

## Is there a difference between posterior stabilized, cruciate retaining, or medial pivot implants used during primary TKA?

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### Response/Recommendation:

Based on a network meta-analysis (NMA) of randomized control trials (RCTs), there is a lack of definitive evidence to suggest a meaningful difference in outcomes between posterior stabilized, cruciate retaining, or medial pivot total knee arthroplasty (TKA) implants. While some minor trends in data suggested possible differences between these implants, results were not statistically significant and would likely not surpass clinically meaningful cutoffs. Due to this, surgeon preference and clinical decision making should be the determining factor behind implant choice when considering these three options.

**Level of Evidence:** Level 1 - Network Meta-Analysis of Randomized Trials

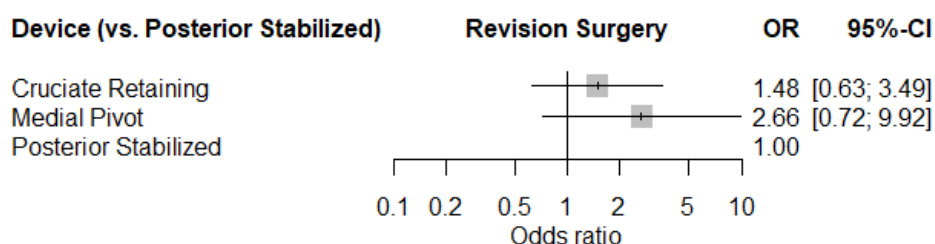
### Rationale

We identified a total of 22 RCTs that compared posterior stabilized, cruciate retaining, or medial pivot TKA implants through a systematic literature search, with 2528 patients enrolled across the included studies.<sup>1-22</sup> The GRADE extension for NMAs was utilized to provide an overall certainty in the evidence for each comparison.<sup>23</sup> While numerous RCTs have been published comparing these different implant designs, the pooled comparisons demonstrated similar revisions, complications, short term functional improvements, and long-term functional improvements between these three implant types. Any differences are likely to be small in magnitude and not surpass clinically meaningful thresholds. All three options had favorable safety profiles, as the total revision rate was 1.2% and the total complication rate was 6.9% across all studies included. There were no statistically significant differences in short or long-term functional improvement.

### Revisions

As previously stated, the overall revision rate across the included studies was 1.2%. The NMA comparison provided no statistically significant differences between the three options (**Figure 1**). When compared to posterior stabilized implants, cruciate retaining (OR: 1.48, 95% CI: 0.63 to 3.49,  $p=0.37$ , Moderate Certainty) and medial pivot (OR: 2.66, 95% CI: 0.72 to 9.92,  $p=0.14$ , Moderate Certainty) were comparable. Although the result was not significant, NMA treatment ranking suggested that posterior stabilized implants were the best option with respect to revisions, followed by cruciate retaining, and finally medial pivot implants.

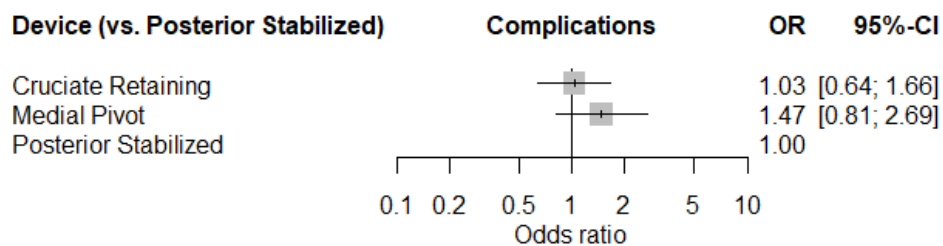
Figure 1: Forest Plot of Revision Surgery



## Complications

There were no significant differences in complication rates between the three implant designs (**Figure 2**). When compared to posterior stabilized implants, cruciate retaining (OR: 1.03, 95% CI: 0.64 to 1.66,  $p=0.91$ , High Certainty) and medial pivot (OR: 1.47, 95% CI: 0.81 to 2.69,  $p=0.21$ , Moderate Certainty) had similar complication rates. NMA ranking suggested that posterior stabilized implants had the best complication rate, while medial pivot implants had the worst. It is unlikely for there to be a meaningful difference in complication rates between these implant designs.

