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Title: Hindfoot alignment following total knee arthroplasty: a systematic review

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Thank you for inviting us to submit a revised version of our manuscript. The comments and suggestions of the reviewers were very much appreciated. We have listed the comments below, followed by the manner in which we have addressed them

Reviewer #1's comment:

1. *Abstract: The abstract is of appropriate length and summarizes the study well. Line 26: could you clearly specify the purpose? Foot and Ankle clinical outcomes.*

Author's response:

Thank you for your comment. We agree with your suggestion and amended the text as follows:

Line 33-35

“To evaluate changes in alignment of the hindfoot following TKA, foot and ankle clinical outcomes in terms of subjective clinical scoring tools following surgical intervention, and to analyse the level of evidence (LOE) and quality of evidence (QOE) of the included studies.”

Reviewer #1's comment:

2. *Introduction: appropriate Line 82: Also clarify what clinical outcomes evaluated are you evaluating.*

Author's response:

Thank you for your comment. We agree with your suggestion and amended the text as follows:

Line 90-92

“The purpose of this systematic review was to evaluate changes in hindfoot alignment and foot and ankle clinical outcomes in terms of subjective clinical scoring tools following TKA.”

Reviewer #1's comment:

3. *Methods: appropriate Line 108-109: Incomplete. Please explain all data evaluated. Line 109: Reoperations are not evaluated in the results.*

Author's response:

Thank you for your comment. We agree with your suggestion and amended the text as follows:

Line 116-119:

“Patient demographic data and postoperative follow up times were gathered. Radiographic parameters used to evaluate the alignment of the hindfoot, lower extremity and ankle joint were also collected. Data on postoperative clinical outcomes in terms of subjective clinical scoring tools were evaluated.”

Reviewer #1's comment:

4. *An appropriate statistical analysis is performed*

Author's response:

Thank you for your comment.

Reviewer #1's comment:

5. *Results: appropriate Line 120: I believe “Clinical trials” is not the best way to describe the articles included. Line 164, 168, 174 and 176: Please explain the magnitude of the improvement.*

Author's response:

Thank you for your comment. We agree with your suggestion and amended the text as follows:

Line 130:

“The studies were published between 2004 and 2019”

Line 170-178:

“Chandler et al[6], Cho et al[7] and Mullaji et al[13] showed a mean postoperative improvement in TCA of 3.1°, 3.1° and 2.0° respectively. Hara et al[8] and Takenaka et al[16] highlighted a mean postoperative improvement in VVA of 3.1° and 3.4° respectively. Jeong et al[9] demonstrated a mean postoperative improvement in HA, HR and HD of 7.7°, 0.1° and 5.8° respectively. Kim et al[10] illustrated a mean postoperative improvement in HAVA of 1.4°. Mansur et al[12] demonstrated a mean postoperative improvement of hindfoot alignment of 3.6. Okamoto et al[14] illustrated a mean postoperative improvement in naviculocuboid overlap of 19.0°. Palanisami et al[15] highlighted a mean postoperative improvement in VVI of 0.25.”

Line 180-185:

“Conversely, Cho et al[7] showed that patients with severe varus knee deformity had the greatest overall improvement in hindfoot alignment. Patients with a severe varus knee deformity displayed a mean change in hindfoot alignment angle of $4.0^{\circ} \pm 3.0^{\circ}$ in contrast to patients with a less severe varus knee deformity who displayed a mean change in hindfoot alignment angle of $1.8^{\circ} \pm 2.5^{\circ}$ [7].”

Line 189-193:

“Both studies recorded improvements in postoperative hindfoot varus alignment. Mansur et al[12] reported an increase in mean hindfoot alignment axis of 7.5, while Mullaji et al[13] recorded a mean decrease in TCA of 1.5°. Also, Mansur et al[13] reported an improvement in postoperative hindfoot valgus alignment, as evident by a decrease in mean hindfoot alignment axis of 3.3.”

Reviewer #1's comment:

6. *Discussion: The discussion is well written.*

Author's response:

Thank you for your comment.

Reviewer #1's comment:

7. *Conclusion: appropriate*

Author's response:

Thank you for your comment.

Reviewer #1's comment:

8. *TITLE Title is appropriate for the study.*

Author's response:

