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OPEN PEER REVIEW

Intra- and Inter-rater Reliability of a Magnetic Resonance Imaging-Based Volumetric Analysis of the Abductor Hallucis Muscle

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About this report

This open peer review (OPR) report shows the public comments made on this article during peer review, by the reviewers, the associate editor and the editor-in-chief, for every revision round, together with the authors' replies. Comments appear only with the consent of the people who wrote them. Reviewers who chose to sign their report are named; the others are shown as "Referee". Comments are edited for language only, and confidential remarks to the editors are not included.

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1 Original submission

4 comments · 18 Jun 2022 – 19 Jul 2022

Referee 1 Reviewer

ACCEPT 18 Jun 2022

Thanks to the authors for considering IJR for their submission.
Overall, it can be said that this manuscript has an appropriate scientific writing structure, correct statistical analysis, and a suitable style of presenting results. However, in terms of novelty, there are some similar studies with larger sample sizes. In general, this manuscript is methodologically acceptable for publication in IJR.

Referee 2 Reviewer

MINOR REVISION 24 Jun 2022

Dear editor in chief

The article is interesting and well structured; however, I think the sample size is small.
Please determine the novelty of the study and highlight it.
with best regards

Referee 3 Reviewer

MINOR REVISION 17 Jul 2022

Dear authors,
Thanks for considering IJR for the publication of your work.
You have evaluated the intra- and inter-rater reliability of an MR-based volumetric measurement of the abductor hallucis muscle.
There are some minor revisions:
1. First of all, I did not understand the clinical utility of your work. Why have you chosen the AH in HV patients? Is there any evidence in the literature regarding the importance of muscle volume in the diagnosis, treatment, or prognosis of HV patients? If so, please provide this evidence.
2. Your work lacks novelty, and lots of similar studies exist.
3. Were the reviewers of the images trained to perform the measurements? If so, please explain how.
4. Finally, the abstract is an exact copy of different parts of the body of your manuscript. This is not acceptable since the abstract must be written independently.

Regards.

Editor-in-Chief

MINOR REVISION 19 Jul 2022

Dear authors,
Your article needs Minor Revision.
Regards

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Revision 1

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

26 July 2022

Authors' response
Manuscript ID: 128725

Dear Dr Kavous Firooznia
Editor in Chief, Iranian Journal of Radiology

Thank you for reviewing the manuscript and thank you for giving us the opportunity to revise our manuscript entitled "**Intra and Inter-rater reliability of a magnetic resonance-based volumetric analysis of the abductor hallucis muscle**". We appreciate the time and effort that you and the reviewers have dedicated to providing your valuable feedback on our manuscript. We are grateful to the reviewers for their insightful comments on our paper and have been able to incorporate changes to reflect most of the suggestions provided by the reviewers. Here is a point-by-point response to the reviewers' comments.

Reviewer #1:

Q: I didn't understand the clinical utility of your work. Why have you chosen the Abd H in HV patients? Is there any evidence in the literature regarding the importance of muscle volume in the diagnosis, treatment or prognosis of the HV patients? If so, please share them.

A: There are many proposed theories to describe the etiology of HV deformity. It has been hypothesized that weakness or dysfunction of intrinsic foot muscles provokes abnormal movement or pathologic conditions in the foot (1-4). Recently, with the introduction of the foot core paradigm, attention to these muscles has been increased (5). In HV, morphological changes and functional weakness of intrinsic muscles occur especially in the Abd H muscle (1-4).

Some studies reported reduced size, cross-sectional area, and thickness of Abd H in HV deformity, which may be associated with a reduction in the functional capacity of the muscle (6). The muscle volume is an important morphological characteristic, like cross-sectional area and thickness that can be used to assess the results of a strengthening treatment plan. Based on Magda Marcon's study, there is a good to excellent linear correlation between muscle cross-sectional area and its volume (7). The muscle volume may be more representative of the muscle characteristics than the cross-sectional area measured in a single image slice (8).

Q: Your work lacks novelty and lots of similar study exists.

A: Previous studies on muscle volume considered intrinsic foot muscles as a group and did not report the volume of a single muscle that is important in deformities like HV. Intrinsic muscles of the foot have small sizes and irregular shapes and evaluating their morphologic characteristics is more challenging than larger skeletal muscles. In addition, our study included all of the slices that Abd H muscle was apparent in them.

