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Author's response to Anthony Halimi and David Poulter's letter to the editor regarding 'A study exploring the prevalence of extremity pain of spinal source (EXPOSS)'

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We would like to thank Anthony Halimi and David Poulter for taking the time to comment on our recently published article [1]. We welcome the opportunity to respond to these valid questions and further elaborate on some aspects of our study.

One of the first points raised in the letter was regarding the natural history of disease. We comment on this as well as other potential factors affecting the outcome aspect of the study in the article's discussion section. The study was primarily focused on establishing the prevalence of a potential spinal source for isolated extremity pain rather than comparing outcomes. However, it is worth noting that in our study, to classify the participant as a 'spinal source', their presenting symptoms, extremity range of movement or functional tests needed to have an *immediate* change following performing spinal movements and this needed to be reproducible, as well as continue to improve through subsequent visits until discharge. Although we cannot state that natural history would not account for changes seen in the patients with acute or subacute pain, we do not believe that natural history would account for the immediate change in presentation and the continued improvement, especially with patients whose pain was chronic. Patients with chronic pain accounted for 42% of the whole study cohort with 46% of those classified as having a spinal source of pain. A further consideration regarding the influence of natural history, would be the evidence documenting that many extremity issues appear to be typified by persistence as opposed to rapid resolution [2–6].

Halimi and Poulter also point out that 'pain improvement may be due to the modification of a nociceptive source, or a change in any other part of the multisensory cues ...' We agree that the most likely cause of observing changes in the symptomatic, mechanical and functional baselines was due to some

form of modification of a nociceptive source. In the 'spinal source' group, as the exercises were directed at the spine, then this was regarded as the source of the participants complaint. This would be the same notion in the extremity source group that responded to specific extremity targeted exercises and who did not demonstrate any change in their extremity pain, range of motion or functional baselines when their spine was assessed.

Expectations of patients/participants are important aspects to consider in any study. As stated by Halimi and Poulter, the MDT evaluation involves the patient in the diagnostic process and therefore sets into practice what current literature on clinician-patient interaction demands [7,8]. Halimi and Poulter counteract this important aspect when speculating that patients feel 'punished' by the active evaluation. If this was in fact the case we would speculate that the patients subsequent expectations of swift recovery after having being 'punished' would be fairly low. Furthermore, the assessment did not focus solely on pain location or pain intensity. Extremity baselines were highly individual and included functional movements, patient specific tests and pain behavior. One could further hypothesize that when a clinician is assessing and treating a body part that the patient believes is *not* related to their specific problem, expectations of a positive effect would be low. Conversely, we might assume that when the patient believes the extremity is the source and this is then the target of the treatment, expectations would be higher. We acknowledge that assessing patient expectations at baseline would have been a useful addition to the study.

In regard to clinical equipoise of the studied clinicians, it is correct that the clinicians did know the purpose of the study. However, for the participating clinicians there was no benefit involved in relation to any possible result, as they routinely treated patients with complaints of spinal AND extremity origin. There is no preference or

benefit for having one proportion classified as spinal source rather than an extremity source which would have made it necessary to account for the issue of clinical equipoise. We were simply interested in investigating the proportion of patients that present with isolated extremity pain who have a spinal source of symptoms and evaluate the response to spinal intervention, which only served to give some level of credibility to the hypothesis that these were of 'spinal source'. As stated, there is currently barely any data available to guide clinicians in this regard, so the objective was to set out the proportions using this specific approach to differentiation.

We acknowledge that what may influence a participant's/patient's presentation is multifactorial. The key element to this trial was that the results were reproducible with each individual and there were improvements from session to session. The effect of the spinal intervention indicated an immediate change in their baselines. The same principle applies to the extremity intervention in the 'extremity source' group. Of course, other factors influencing the patient's experience of pain would also play a role but would apply equally to both groups.

