Reviewer's report

Title: Foot structure, pain and functional ability in people with gout in primary care: cross-sectional findings from the Clinical Assessment Study of the Foot

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Reviewer: Sarah Stewart

Reviewer's report:

Thank you for the opportunity to review this manuscript which assessed a number of foot characteristics (pain, structure, function) in primary care patients with gout compared to people without gout. Although the manuscript is written well, there are a number of major methodological issues which need consideration.

Firstly, participants in both groups were derived from an existing study which included only people with foot pain (and most likely also foot problems). This is likely the reason the authors found no differences in foot pain, lower limb function and other foot deformities between the two groups. Considering the large number of variables assessed (>50), it is possible that the only two differences between the groups (STJ and 1MTP ROM) were due to type 2 error. What is the clinical importance of comparing people with gout to people with foot pain?

Secondly, the inclusion criteria for participants with gout included reviewing medical records 18 months after the date in which the participant attended the clinical assessment. If a participant developed symptoms of gout 18 months after the study took place, then they did not actually have gout at the time the data was collected and therefore should not be included in the gout group.

Thirdly, the characteristics of the participants with gout are not described (page 4, line 23). It is important to include information about disease duration, medications, flare history (including flare at time of assessment), serum urate levels and the presence of subcutaneous tophi. The authors acknowledge that joint aspiration was not performed to definitively confirm gout diagnosis (limitations section of discussion), however was this information not available in the medical records? Furthermore, no clinical criteria was used to confirm diagnosis either (i.e. the ACR/EULAR Classification Criteria for Gout). Were the patients on any urate lowering therapies? Were there any records of imaging studies (ultrasound, x-rays) available to help confirm diagnosis? (page 4, lines 16-18).
Other concerns:

Title: Consider revising the current title of the manuscript (Impact of gout on foot structure, pain and functional ability: cross-sectional findings from the CASF). You cannot determine causality (i.e. "impact of gout") from a cross-sectional design. This is particularly problematic with the current methodology which included people with gout who may have been diagnosed with gout 18 months after data collection took place.

Background: The primary justification for the study seems to be that participants with gout were recruited from primary care settings as opposed to secondary care settings. If so, this theme should be incorporated into the discussion and perhaps also the title of the manuscript. The authors may also like to include reference to these additional studies in their introduction (and discussion) which have examined foot characteristics in people with gout including joint range of motion: Journal of Foot and Ankle Research 8:41 doi: 10.1186/s13047-015-0091-8; Journal of Foot and Ankle Research 10:25 doi: 10.1186/s13047-017-0207-4; Gait and Posture 44:18 doi: 10.1016/j.gaitpost.2015.11.004

Methods: Page 3, line 21: the inclusion of participants older than 50 years should be discussed. As gout tends to present in the mid-third to fourth decades, it is possible that people with gout in the current study may have had the disease for quite some time.

Statistical analysis: I'm not sure that simply including a random intercept is sufficient to account for the repeated right and left foot measures. Was a random effect of foot side (right or left) also included? This paper may be helpful: Gait Posture. 2018 Jan;59:182-187. doi: 10.1016/j.gaitpost.2017.10.018

Results: Page 8, lines 13-18: obviously there will be no differences in foot pain and disability between the groups since participants in both groups were initially included only if they had foot pain. It is unclear why pain-related variables are included.

Tables 3 & 4: If the repeated right and left foot measures have been correctly accounted for in the analyses, then reporting data separately for right and left feet is not necessary. I suggest combining right and left foot data together and reporting n (%) for the number of feet rather than number of participants (Table 3). Also consider incorporating the ORs/estimated means reported in Table 4, into Table 3 (i.e. so you only have one results table). There is a lot of data presented which can be overwhelming to the reader. Also, did you consider analysing the data to determine the odds of having a feature present in one group vs having the feature present in the other group (i.e. reporting a single odds ratio per variable, rather than an odds ratio for each group)? This would further simplify the results for the reader.
Discussion: Overall, the discussion could be stronger with respect to comparing the findings from the current study with existing literature. This would be a good opportunity to discuss any similarities/differences between primary care and secondary care patients with gout (i.e. the main justification for the current study). Other discussion points to consider:

Page 12, line 6: reporting that people with gout are more likely to have HV in the left foot is a very odd way to report results. I think you should focus on the pooled right/left foot results from an accurately adjusted model (see comment above).

