ISAKOS CONGRESS 2025 | MUNICH GERMANY June 8–11

NHS University Hospitals Birmingham NHS Foundation Trust

BIRMINGHAM KNEE SCHOOL

Chronicity of anterior cruciate ligament rupture influences morphologic changes of the posterior cruciate ligament and its alignment.

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Faculty Disclosure Information

- Nothing to disclose

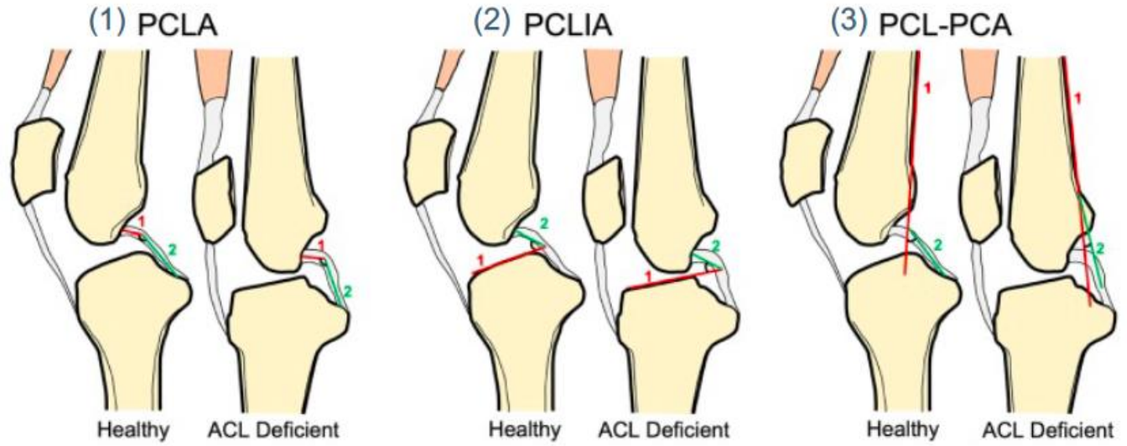
Aims

- To evaluate the morphological changes of the PCL configuration on MRI, in normal (control) and ACL deficient knees (acute & chronic).

- Hypothesis:
  - all PCL changes worsen with time elapsed from the injury following ACL rupture