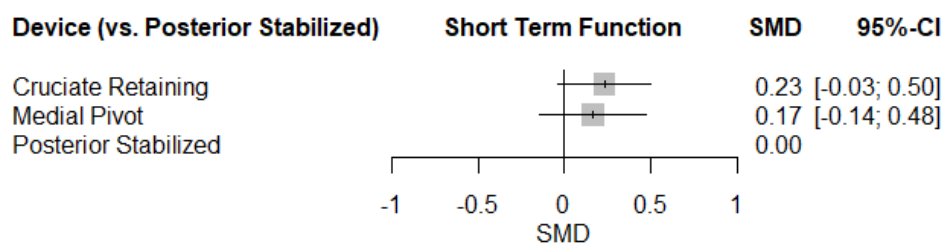
**Figure 2: Forest Plot of Complications**



## Short-term Function (3 – 6 Months After Surgery)

Of the 22 RCTs identified, only 8 investigations reported on functional improvements between 3-6 months.<sup>1,2,6,7,12,18,20,22</sup> There were no significant differences between these implants regarding short-term function (**Figure 3**). Cruciate retaining TKA had the best NMA ranking, which trended towards a better short term functional improvement than posterior stabilized implants (SMD: 0.23, 95% CI: -0.03 to 0.50,  $p=0.09$ , Low Certainty), but was not significant. Similarly, medial pivot implants were ranked as the second-best option (SMD: 0.17, 95% CI: -0.14 to 0.48,  $p=0.28$ , Low Certainty). Posterior stabilized implants were ranked the worst for short term functional improvements.

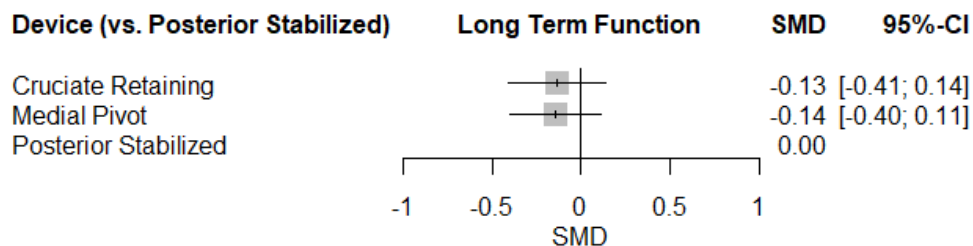
**Figure 3: Forest Plot of Short-Term Function**



## Long-term Function (>1 year After Surgery)

There was no difference between the three implant designs regarding long-term function, which was reported in 21 out of 22 included RCTs (**Figure 4**).<sup>1-12,14-22</sup> Posterior stabilized implants were ranked the best in terms of long-term function, although they were not significantly better than cruciate retaining (SMD: -0.13, 95% CI: -0.41 to 0.14,  $p=0.34$ , Moderate Certainty), or medial pivot (SMD: -0.14, 95% CI: -0.40 to 0.11,  $p=0.28$ , Moderate Certainty) implants.

**Figure 4: Forest Plot of Long-Term Function**



### Strengths and Limitations

This review is strengthened by the robust nature of NMA. The analysis allows for comprehensive comparison across all three implants, inferring possible differences from both the direct and indirect evidence. NMA also allows for treatment rankings, which provide additional insight into the potential trade offs of the implant types. Despite the robust nature of this analysis, it is not without limitation. The use of treatment rankings is beneficial but should be interpreted with caution. These NMA rankings suggest a “best” and “worst” implant for every outcome, even when differences between those outcomes may not be statistically significant. This ranking is based on the magnitude of effect but does not consider confidence intervals. For that reason, the treatment rankings are beneficial to include as supplemental information but should not be used to solely drive conclusions or clinical decision making.

### Conclusion

Based on an NMA of available RCTs comparing posterior stabilized, cruciate retaining, or medial pivot implants; there are small, statistically significant and clinically unimportant differences between these implants with regard to revisions, complications, and knee function at short and long-term follow up. Surgeon preference and clinical decision making should be the determining factor behind implant choice when considering these three options.

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