



Relationship Between Radiographic Knee Osteoarthritis Severity and Hip Movement Quality in Patients Without Hip Osteoarthritis

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AIM

To investigate the relationship between radiographic KOA severity and hip movement quality in patients without hip osteoarthritis

Hip movement quality was evaluated using MAI Motion and the C.R.A.F.T. framework.

BACKGROUND

Knee osteoarthritis (KOA) affects not only the knee joint but also proximal kinetic-chain biomechanics, including hip movement patterns. MAI Motion is an artificial intelligence-based markerless motion analysis platform that evaluates movement quality using the C.R.A.F.T. framework: control, repetition, asymmetry, flow and rotational dynamics-twist.

1 METHODS

A total of 177 patients with KOA and without radiographic hip osteoarthritis were included. KOA severity was categorized using the Kellgren–Lawrence grading system.
Ethical approval: Hacettepe University Health Sciences Research Ethics Committee (Decision No. 2025/21-22; Research No. SBA 25/369).

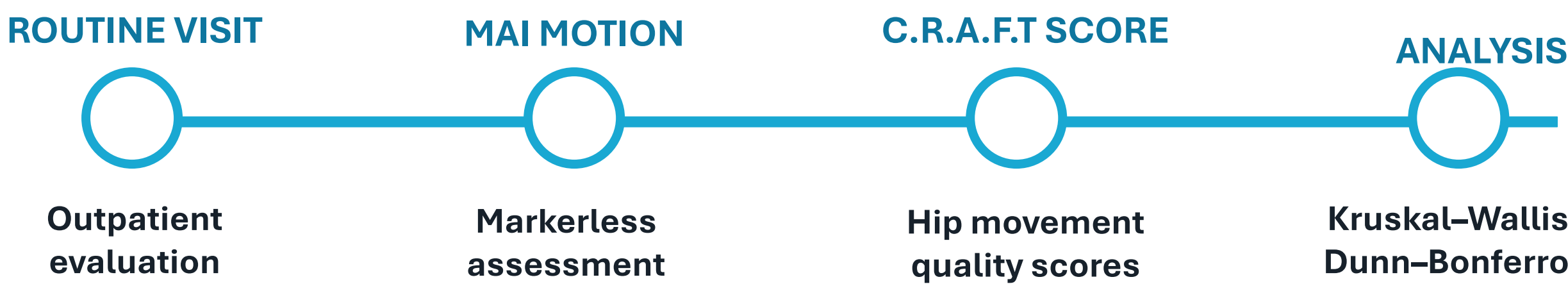
ASSESSMENT & ANALYSIS

Hip movement was assessed during routine outpatient evaluation using MAI Motion. Hip-Repetition, Hip-Asymmetry, Hip-Flow, Hip-Twist and Hip-Overall scores were evaluated. Nonparametric analyses used Kruskal–Wallis testing followed by Dunn–Bonferroni post-hoc analysis.