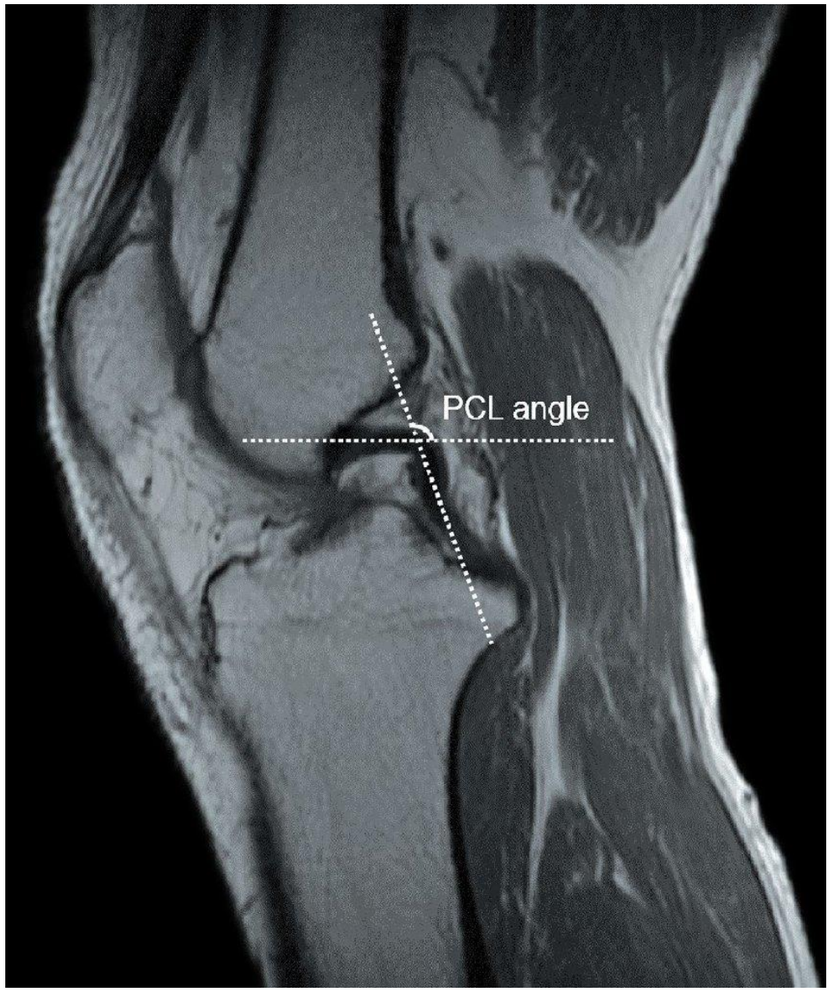
McCauley et al. Am J Roentgenol. 1994

Gali et al. KSSTA. 2022



Siboni et al. Knee Surgery, Sports Traumatology, Arthroscopy (2023) 31:332–339
https://doi.org/10.1007/s00167-022-07145-6

PCLA



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The posterior cruciate ligament angle (PCLA) is determined as the angle between the lines drawn through the central portion of the tibial and femoral insertions of the PCL.

PCLIA

Posterior cruciate ligament inclination angle. Line 1 is the tangent line to the