



[Print this Page for Your Records](#)

[Close Window](#)

Control/Tracking Number: 2023-A-440-SEACSM

Activity: Abstract

Current Date/Time: 1/3/2023 10:37:01 PM

A COMPARISON OF TECHNIQUES ASSESSING THE MORPHOLOGICAL CHARACTERISTICS OF SKELETAL MUSCLE FIBERS

Author Block: Breanna J. Mueller, Paulo H. C. Mesquita, Bradley A. Rupple, Joshua S. Godwin, Casey L. Sexton, Shelby C. Osburn, Mason C. McIntosh, Andreas N. Kavazis, FACSM, Cleiton A. Libardi, Kaelin C. Young, Michael D. Roberts. *Auburn University, Auburn, AL.*

Abstract:

Background: Two-dimensional cross-sectional analysis is a technique that is widely used to assess skeletal muscle fiber morphology in response to resistance training. While this technique affords some advantages in assessing fiber cross-sectional area (fCSA), fiber typing and other variables, it may not be representative of the whole fiber. A more dimensional analysis is needed to render greater accuracy and insight into the morphological characteristics of a three-dimensional fiber. The purpose of this study was to evaluate single fiber analysis as a valid and comparable technique in analyzing fiber morphology.

Methods: Vastus lateralis muscle biopsies from 11 untrained males were collected at pre- and post- of a 7-week total body resistance training protocol. Using two-dimensional cross-sectional analysis and single fiber analysis techniques, we measured fCSA, myonuclear number (MNN), and myonuclear domain (MND). T-tests and correlations were performed with the data to determine any significant changes and relationships between techniques. **Results:** Two-dimensional cross-sectional analysis revealed a significant increase in myonuclear number (35.51%, $p = 0.031$) and fCSA (19.81%, $p = 0.010$), but not in MND (1.15%, $p = 0.413$). In comparison, single fiber analysis also demonstrated a significant increase in myonuclear number (13.52%, $p = 0.011$), fCSA (32.55%, $p = 0.009$), and MND (17.35%, $p = 0.118$). There was no significant correlation between two-dimensional analysis and single fiber analysis in fCSA ($r = -0.074$, $p = 0.828$), myonuclear number ($r = 0.326$, $p = 0.327$), or myonuclear domain ($r = -0.264$, $p = 0.435$) percent change. **Conclusion:** In conclusion, the measurements taken with two-dimensional cross-sectional

analysis and single fiber analysis did not agree, and statistical analysis showed no correlations between the two measurements. However, these results may have been impacted by our limited sample size. Additional investigation utilizing a greater sample size may provide more promising results. Therefore, future investigation of the longitudinal view provided by single fiber analysis may yet yield an advantage in the morphological assessment of the skeletal muscle fiber. **Funding:** Participant compensation as well as select reagents related to analyses presented herein were funded by a grant awarded by National Strength and Conditioning Association Foundation to Paulo H.C. Mesquita.

Presentation Type (Complete): Original Research

Category (Complete): 0800 Connective Tissue/Bone/Skeletal Muscle

Additional Information (Complete):

This abstract has been reviewed by ALL listed authors and ALL Authors approve of the content of the abstract: Yes - All Approve

Student Information (Complete):

Are you a Student at the time of data collection for this abstract? (Select one of the following):

Yes-Doctoral Student

Are you a first time student presenter?: No

Would you like to apply to present in the Student Research Award session?: No

Student Award (Complete): No Student Award

Asst Prof / Post Doc Award (Complete):

I am interested in having my abstract reviewed for the *What's Up Doc?* competition.: No

Status: Complete

 Feedback

Powered by [cOASIS](#), The Online Abstract Submission and Invitation System SM

© 1996 - 2023 [CTI Meeting Technology](#). All rights reserved. [Privacy Policy](#).