-3.50	0.12	0.03	4.19	0.59	65.8
MPTA	-0.4	0.001	0.70	-1.7	0.029	0.18
MPTS	<-0.1	0.73	0.98	0.9	0.025	2.42
LPTS	<-0.1	0.30	0.94	<-0.1	0.94	0.98

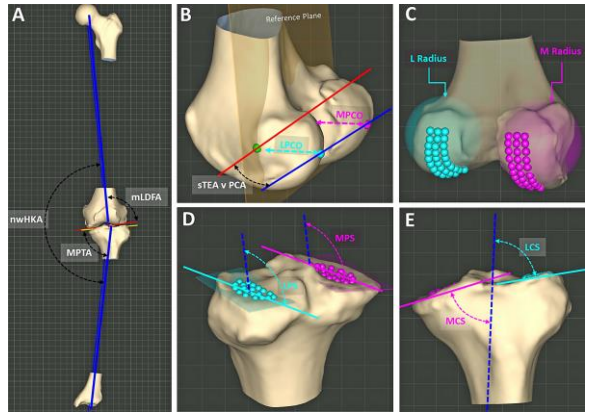
Logistic regression analysis, dependent variable: BML (+) Adjusted by lifestyle and pathological findings

- non-OA: Age and smaller MPTA were correlated with BML
- EKOA: Smaller MPTA & larger MPTS were correlated with the presence of BML

PTS increases in KOA

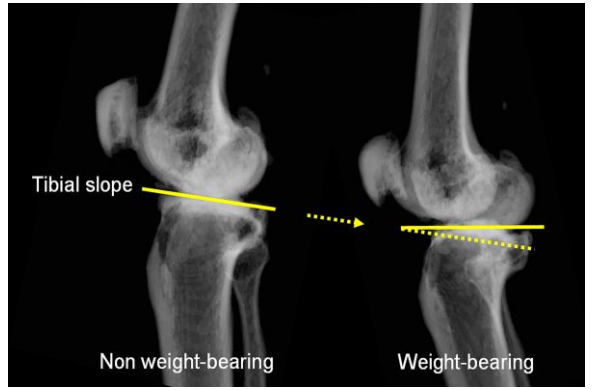
- **OA group had higher MPTS compared with the normal group**

Siddiqi A, et al. JBJS-A 2022



- **PTS were larger in the flexion contracture group**

Mochizuki T, et l. PLOS one 2018



Our result:

Larger MPTS was correlated with BML

Association b/w BML and proximal tibial morphology

- **Varus alignment is a potential risk factor for medial overload and progression of OA.**

  Brouwer GM, et al. Arthritis Rheum 2007, Sharma L, et al. Arthritis Rheum 2008

- **Increasing PTS after open-wedge HTO may influence knee kinematics and stability.**

  Rodner CM, et al. Am J Sports Med 2006

Our result:

Smaller MPTA was correlated with BML

Conclusion

- **MPTA and mPTS were significantly correlated with BML even in those without radiographic abnormalities.**
- **3-D morphological changes in the proximal tibia already occur before radiological knee OA**

References

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