

BACKGROUND

- Over 116,000 TKRs are performed each year in the UK, costing the NHS £750 million annually



1 in 5
dissatisfied



55% ongoing pain



£750M/year NHS

- Post-operative knee alignment** is a key modifiable factor influencing Patient Reported Outcome Measures (PROMs)
- But most research focuses only on coronal (front-view) alignment in 2D.
- We need to assess how **3D sagittal alignment** impacts what matters most: **patient outcomes**.

OBJECTIVE

To explore the relationship between post-operative alignment from side (sagittal) and PROMs.

METHODS

- We conducted PROSPERO-registered meta-analysis [CRD42024584335]
- Five electronic databases until 2025 for studies reporting post-TKR sagittal alignment and PROMs.
- Case-weighted meta-regression models assessed sagittal alignment–PROM relationships
 - across individual timepoints post-TKR,
 - across all timepoints (pooled effects)
- Results are reported as regression coefficient (RC) and 95% confidence intervals (95%CI).

RESULTS

Of 622 studies, 51 were included (N=10,769 TKRs).

- Higher Femoral-Flexion (FF)** was associated with improved
 - Knee-Society-Score (KSS) (FF:RC=0.83, 95%CI=0.53-1.14, n=510) across all timepoints.
 - Knee-Injury-and-Osteoarthritis-Outcome-Score (KOOS) (FF:RC=1.42, 95%CI=0.62-2.21, n=400) across all timepoints.
- Lower Femoral-Sagittal-Angle (FSA)**, range:0.90-3.80) was associated with improved
 - KSS (RC=-6.09, 95%CI=-7.63- -4.54, n=280) at all timepoints
 - KSS (RC=-6.29, 95%CI=-8.68- -3.903, n=160) at 12 months
- Higher Posterior-Condylar-Offset (PCO)**, range:24.00-33.60) was associated with improved
 - KSS (RC=31.6, 95%CI=23.52-39.76, n=338) across all timepoints
 - KSS at 12 months (RC=31.9, 95%CI=19.8-43.9, n=613).
- Higher Posterior-Tibia-Slope (PTS)**, range:-5.00-8.86) was associated with
 - Visual-Analogue-Scale-Pain scores (RC=1.00, p<0.001, n=90) at 1 month
 - Oxford-Knee-Score (RC=3.28, p=0.009, n=117) at 6 months
 - KSS-Knee (RC=3.29, p=0.002, n=150) at 24 months
 - BUT pooled analysis across all timepoints didn't show significant relationship with PROMs.



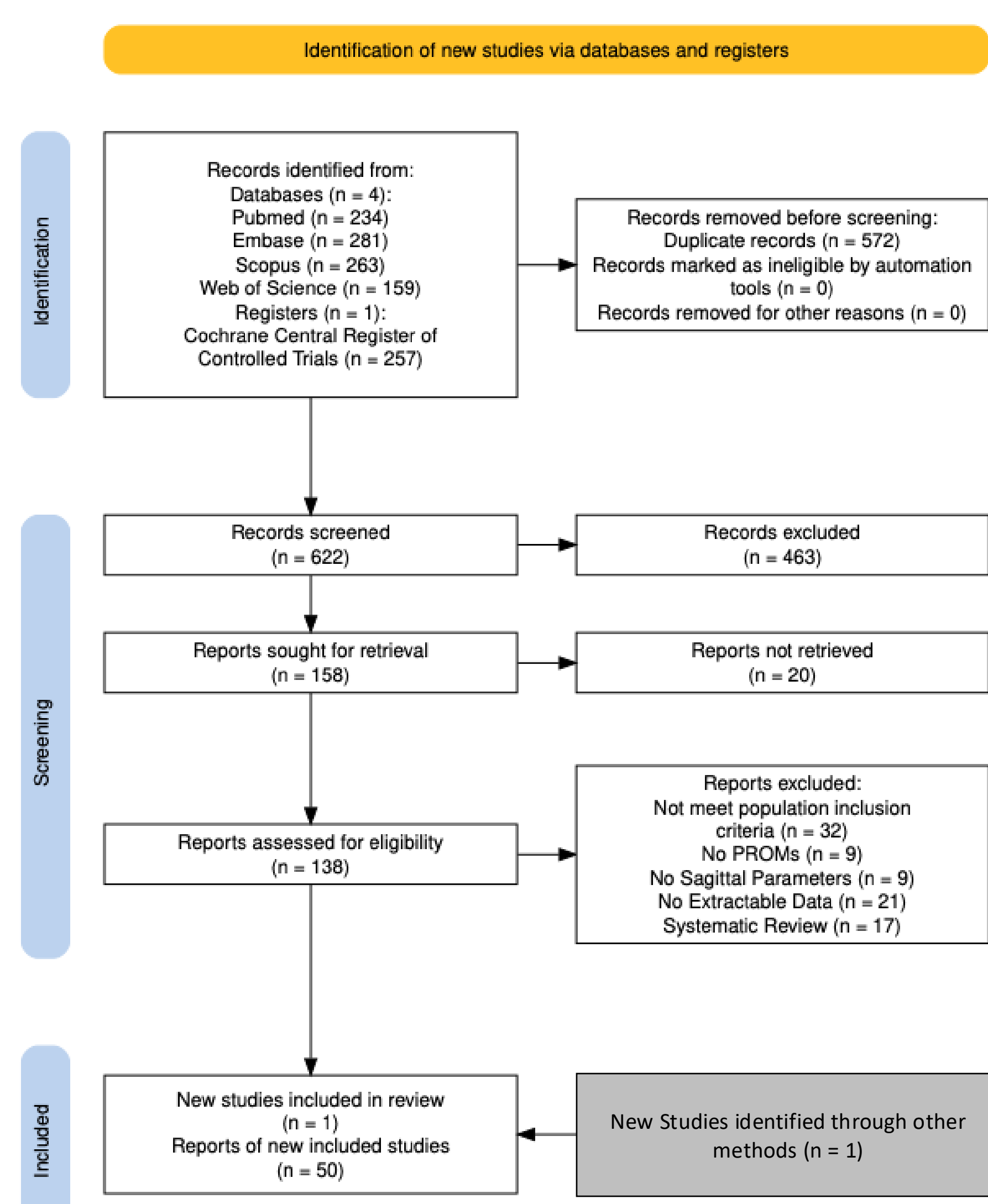
Sagittal Alignment



Patient Outcomes

Need For This Research & Future Direction

- This review shows that sagittal alignment influences PROMs, with higher Femoral Flexion, lower Femoral Sagittal Angle, and greater Posterior Condylar Offset associated with improved patient outcomes.
- We urge a shift from outdated 2D thinking to a true 3D understanding of knee alignment.
- A clear consensus on what core sagittal parameters must be reported is now essential to standardise and strengthen future research.



REFERENCES

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