articular surface of the tibial plateau and intersects the PCL, and line 2 connecting the centre of the femoral endpoint of the PCL to the intersection between the first line and the PCL

Knee Surgery, Sports Traumatology, Arthroscopy (2022) 30:124–130
https://doi.org/10.1007/s00167-021-06789-0

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The posterior cruciate ligament inclination angle is higher in anterior cruciate ligament insufficiency

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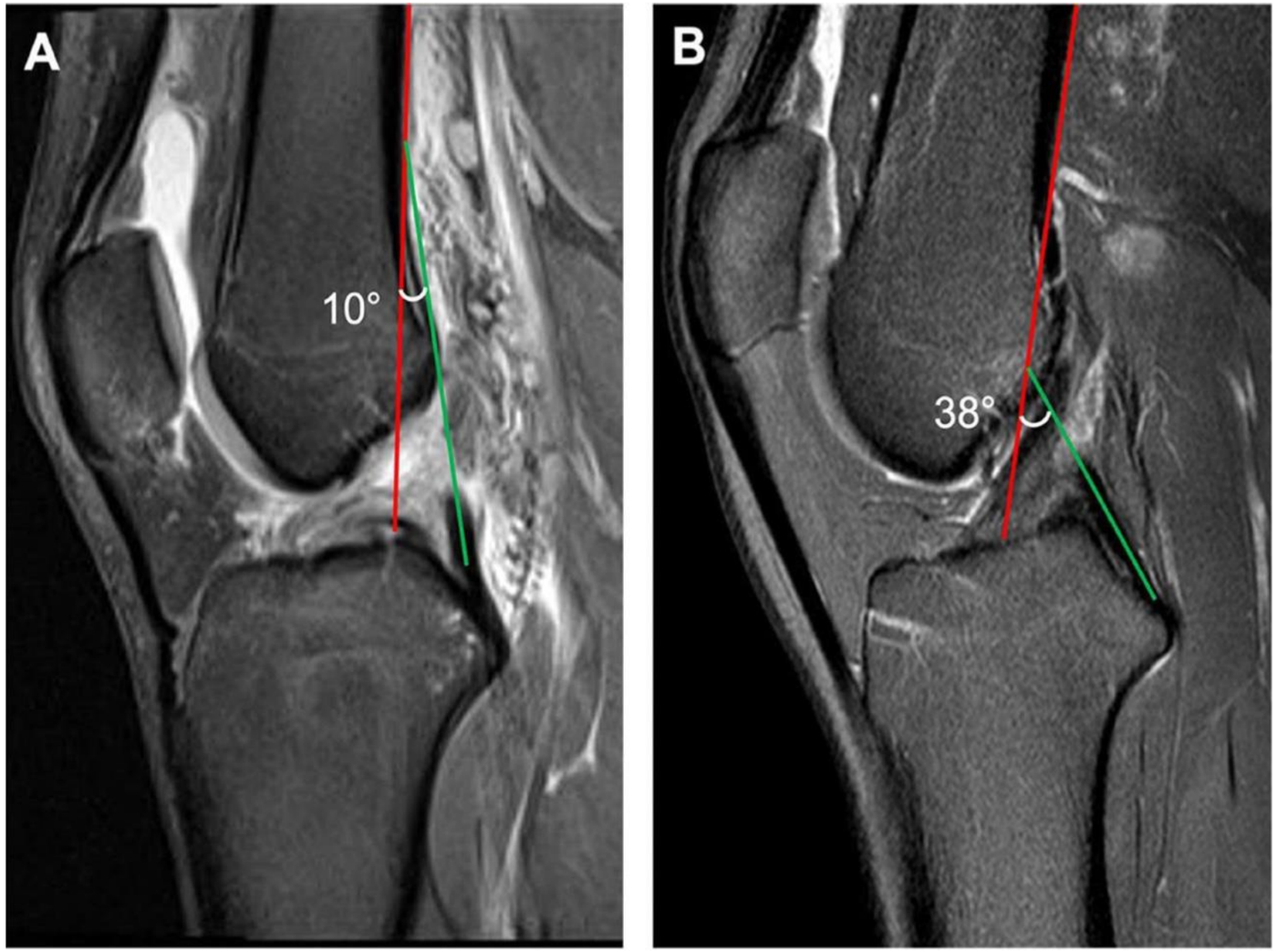
Conclusion

