Author’s response to reviews

**Title:** Multi-parametric Muscle and Fat Correlation of Computed Tomography Parameters to Outcomes in a Total Hip Arthroplasty Population

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1. Introduction: The novelty of this study is not clear and should be elaborated in the introduction and outlined in the main objective. Why do you consider yet another time-consuming (albeit shorter than some) parameter could add any value to a busy clinician's prognostic capacity? On what precedence do you base this? Is there other literature on muscle composition parameters that point to its importance, others joints or anatomical regions, perhaps?

Response: Sarcopenia has been shown to affect surgical outcomes negatively, but the studies are limited to single slice muscle analysis using CT imaging. No prior study has evaluated THA outcomes with respect to muscle analysis. With the employed software capability, we could obtain multi-compartment tissue evaluation and assess correlations to THA outcomes. Thus, it is an exploratory study where we found some interesting correlations as reported in the article. With a larger sample, these could be further explored in future which may aid in improved pre-operative planning. We have added the statement to the introduction.
2. Methods: Indicate what comprised (in hours) of the training of the medical students, which has been shown to relate to the repeatability of segmentation methods (e.g. Mhuiris et al. 2016 BMSD); indicate what year the medical students are in (is this a final year project?); please clarify how your definition of ROI relates to the literature (either as a method used previously, or anatomically-defined text); clarify how the readers 'worked together' on the first three CTs (do you mean they agreed to the definition of each ROI per slice and then independently encircled them? In which case you should have almost 'perfect' agreement (an advantage); while there has been improved clarification that the results represent the mean of two (?relatively novice) readers, there remains question for me as to the intra-rater repeatability of the methods, which is crucial in such a proof of concept/validation-type study and certainly in convincing a readership examining the utility of a method.

Response: Two second year medical students evaluated the studies under the direction of the fellowship trained MSK radiologist. Much of the analysis is automated, therefore, we wanted to assess how the inter-reader performance varies when done at the non-attending level. All details regarding their training, independent reads, and ROI placement have been added. Rationale and literature support for ROI selection has also been added.

3. Discussion: This remains unconvincing in terms of meaningfulness of this study to the readership. I find the justification for the study to be a precursor to a more detailed (and larger sample) study to be inadequate. While I appreciate the succinct nature of the reporting, it is arguably not enough just to list other studies; e.g. how does your study better those before it?

Response: To our knowledge, this is the 1st study on THA with outcomes scores and multi-compartment tissue segmentation. It is an exploratory study and establishes a foundation for future prospective studies in this domain to expand validity of our preliminary results. The conclusion statement has been modified.