Author's response to reviews

Title: Differences in gait characteristics between total hip, knee, and ankle arthroplasty patients: a six-month postoperative comparison

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Author's response to reviews: see over
Responses to Reviewer #1

Please note that:
[C] = Reviewer comments;
[R] = Author responses;
(...) = Author action: changes in manuscript (Page, paragraph, line).

Thank you for the useful comments, which helped us improve the quality of the manuscript. We hope that all the points have been satisfactorily addressed.

1. Is the question posed by the authors well defined?
Yes, the question is well posed and the authors have identified a gap in the literature in that other studies have examined gait characteristics in similar populations but these have not been examined in a systematic way to compare across groups. This adds to the current body of knowledge.

2. Are the methods appropriate and well described?
The methods are well described and reproducible. There are clear selection criteria for the subjects and the equipment and protocols used to measure the gait characteristics are consistent with other research.

3. Are the data sound?
[C1] Yes the data are sound. However in the results section there is a reasonable amount of text given to the results of the TAA and TKA as they had a statistically significant difference compared to the controls. However, there is no mention of the THA results in that section obviously as there was no difference in the measured variables with the controls. I think this would be worth putting into that section with the relevant p values. The reason I suggest this is that the non-significant result for the THA group is commented on in the discussion quite often without a link back to the results.
[R1] A sentence has been added, which summarizes the results of THA patients.
{Page 11, paragraph 1}

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?
Yes.

5. Are the discussion and conclusions well balanced and adequately supported by the data?
[C2] Yes the discussion and conclusion are well balanced. I would like to suggest the authors consider giving some thought to the fact that these deficits in gait still exist after 6 months and as they have stated even up to four years post-surgery. They may want to consider the possibility that these may exist because the post-operative physiotherapy and exercises may have not achieved full resolution of the deficit before the patient was discharged from care or that the standard post-operative management does not encourage extended use of physical therapies. There is research to suggest that there can be a mismatch between the time therapists think the patient is functional enough for discharge and when the patient actually feels that they are functionally able to leave therapy (Larmer, McNair, Smythe, & Williams, 2011).
[R2] The point that functional recovery of patients could be incomplete before discharge from physical therapy due to a mismatch between patient and clinician perception of the functional recovery of patient has been discussed based on the article of Larmer et al. (2011).
{Page 13, paragraph 3}

6. Are limitations of the work clearly stated?
Yes.

7. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished?
Yes there is a brief mention of further research at the conclusion of the discussion. Based on the reference above there could be the suggestion that research into patient’s perceptions of their deficit and the success of the operation on their functional gains could be explored. There is also mention that the pre-operative deficits were not measured. This was a limitation of the study and therefore could also be an area of future investigation.

Both preoperative gait assessments and the implementation of patients’ self-reported questionnaire (besides objective functional evaluation) have been mentioned as perspectives for future research.

8. Do the title and abstract accurately convey what has been found?
Yes.

9. Is the writing acceptable?
Yes the paper is well written. There are a few sentences where small grammatical changes could be helpful. These are highlighted in red below:

Abstract
The aim of this study was to objectively compare the gait ability of patients after unilateral total hip arthroplasty (THA), total knee arthroplasty (TKA) and total ankle arthroplasty (TAA) with a group of healthy controls.

Background
They have been proven to be successful in reducing joint pain and stiffness....

Methods
The sample size.....
Responses to Reviewer #3

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Abstract
[C1] Remove gait ability to gait differences.
[R1] Done.
{Page 2, paragraph 1}

[C2] In the methods section please mean (SD) age of patients recruited into study.
[R2] Done.
{Page 2, paragraph 2}

[C3] Conclusions: is there gait disability or a reduction in gait characteristics?
The term gait disturbances could be misinterpreted please consider re-wording.
[R3] Done.
{Page 2, paragraph 4}
{Page 3, paragraph 1}

Methods
[C4] How did the authors identify psychiatric problems?
[R4] The sentence has been modified.
{Page 6, paragraph 2}

[C5] Post-operative care: was it undertaken for each individual or as a group session.
Please clarify.
[R5] All the patients underwent individual physical therapy sessions.
{Page 7, paragraph 2}

[C6] The physical therapy was not standardised across all groups. This could be a limitation of the study.
[R6] We agree. This limitation has been clearly acknowledged in the discussion.
{Page 12, paragraph 1}

[C7] How many patients completed rehabilitation after 6 months for each group? A flow-chart maybe useful.
[R] All the patients completed physical therapy sessions before gait ability evaluation (about 6 months after surgery). This detail has been provided in the methods section.
{Page 6, paragraph 2}

[C8] Unclear on the reasons of a fast walk: perhaps the authors can elaborate.
[R8] Gait disability may be accentuated when patients are asked to perform a more demanding task (Andriacchi TP et al. Walking speed as a basis for normal and abnormal gait measurement. Journal of Biomechanics. 1977,10:261-268). Therefore, it can be expected that patients demonstrated no gait impairments when walking at a normal speed, but some disability when walking at a faster speed. In the present study, this was demonstrated for TKA patients, where the differences in walking velocity compared to controls were larger at fast than at normal speeds.
Could fatigue be an issue with three repetitions at each walking speed? Did the authors allow a time to recover from each walking trial?

The rest interval of 60 s, which was provided between the trials, did not cause the patients to fatigue.

To reduce bias did the authors consider randomizing the walking speeds?

For gait analysis, we are used to first evaluate gait parameters at a self-selected normal comfortable speed (see e.g., Maffiuletti NA et al. Spatiotemporal parameters of gait after total hip replacement: anterior versus posterior approach. Orthop Clin North Am. 2009,40:407-415) in order to better familiarize patients with the testing procedure. This approach does not compromise the excellent reliability of the spatiotemporal gait parameters as evaluated here and elsewhere (van Uden & Besser, Test-retest reliability of the temporal and spatial gait characteristics measured with an instrumented walkway system (GAITRite). BMC Musculoskelet Disord. 2004,5:13).

Table 2: rather than report F-values perhaps actual values (mean and SD) would be sufficient.

Because actual values (means and standard errors of the means) were already reported in Figures 1-3 (original submission), we preferred not to modify Table 2.

How was mean side-to-side asymmetry assessed?

The mean side-to-side asymmetries were calculated as (100 x (mean uninvolved side - mean involved side)/ mean uninvolved side) for SLS and stance time, and as (100 x (mean involved side - mean uninvolved side)/ mean involved side) for step length. These details have been provided.

Discussion

There is perhaps too much postulation relating to the current results, and suggest delete the comments and this would also reduce the discussion section to be more succinct:
Page 13: remove ‘it is likely that patients purposely avoided knee flexion….’
Page 13: remove ‘it is worth mentioning that side-to-side asymmetries….’
Page 14: remove ‘we conjectured that quadriceps weakness...’
Page 13: perhaps too much of a literature review relating to Brodsky et al work. Please be more succinct.

These sentences have been removed. In addition, the section where the main findings of Brodsky et al. (2011) were reported has been considerably shortened.