

QIBA Musculoskeletal (MSK) Biomarker Committee (BC) Call

Tuesday, March 23, 2021 at 10 a.m. CT

Call Summary

In attendance

Thomas Link, MD, PhD (Co-Chair)

Xiaojuan Li, PhD (Co-Chair)

Michael Boss, PhD

Angie Botto-van Bemden, PhD

Majid Chalian, MD

Ruud de Boer, PhD

Maggie Fung, MEng

Ali Guermazi, MD, PhD

Peter Hardy, PhD

Youngkyoo Jung, PhD, DABR

Feliks Kogan, PhD

Kecheng Liu, PhD, MBA

Annelise Malkus, PhD

Nancy Obuchowski, PhD

Yuxi Pang, PhD

Qi (Chris) Peng, PhD

Cory Wyatt, PhD

RSNA

Joe Koudelik

Susan Stanfa

MSK Profile – Review Public Comments (Dr. Link)

- The public comment period closed on October 29, 2020, and MSK BC members have been using the [MSK public comment resolutions Google Sheet](#) to document how feedback is addressed

Discussion on unaddressed comments resumed

Miika T. Nieminen, PhD; Mikko J. Nissi, PhD; Evelina Lammintausta, PhD; Victor Casula, PhD (Oulu University Hospital)

- Regarding the reconstruction of relaxation maps: the process of eliminating noisy voxels when SNR is high needs to be more precisely defined, as fitted data values will be affected
 - Drs. Li, Hardy, and physicists to be consulted re: fitting algorithms to accommodate noise
 - Drs. Li and Hardy to review and add resolutions to the [comment resolutions Sheet](#); Dr. Li will provide more information and references
- Issues related to the definition of compartments in the Global and Compartment Specific Analysis subsection of Section 3.7: Image Data Analysis were discussed
 - Dr. Link updated Figure 2, better defining the regions to show anatomical landmarks and adding lines indicating boundaries between regions
 - The second issue was that proposed regions may be too large, resulting in the averaging out of most local changes and reducing sensitivity to early cartilage degeneration
 - Discussion re: whether the femoral region should be subdivided between weight-bearing/non-weight-bearing deep and superficial cartilage layers
 - Additional regions will be discussed further; the MRI Osteoarthritis Knee Score (MOAKS) system and Dr. Felix Eckstein's work will be referenced
 - It was noted that reproducibility data in the MSK Profile are based on major compartments and that subdivision may decrease reproducibility
- Clarification that T1p and T2 relaxation times are field dependent was added to the Imaging Equipment subsection of 4.1.1 Assessment Procedures: T1p and T2 of Cartilage
- Dr. Obuchowski confirmed that since the target is 4-5%, the upper bound of wCV being less than 5% can be left as is
- The findings of two recent systematic reviews and meta-analyses were considered, and the following two references were added to Appendix B
 - Atkinson HF et al. [MRI T2 and T1p relaxation in patients at risk for knee osteoarthritis: a systematic review and meta-analysis](#). *BMC Musculoskelet Disord*. 2019;20(1):182. doi:10.1186/s12891-019-2547-7
 - MacKay JW et al. [Systematic review and meta-analysis of the reliability and discriminative validity of cartilage compositional MRI in knee osteoarthritis](#). *Osteoarthritis Cartilage*. 2018;26(9):1140-1152. doi:10.1016/j.joca.2017.11.018

James Mackay, MBBCHIR, MRCP (Norwich Medical School, UK)

- There was discussion regarding the preference for the term, “osteoarthritis,” as degenerative joint disease may be vague
 - It was noted that the definition of osteoarthritis in the MSK Profile was based on KL and clinical findings
 - The consensus was to exchange “degenerative joint disease” with “(early) osteoarthritis”; the OARSI white paper submitted to the FDA, “[Osteoarthritis: A Serious Disease](#),” will be added as supporting material
- There was an inquiry regarding whether the reproducibility of 4-5% refers to global, compartmental, or laminar (e.g., superficial, deep) values; one would expect reproducibility to worsen with more granular analyses
 - It was clarified that it is probably best to use global and the six major compartment measurement; discussion to be added
- Suggestion to clarify that many studies have demonstrated bidirectional changes in T2/T1p with increasing degeneration, so one-sided analyses should only be performed with caution; it should also be acknowledged that concurrent increases and decreases in T2/T1p in different regions of the same knee can be seen
 - The MSK BC agreed that bi-directional changes have been seen with more advanced degeneration, especially with T2, and language and references will be added
 - The MSK BC also agreed with different loading, and with treatment or therapeutic interventions, bidirectional changes in T2/T1p can be observed. Additional references will be implemented (also Stanford group publication on Collegiate Basketball players)
- Suggestion to remove statement on discouragement of flexible coils or provide supporting data; Dr. Li to provide details, explaining that if flexible coils are used, they must meet Profile conformance
- Dr. Obuchowski to be consulted regarding the recommendation to place a “student's t-test” with a Bland-Altman analysis in Section 3.3. Periodic QA; discussion on this [row 102 comment](#) to continue during the April 27 meeting
- The MSK BC aims to finish addressing comments during the next meeting

Next Call: Tuesday, April 27, 2021 at 10 a.m. CT [4th Tuesday of each month]

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