Author’s response to reviews

Title: Gait characteristics associated with the foot and ankle in inflammatory arthritis: a systematic review and meta-analysis

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Author’s response to reviews: see over
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Dr Mattia Loppini
BMC Musculoskeletal Disorders

RE: Response to reviewer’s comments MS: 1911589831153288

Dear Dr Loppini

As per your request on the 10th March 2015, I am submitting a revised version of the manuscript “Gait characteristics associated with the foot and ankle in inflammatory arthritis: a systematic review and meta-analysis” by Matthew Carroll et al., to BMC Musculoskeletal disorders.

The letter is in response to comments made by the reviewers. I have addressed each comment and include attached a summary of how each comment was addressed and where changes were made in the manuscript.

Thank you for considering the resubmission of the manuscript.

Yours sincerely,

Matthew Carroll
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Response to reviewers

We would like to thank the reviewers for the time taken to review the manuscript and the comments provided. Please find our response to the reviewer’s comments below. Bold text indicates the location of the changes with the in text changes in italics.

**Reviewer 1**

**Minor essential revision 1**

Median and range of patients and controls should be given in the text to make it easier to the reader.

The mean (SD) age of the IA cases and controls are reported in the results section on page 7 lines 160-160. Additionally, in Table 1 the characteristics of the population are presented. In Table 1 the mean (SD) were reported for the population characteristics. Where this was not possible due to inadequate data reporting the median and range were reported. We have also added the following sentence to the text.

**Page 6, lines 144-145:** ‘When mean and SD was not reported, the median and range were reported’.

**Minor essential revision 2**

Limitations concerning sample sizes and inhomogeneity in the activity, duration and different types of inflammatory arthritis regarded in the reviews and the meta-analysis are mentioned, while the distribution of the different types of gait analyses in the individual studies can be taken from the additional files only. Due to their impact of the results from the different studies regarded in the review and the meta-analysis, this should be more pronounced in the manuscript as a limitation as well.

**Page 10, lines 240-243:** ‘Previous studies have described a wide range of methodologies to acquire and define gait parameters and this complicates the synthesis of data across different studies.'
Reviewer 2

Major Compulsory revision 1

Since 31 of the 36 included studies concern RA, I was wondering to what extent this study adds to the review by Baan et al (2012).

Page 4, lines 80-84:

‘Baan [25] only reported gait parameters in RA and did not consider other IA conditions. However, recently there has been an interest in evaluating gait patterns in other IA conditions that includes gout [12], PsA [21] and AS [10]. No previous systematic review has conducted meta-analysis of gait parameters in IA compared to healthy control population’.

How many new studies (after 2012) have been included? What were the inclusion criteria for publication year?

Page 5, line 100: ‘No limitation was placed on the date of the publication with databases screened up to March 2015’.

We have also re-run the search strategy in response to this comment to ensure the systematic review is current. No additional studies were found that met the inclusion criteria.

We have amended the sentence on Page 4, Line 90: ‘The search was completed in March 2015’.

Major compulsory revision 2

In the introduction section, the authors state that the study provides information about the relationship between joint diseases, impairments and compensatory strategies. In the discussion section it is shown that RA adopts an antalgic gait resulting from pain avoidance. I would expect a bit more detail on how this exactly works from a biomechanical point of view (e.g. why less ankle power? Is this related to peak plantar pressure? etc).

We have added the following to Page 3, lines 57-68:

‘Foot pain is considered an important factor in the development of antalgic gait in IA, specifically in RA and gout [6, 11, 12]. In RA, foot pain is derived from structural and functional alterations associated with inflammatory and structural change [6, 13]. With the development of an antalgic gait, adaptations occur based upon a pain avoidance strategy. Previous studies have reported gait adaptations in RA and these include: a decrease in walking velocity and subsequent alterations to velocity related spatiotemporal parameters including, reduced cadence, increased double limb support time and decreased step length [14-18]. Changes to kinematic parameters including, reduced sagittal plane ankle ROM and increased peak rearfoot eversion have also been reported [7, 14, 17, 18]. Furthermore, previous studies have reported alteration to kinetic parameters including, reduced peak ankle plantarflexor power associated with reduced walking velocity, reduced ankle joint ROM, reduced ankle joint angular velocity, reduced ankle plantarflexor moments and decreased strength of the ankle plantarflexor muscles [16, 17, 19]. An increase in peak forefoot plantar pressure parameters has also been reported in RA [16].’
In the introduction section the pathology of different types of IA could be further explained. To a novice reader it is not very clear what differences are between RA, AS, PsA and the other diseases

We have amended the sentence to **Page 3, lines 50-55:** ‘RA is a chronic progressive autoimmune disease characterized by joint swelling, joint tenderness and destruction of synovial joints [2]. SpA encompasses a heterogeneous group of inflammatory arthritic conditions, characterised by vertebral involvement, peripheral oligoarthritis or polyarthritis, enthesitis, AS, PsA and undifferentiated spondyloenthesoarthritis [3, 4]. Gout is a common form of inflammatory arthritis caused by the deposition of monosodium urate crystals within joints and other soft tissue associated with hyperuricaemia [5].’

The review includes many figures as well as supplementary material. I am not sure what number of figures is allowed in the Journal. Otherwise, the authors need to limit

We have reviewed the instructions for authors relating to research articles for BMC Musculoskeletal disorders to ensure compliance with table, figures and additional files.