Cohort, grading & measures

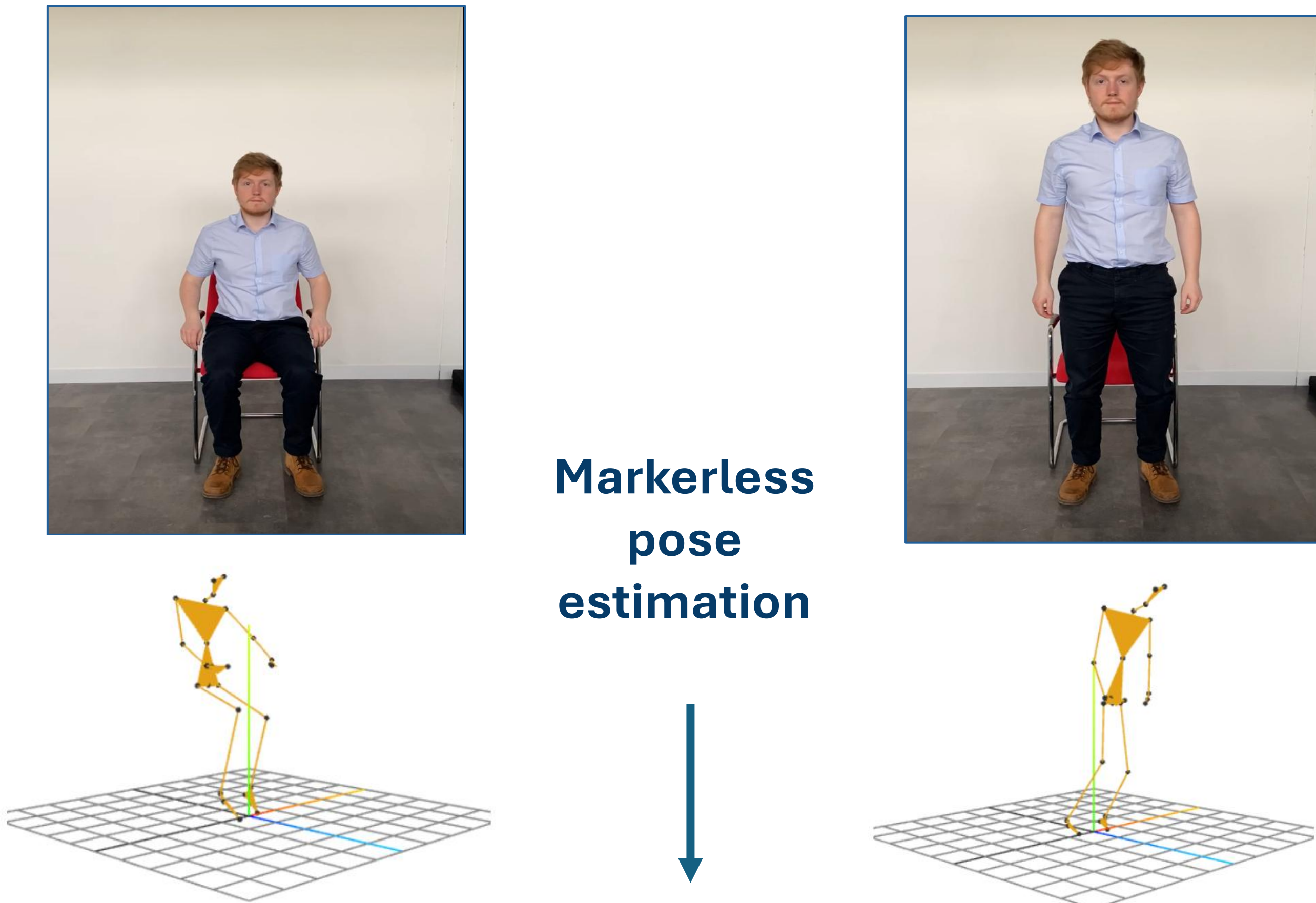
COHORT	177 patients with KOA and without radiographic hip osteoarthritis.
GRADING	Kellgren–Lawrence: Control (n=21), Grade 1 (n=32), Grade 2 (n=63), Grade 3 (n=40), Grade 4 (n=21).
PLATFORM	MAI Motion: artificial intelligence-based markerless motion analysis platform
OUTCOMES	Hip-Repetition, Hip-Asymmetry, Hip-Flow, Hip-Twist and Hip-Overall scores.