The PCLIA was significantly higher in individuals with ACL injuries. The measurement of this angle using MRI images may allow for detection of ACL insufficiency and thus assist in an individualized and precise approach to the treatment of injuries to the ACL.

PCL-PCA



posterior cruciate ligament posterior cortex angle. Line 1 is defined by the posterior border of the femoral cortex and line 2 is drawn through the central portion of the most vertical part of the PCL

KNEE

The posterior cruciate ligament–posterior femoral cortex angle: a reliable and accurate MRI method to quantify the buckling phenomenon of the PCL in ACL-deficient knees

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Received: 31 July 2022 / Accepted: 26 August 2022 / Published online: 3 September 2022

Conclusion In comparison with previously described methods, the PCL–PCA was the most reliable and accurate method to measure the PCL buckling phenomenon on MRI in anterior cruciate ligament (ACL)-deficient knees. It offers an easy and objective method for the follow-up of ACL-injured patients and can therefore be recommended for routine use.

Methodology

- A retrospective observational analysis.

- T2 sagittal MRI scans of
  - ACL deficient knees
    - Acute ACL (<60 days),
    - Chronic ACL (>90 days), and
  - Control were assessed and PCL parameters were measured.

- All three measurement previously described were obtained:
  - Posterior cruciate ligament angle (PCLA),
  - Posterior cruciate ligament inclination angle (PCLIA),
  - Posterior cruciate ligament posterior cortex angle (PCL-PCA).

Results: Demographics

Group	Number	Age Mean (Range)	Sex (M/F)
Acute ACL	52	32 (18-54)	21 F
Chronic ACL	31	33 (17-54)	11 F
Control	52	22 (16-48)	23 F