Page 12, line 20: it is possible that the reason you did not find that people with gout walked slower is because both groups had foot pain. Foot pain is known to be a mediating effect of walking speed, particularly in people with gout (Gait and Posture 44:18 doi: 10.1016/j.gaitpost.2015.11.004).

Page 12, line 25: the authors state that 1MTPJ ROM was limited because gout commonly affects that joint. Can you be more specific - what aspects of gout contribute to reduced joint motion? Pain? Swelling? Tophus? This paper reported a similar finding and may be helpful: Journal of Foot and Ankle Research 8:41 doi: 10.1186/s13047-0150091-8

Page 13: lines 1-3: The presence of secondary/concomitant OA was not measured so it is difficult to make this claim, particularly since all participants were older than 50 years, and both groups were likely to have some form of OA. Perhaps in reference to ankle joint function, the authors may find this paper helpful: Gait and Posture 63:150 doi: 10.1016/j.gaitpost.2018.04.020

Page 13: lines 7-9: There are a number of studies which have assessed foot posture in people with gout (your reference #4 and: Arthritis Care & Research 64:3 doi: https://doi.org/10.1002/acr.20670; Journal of Foot and Ankle Research 8:41 doi: 10.1186/s13047-0150091-8). There is also the possibility that FPI was not accurately captured due to people adjusting their foot position to offload pain. In people with gout, there are also other variables that affect FPI such as tophus deposition which can significantly alter foot alignment.

Page 13, lines 10-12: This does not make sense. Do you mean "consistent", not "inconsistent". This study found that people with gout had more HV: Journal of Foot and Ankle Research 8:41 doi: 10.1186/s13047-0150091-8

Page 13, line 14: HV is not always painful.
Page 13, lines 15-17: HV can actually be asymmetrical

Page 14, lines 5-7: the authors state a limitation was the inability to distinguish which foot was affected by gout. By this do the authors mean by an acute flare of gout? Also note, that neither foot may have had a history of acute involvement. Also, research has shown that even during asymptomatic periods, people with gout still report pain and disability and exhibit structural and functional impairments (Journal of Foot and Ankle Research 8:41 doi: 10.1186/s13047-0150091-8)

Minor edits:

Page 2, line 17 and line 22: be consistent with abbreviation of metatarsophalangeal joint. I.e. use either MTPJ or MTP.

Page 3, line 4: change "…resulting in severely painful acute attacks" to "which may result in severely painful acute attacks". MSU deposition can be subclinical and asymptomatic and does not always cause acute symptoms of gout.

Page 3, line 6: change "commonly affects the…” to "commonly affecting the…”

Page 3, line 9: what do you mean by "chronic effects of gout"?

Page 3, line 12: this is incorrect. These studies found shorter step and stride lengths in people with gout compared to healthy controls (not longer step and stride lengths).

Page 5, line 4: need to state abbreviation MFPDI in full at first use.

Page 5, line 12: include more information on the 'gait speed test' and how it was performed.

Page 5, line 25: this is incorrect. The FPI is scored between +12 and -12 (not +2 and -2).

Page 6, line 10: what is meant by "deformity" at the 1st MTPJ? What kind of deformity?


Page 6, lines 17-18: remove ".. assessment of both feet was performed..". It is already stated above that feet were assessed bilaterally. Also, how was STJ ROM measured? Goniometry?

Page 7, line 19: why adjust for BMI? What effect might BMI have on the variables measured? Include reference to relevant literature reporting on the association between BMI and foot problems.

Page 8, line 1: change "26" to "Twenty six".
Page 8, lines 7-8: this data is not presented in any tables - perhaps report the data in the text here (i.e. n (%) of participants in each group categorised as being overweight). Also provide BMI cut point definition of "overweight".

Page 12, line 21: this is the incorrect reference

Page 13, line 12: check that this is the correct reference.

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