Study pathway



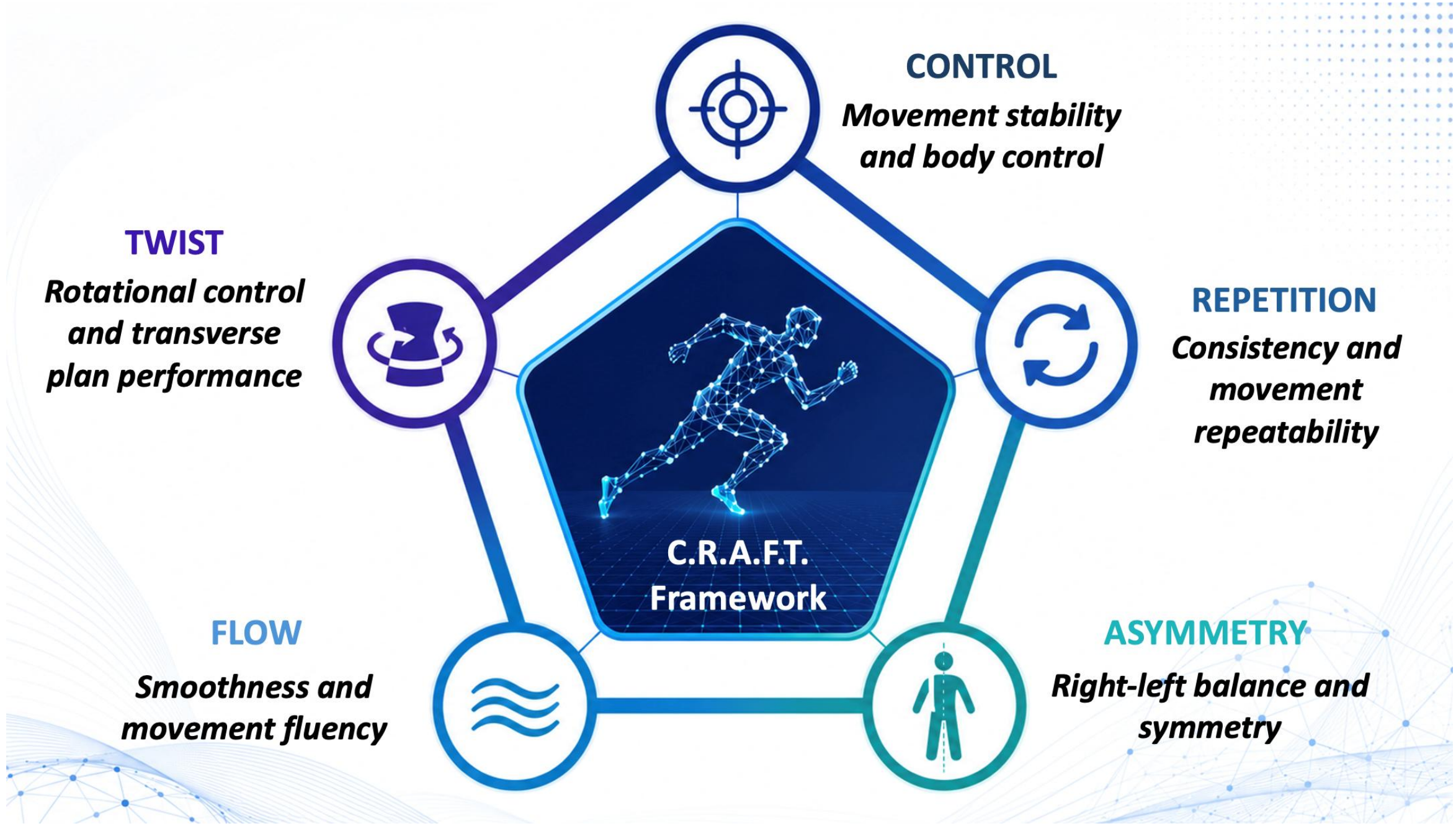
KOA severity: Control (n=21), Grade 1 (n=32), Grade 2 (n=63), Grade 3 (n=40), Grade 4 (n=21).

How Hip Movement Quality Was Assessed?



