

# Reliability of sonoelastography to determine stiffness of the supraspinatus tendon in a healthy population

## - a pilot study

Brage K<sup>1,2</sup>, Hjarbaek J<sup>3</sup>, Kjaer P<sup>1</sup>, Juul-Kristensen B<sup>1,4</sup>

<sup>1</sup>Department of Sports Science and Clinical Biomechanics, University of Southern Denmark, Odense, DK

<sup>2</sup>University College Lillebaelt, Education of Radiography, Odense, DK

<sup>3</sup>Department of Radiology, Odense University Hospital, Odense, DK

<sup>4</sup>Bergen University College, Institute of Occupational Therapy, Physiotherapy and Radiography, Department of Health Sciences, Bergen, N

### **Introduction**

Sonoelastography (SEL) is used to measure tissue stiffness, but its reliability when applied to the supraspinatus tendon is unknown.

### **Aims**

To test the intra- and inter-examiner reliability of a novel SEL protocol for supraspinatus tendon stiffness in healthy individuals.

### **Materials & methods**

Four males and six females aged 22-29 with no shoulder complaints were examined independently by two radiographer students. GE LOGIQ S7 fitted with a quasi-static strain imaging software was used to create elastograms as ratios between supraspinatus tendon and reference regions of fat, muscle, (deltoid muscle), and a gel pad, respectively. The examiners were blinded to the ratios. Each examiner performed the measures two times with one hour in between. The first time, each examiner also rated the stiffness of the tendon by imaging color from low to high by 1: red, 2: green, maximum 25% red, 3: green, 4: green, maximum 25% blue, 5: blue, highest stiffness = healthy.

### **Results**

For the intra examiner reliability, the intra-correlation coefficients (CC) for each examiner were for fat 0.73 and -0.05, for muscle 0.65 and 0.23, while for the gel pad it was 0.02 and 0.21.

For the inter-examiner reliability (inter-CC) was for fat 0.17, for muscle 0.58 and for the gel pad 0.06.

Eight of the 10 tendons (80%) were rated 4, with the remaining two tendons rated 5 consistently between observers (100% agreement).

### **Conclusions**

Intra- and inter-examiner reliability in this pilot study for supraspinatus tendon stiffness was best when using the deltoid muscle as a reference. Using the color scale was reliable in this study

sample. In order to achieve better reliability, the method needs refinement and larger studies on healthy and patient populations.