Exclusion criteria

Skeletal immaturity

Any fractures of tibial plateau

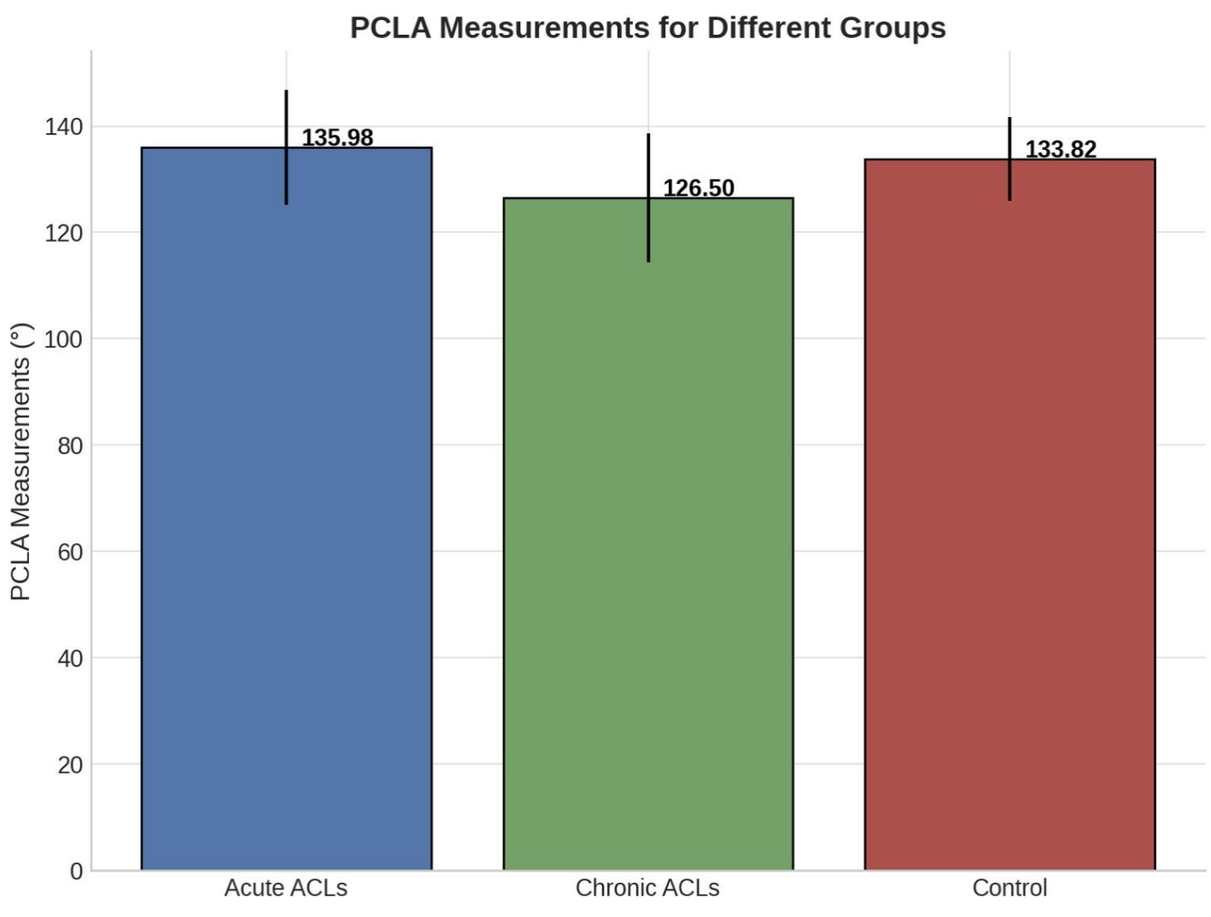
MLKI

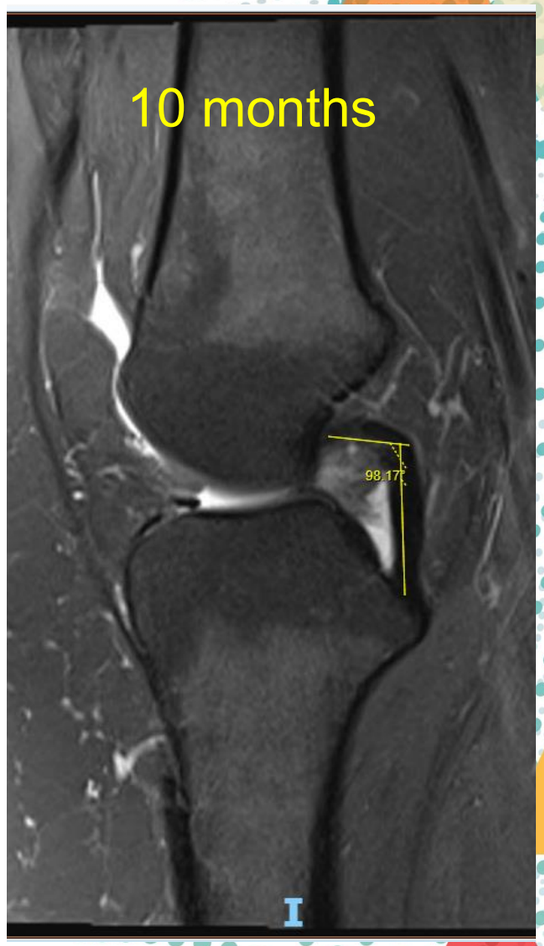
Bucket handle tears of meniscus