Markerless pose estimation

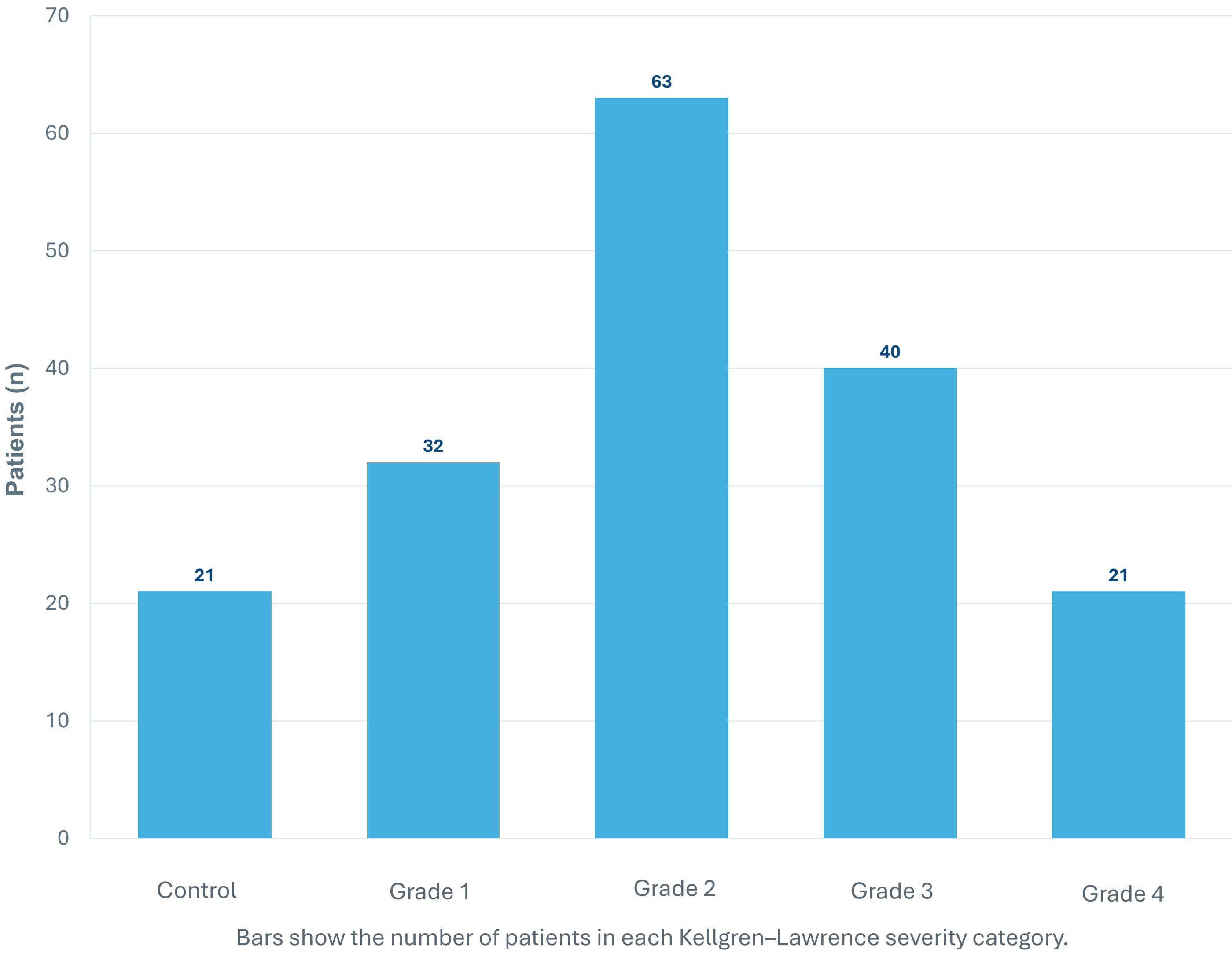
C.R.A.F.T.-based hip movement-quality scores



MAI Motion is an AI-based markerless motion analysis platform. Hip movement quality was evaluated across Hip-Repetition, Hip-Asymmetry, Hip-Flow, Hip-Twist and Hip-Overall scores.