Patients with hip and shoulder symptoms were a part of the study, as we included every patient who fulfilled the inclusion criteria. We acknowledge that both the shoulder and hip regions are common referral areas from the spine, but it must be emphasized, that to be included in the study, the patients and referring physicians had to believe that the patients' complaints were from their extremity. We believe that, due to the proximity of the joints to the spine, there would be a greater justification as this would be a particularly challenging area for clinicians to differentiate. We therefore felt appropriate to include these patients in the overall results. We acknowledge that Halimi and Poulter are correct in stating that when moving the lumbar spine, the hip joint is also moved and therefore questioning whether the source of baseline change is the spine or the extremity. Due to this challenge, clinicians in the study made every effort to examine the patient response while the extremity joint or the spine was kept in neutral or in a direction that was not considered the directional preference. So, for example, when performing repeated lumbar extensions in lying, allowing the symptomatic hip to rest in a few degrees of flexion, off the side of the table would routinely be performed to ensure that the change in the baselines was due to the end range extended spine and not the hip. For the shoulder and hip, clinicians may also have used strategies such as clinician mobilization to ensure that the spine was taken to end range whilst the extremity was kept as close to neutral as possible.

Halimi and Poulter state that '...the first group is only composed of patients that achieved successful results.' Here we would like to clarify the study process. All patients were assessed to determine if the source of the

problem was spinal or extremity. Once this designation was made, each patient remained in their allocated group, there was no switching to an extremity group if the complaint was not 'fully resolved with just spine movements'. A possible explanation of the poorer outcome of the extremity group is given in the study's discussion section.

Finally, we agree with the concluding statement by Halimi and Poulter. Future research should include a randomized control trial to explore the outcomes of patients presenting with extremity pain and being treated with spinal intervention. Determining the role of the spine in patients presenting with isolated extremity pain remains a diagnostic challenge for many clinicians. The overall consequence is that despite recommendations for the assessment of the spine in patients presenting with extremity pain [9], clear guidance is not available [10]. The intent of this study and future papers based on the data collated from this study is to guide clinicians in the assessment of the spine for these patients.

Disclosure statement

Richard Rosedale is employed as the International Director of Education and an International Instructor with the McKenzie Institute International. Josh Kidd is an instructor with the McKenzie Institute USA. Greg Lynch is a Director on the Board of Trustees of the McKenzie Institute International and employed as an International Instructor. Georg Supp is a member of the McKenzie Institute's Education Council and employed as an International Instructor.

Notes on contributors

Richard Rosedale completed his Diploma in MDT in 1997. He has been active in research and has authored/coauthored over a dozen papers, primarily exploring the clinical utility of MDT. Richard is an International Instructor with the McKenzie Institute. Richard is now the International Director of Education for the McKenzie Institute.

Ravi Rastogi has worked in orthopedics, in the private and public sector. He completed his Masters in 2006 and credentialed in MDT in 2011. Ravi is currently practicing as in an Advanced Practice role as the lead of a Musculoskeletal Rapid Access Program for low back pain in Southwestern Ontario.

Josh Kidd completed his board certification in orthopedics in 2010, Diploma in MDT in 2011, a Masters in Orthopedic Manual Therapy in 2015, and was awarded AAOMPT Fellowship status in 2016. He is faculty for the McKenzie Institute and the clinical coordinator for the McKenzie Institute USA Orthopedic Residency Program

Greg Lynch is a Co-Director of Inform Physiotherapy Limited and a founding Director of Wellington Sports Medicine. He is an accredited provider with 'High Performance Sport New Zealand'. Greg is a Faculty member for the McKenzie Institute International and was appointed to the Board of Trustees in 2018.

Georg Supp runs PULZ physiotherapy in Freiburg, Germany. He received the Diploma in MDT in 1999. Georg was the

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Shawn Robbins is an Associate Professor at McGill University. He completed his BScPT and PhD at Western University in 2001 and 2010 respectively and did a post-doctoral fellowship at Dalhousie University. Dr. Robbins' research utilizes biomechanical and clinical measures to assess orthopedic health conditions and interventions.

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