Victor A. Cheuy in 2013, assessed the reliability and validity of Magnetic Resonance-Based volumetric analysis of the intrinsic foot muscles. In this study, a semi-automated program was evaluated and just single MR slices at forefoot, midfoot, and hindfoot were segmented. At all three foot locations, the intrinsic foot muscles were segmented as a group and not as individual muscles (9). Ryan Chang in 2011, also assessed plantar intrinsic muscles as a group (10). Hans Lund in 2001, determined the intra and inter-observer variation of manually outlined extensor muscles volume measurements. The purpose of this study was to estimate the minimum number of slices needed for the calculation of muscle volume. Only eight slices of muscles were needed and assessed in this study (11).

The manual technique to calculate a muscle volume has been used mostly in large muscles and the reliability of this technique has not been assessed in Abd H muscle especially, in HV deformity which affects this muscle greatly (3).

Q: Were the reviewers of the images trained for the measurements? If so, please explain how?

A: An associate professor of radiology who is one of the research team members trained the raters to decide on the origin and insertion slices, separate the muscle's borders, use the software utilities, measure the cross-sectional area on each slice and measure the total volume of the muscle. Before beginning independent measurements by raters, they practiced the method several times together to ensure the uniformity of their measurement technique.

Q: The abstract is exactly a copy of the different parts of the body of your manuscript.

A: Thanks for your comment. The abstract was rewritten.

Reviewer #2:

Q: In terms of novelty, there are some similar study with more sample size.

A: Previous studies on muscle volume considered intrinsic foot muscles as a group and did not report the volume of a single muscle that is important in deformities like HV. Intrinsic muscles of the foot have small sizes and irregular shapes and evaluating their morphologic characteristics is more challenging than larger skeletal muscles. In addition, our study included all of the slices that Abd H muscle was apparent in them.

Victor A. Cheuy in 2013, assessed the reliability and validity of Magnetic Resonance-Based volumetric analysis of the intrinsic foot muscles. In this study, a semi-automated program was evaluated and just single MR slices at forefoot, midfoot, and hindfoot were segmented. At all three foot locations, the intrinsic foot muscles were segmented as a group and not as individual muscles (9). Ryan Chang in 2011, also assessed plantar intrinsic muscles as a group (10). Hans Lund in 2001, determined the intra and inter-observer variation of manually outlined extensor muscles volume measurements. The purpose of this study was to estimate the minimum number of slices needed for the calculation of muscle volume. Only eight slices of muscles were needed and assessed in this study (11).

The manual technique to calculate a muscle volume has been used mostly in large muscles and the reliability of this technique has not been assessed in Abd H muscle especially in HV deformity which affects this muscle greatly (3).

The samples size was estimated considering the requirements of α=0.05 and ß=0.2, and ICC value of 0.6 (12), which indicates moderate reliability (13).

Reviewer #3:

Q: The sample volume is low.

A: The samples size was estimated considering the requirements of α=0.05 and ß=0.2, and ICC value of 0.6 (12), which indicates moderate reliability (13).

Q: Please determine the novelty of study and highlight it.

A: This sentences were added in the last paragraph of the introduction section:

“The manual technique to calculate a muscle volume has been used mostly in large muscles and the reliability of this technique has not been assessed in Abd H muscle, especially in HV deformity which affects this muscle greatly.”

Reviewer #4:

Q: Regarding the importance of “conflict of interest” clarification, the corresponding author should fill out the “ICMJE form” and upload in the submission process.

A: The Completed ICJME form was uploaded.

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2 Revision 1

1 comment · 27 Aug 2022

Editor-in-Chief

MINOR REVISION 27 Aug 2022

Dear authors,
Your article needs Minor Revision.
Regards

3

Revision 2

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

27 August 2022

Authors' response
Manuscript ID: 128725

Dear Dr Kavous Firooznia
Editor in Chief, Iranian Journal of Radiology

Thank you for reviewing the manuscript and thank you for giving us the opportunity to revise our manuscript entitled "**Intra and Inter-rater reliability of a magnetic resonance-based volumetric analysis of the abductor hallucis muscle**". We appreciate the time and effort that you and the reviewers have dedicated to providing your valuable feedback on our manuscript.

Reviewer #2:

Q: Add in conclusion that further studies with larger sample volume is recommended.

A: Thanks for your comment. It was added in the conclusion.

Associate Editor #2:

Thanks for your valuable comments. All edits applied and highlighted in the text.

3 Revision 2

1 comment · 4 Sep 2022

Editor-in-Chief

ACCEPT 4 Sep 2022

Dear authors,
Your article is acceptable for publication in IJR.
Regards