No previous surgery to the knee or previous ACLR

No PCL injury

Results:





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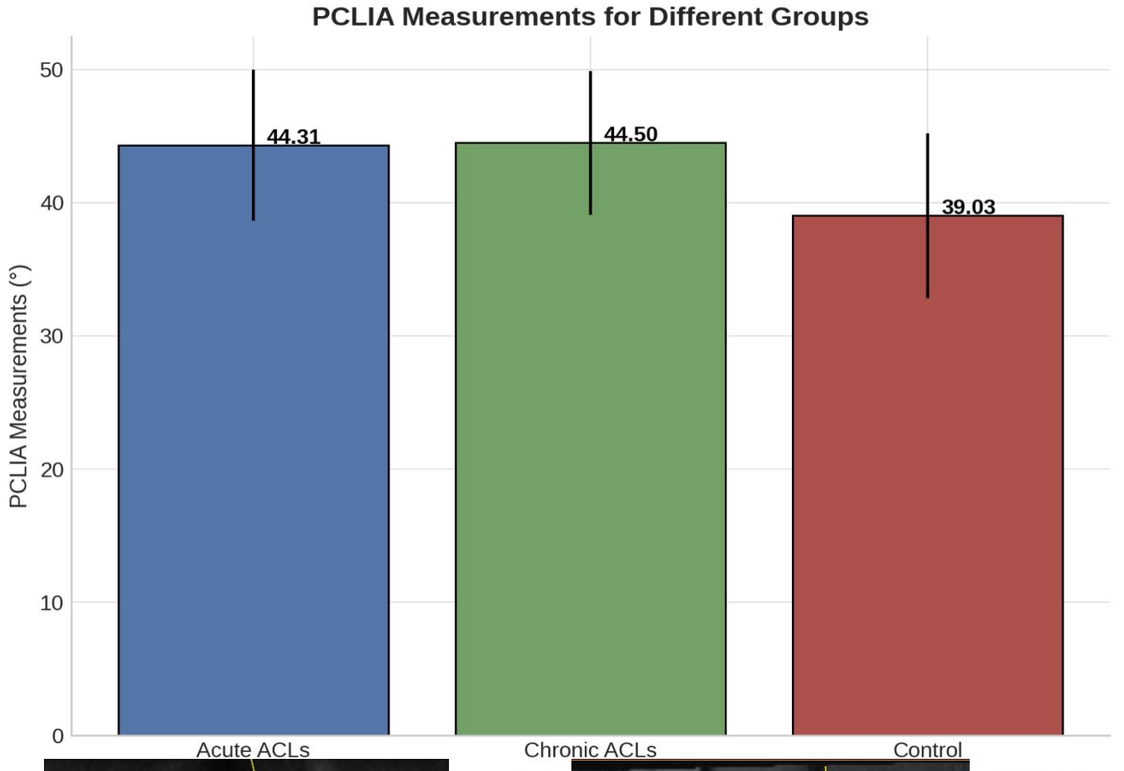
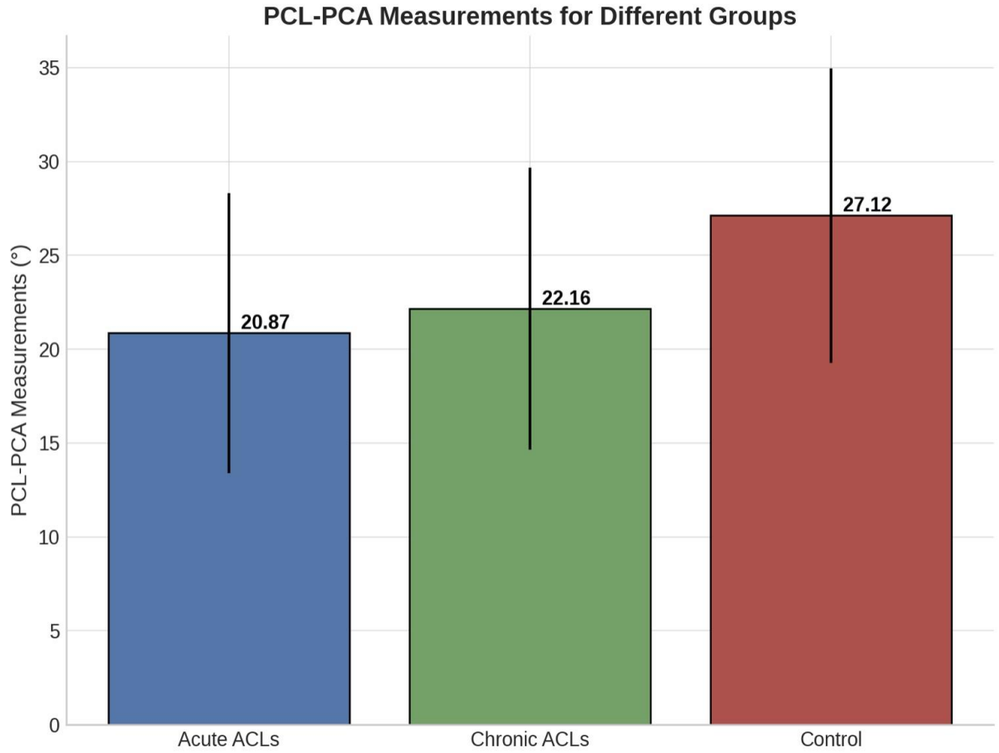
Results:

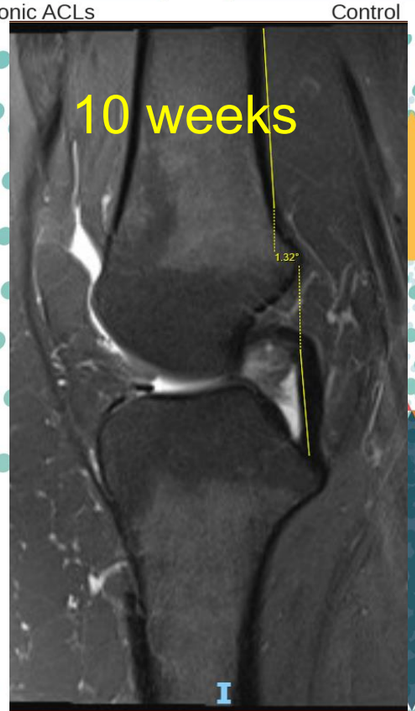

6 weeks
40.33°

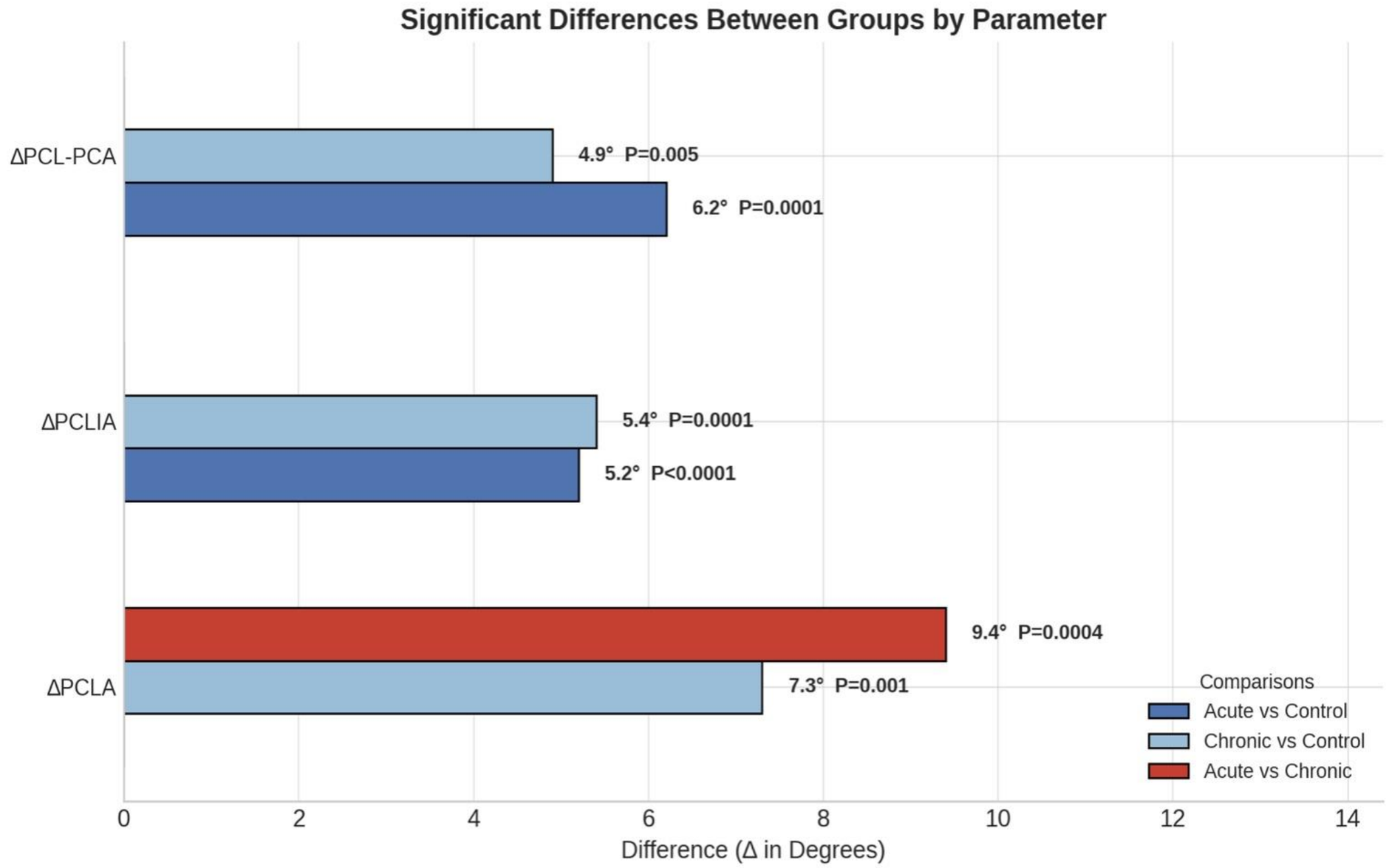

10 months
23.06°


PCLIA Measurements for Different Groups
PCLIA Measurements (°)
0
10
20
30
40
50
44.31
44.50
39.03
Acute ACLs
Chronic ACLs
Control


PCL-PCA Measurements for Different Groups
PCL-PCA Measurements (°)
0
5
10
15
20
25
30
35
20.87
22.16
27.12
Acute ACLs
Chronic ACLs
Control


6 weeks
173.65°


10 weeks
1.32°



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Conclusions

- PCL alignment measurements undergo changes as a result of ACL rupture.
- These changes become worse with chronicity of ACL injury.
- The present study offers additional evidence that ACL deficient knees develop changes in sagittal plane alignment as demonstrated by static imaging modality parameters and these changes are accentuated with more chronic ACL ruptures.

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