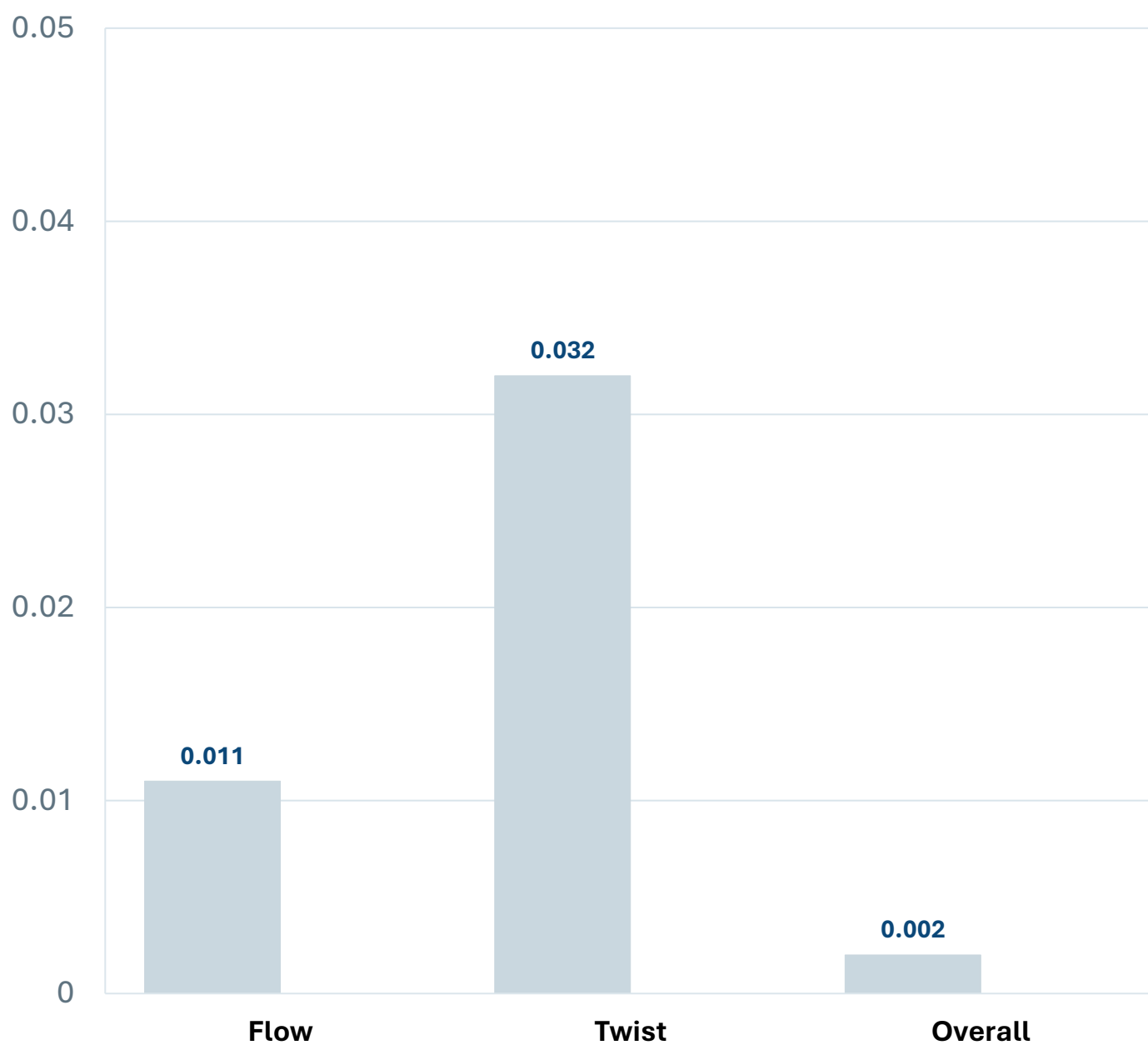
2 RESULTS & INTERPRETATION

Kellgren-Lawrence Grade Distribution

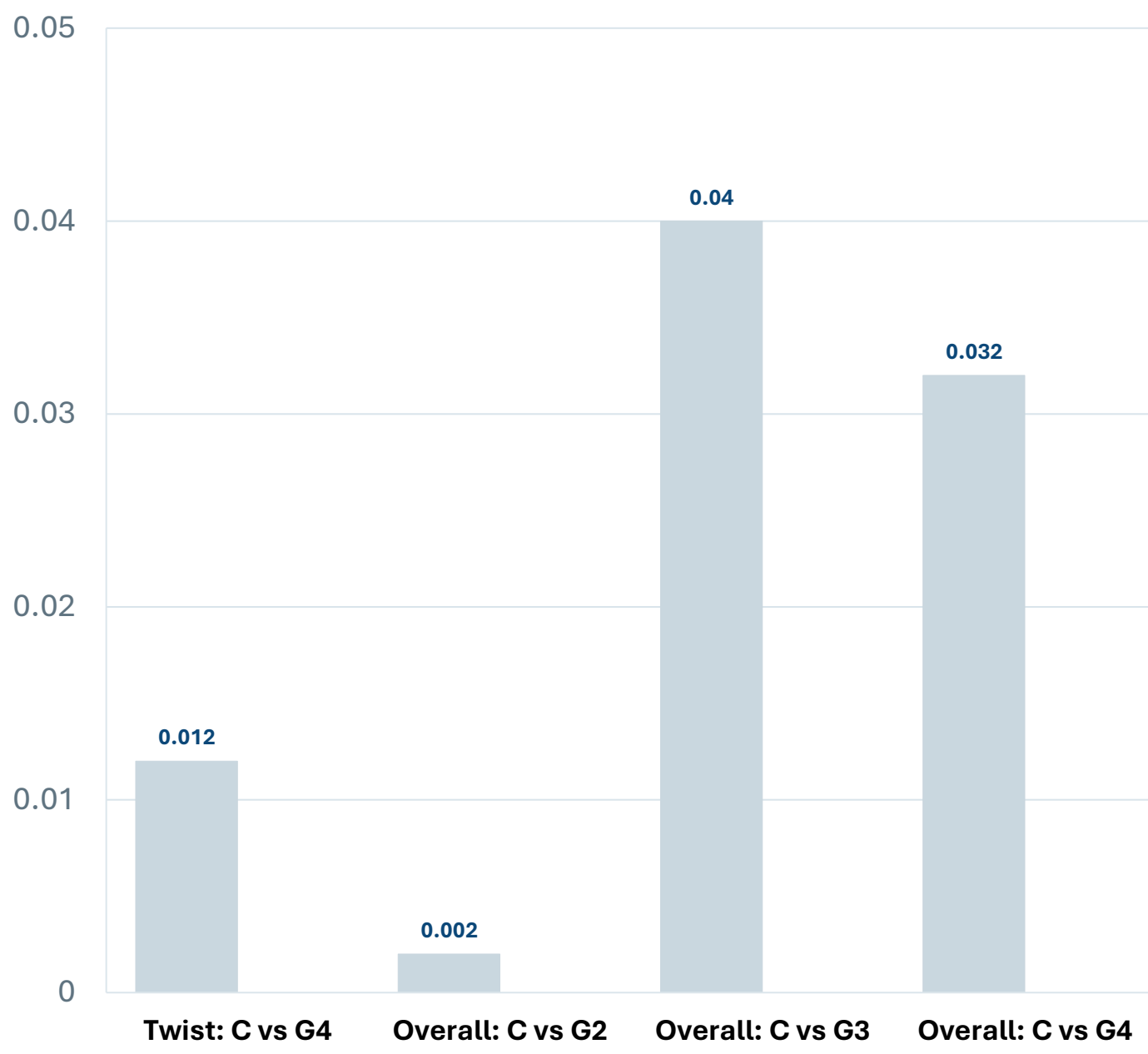


Significant Findings

Overall Kruskal–Wallis p values



Significant pairwise comparisons



Only p values were reported; individual score means and dispersion were not available for visualization.

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hip movement-quality scores showed significant overall group differences

Hip-Flow p=0.011; Hip-Twist p=0.032; Hip-Overall p=0.002. Hip-Repetition p=0.182; Hip-Asymmetry p=0.615.

CONCLUSION

Hip movement quality deteriorated with increasing KOA severity despite the absence of hip osteoarthritis.

Early detection and treatment of KOA, particularly in lower grades, may help prevent secondary alterations in hip biomechanics.

IMPLICATIONS

Markerless motion analysis may provide an objective tool for functional assessment and monitoring in KOA and early changes in hip biomechanics.

TAKE-HOME MESSAGE

Radiographic KOA severity is associated with deteriorating hip movement quality in patients without hip osteoarthritis.

For more information about MAI Motion platform:

<https://maimotion.com/>