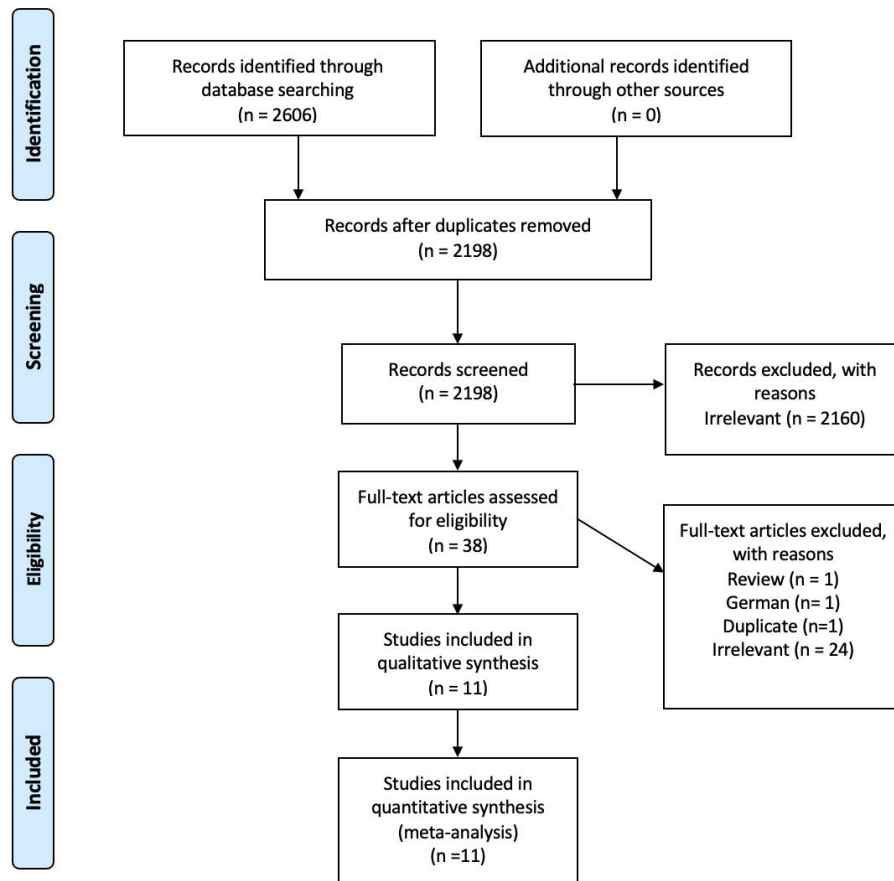
Thank you for your comment.

Reviewer #1's comment:

9. *Tables and Figures: Figure 1. Please explain the reasons for excluding those 2160 articles.*

Author's response:

Thank you for your comment. We agree with your suggestion and Figure 1 has been amended as follows:



Reviewer #1's comment:

10. References: References are in correct order and correct format.

Author's response:

Thank you for your comment.

Reviewer #2's comment:

Only in the discussion section, I have a suggestion. In page 10, line 209-211, interestingly, Cho et al reported improvement in hindfoot alignment 3 weeks post TKA but little to no improvement at 2 years postoperatively, suggesting that compensatory changes in hindfoot alignment predominantly occur during the early postoperative period. As the change of biomechanics in lower limbs is a complex process, which is one of the reasons why there are so few RCTs in this subject, there should be more discussion in the end of this paragraph.

Author's response:

Thank you for your comment. We agree with your suggestion and the text has been amended as follows:

Line 226-234:

“Interestingly, Cho et al[7] reported improvement in hindfoot alignment at 6 weeks post TKA but little to no improvement at 2 years postoperatively, suggesting that compensatory changes in hindfoot alignment predominantly occur during the early postoperative period. This lack of

improvement in hindfoot alignment at the 2 year follow up point may indicate that following the early postoperative period, there may be no further hindfoot alignment compensation as the knee joint alignment has now been corrected following TKA. However, Takenaka et al[16] recorded improvement in hindfoot alignment at 3 weeks post TKA with further improvement noted 1 year post TKA. The discrepancy between these 2 studies highlights that further research is warranted to understand the complex lower limb biomechanical alterations that occur in sequential postoperative time points following TKA.”

Science editor’s comment:

1. *The title is too long, and it should be no more than 18 words*

Author’s response:

Thank you for your comment. The title has been amended to:

“Hindfoot alignment following total knee arthroplasty: a systematic review”

Science editor’s comment:

2. *The authors did not provide original pictures. Please provide the original figure documents. Please prepare and arrange the figures using PowerPoint to ensure that all graphs or arrows or text portions can be reprocessed by the editor*

Author’s response:

Thank you for your comment.

Science editor’s comment:

3. *PMID and DOI numbers are missing in the reference list. Please provide the PubMed numbers and DOI citation numbers to the reference list and list all authors of the references. Please revise throughout*

Author’s response:

Thank you for your comment. The references have been amended in the text.

Science editor’s comment:

4. *The “Article Highlights” section is missing. Please add the “Article Highlights” section at the end of the main text.*

Author’s response:

Thank you for your comment. Please find the “Article Highlights” section below:

Line 307-339:

“Article Highlights:

Research background:

There are a variety of reports demonstrating a relationship between deformities at the knee joint and hindfoot malalignment in patients with knee osteoarthritis (OA).

Research motivation:

The relationship between knee joint deformities and alterations in hindfoot alignment following total knee arthroplasty (TKA) has not been fully investigated to date.

Research objectives:

To evaluate changes in alignment of the hindfoot following TKA and foot and ankle clinical outcomes in terms of subjective clinical scoring tools following surgical intervention.

Research methods:

MEDLINE, EMBASE and Cochrane Library databases were systematically reviewed. Studies reporting changes in the postoperative alignment of the hindfoot following TKA were included.

Research results:

Eleven studies with a total of 1142 patients (1358 knees) were included. Patients with preoperative varus knee deformity and valgus hindfoot deformity demonstrated improvement in hindfoot alignment post TKA. Patients with preoperative varus knee deformity and varus hindfoot deformity demonstrated no improvement in hindfoot alignment following TKA. Twelve different radiographic parameters were used to measure the alignment of the hindfoot, with the tibio-calcaneal angle (TCA) most frequently utilised (27.3%).

Research conclusions:

The hindfoot may display compensatory changes in alignment following TKA in patients with knee OA. However, the marked heterogeneity between the included studies and poor quality of evidence confounds the generation of robust conclusions from this review.

Research perspectives:

Further, higher quality studies are required to determine the changes and outcomes of hindfoot alignment following TKA.”