BACKGROUND AND AIM:
Ultrasound shear wave elastography (SWE) was shown to represent in vivo active [1] and passive [2, 3] muscle mechanics. We hypothesized that SWE reflects changes in mechanical properties of the Biceps Brachii muscle (BB) due to
(i) Activity level changes,
(ii) Muscle length changes,
(iii) Aging.

PARTICIPANTS:
● 14 healthy young (7 females) (28.07 ± 5.06 years old)
● 10 healthy older (5 females) (67.80 ± 5.69 years old)

METHODS:
● Simultaneous SWE, surface electromyography (sEMG) of the BB, and elbow torque measurements at 60°, 90°, 120°, 150°, and 180° elbow angles.
● Rest, maximum voluntary contractions (MVC), and isometric ramp contractions (up to 25%, 50%, 75% of MVC torque) were performed.

RESULTS:
Passive shear elastic modulus:
● increased with increasing elbow angle (p < 0.001) for both groups.
● was higher for the older adults compared to the young (p < 0.001).

In active situation:
1) The shear elastic modulus represents muscle’s length-dependent force production characteristics in vivo
2) The shear elastic modulus increases with increased torque for each joint position and SWE reflects the decreased active force production capability with age
3) Passive muscle stiffness increases with age

CONCLUSIONS:
1) The shear elastic modulus represents muscle’s length-dependent force production characteristics in vivo
2) The shear elastic modulus increases with increased torque for each joint position and SWE reflects the decreased active force production capability with age
3) Passive muscle stiffness increases with age

References: