別紙様式３（論文博士申請者用）

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学位論文題名（注：学位論文題名が英語の場合は和訳をつけること）

Evaluation of the tissue thickness of the supraspinatus and biceps long head tendons using ultrasound among elderly patients with unilateral adhesive capsulitis in the freezing phase.
（片側性の肩関節周囲炎 freezing phase 高齢患者への超音波検査による棘上筋腱および上腕二頭筋長頭腱の組織厚の評価）

学位の種類： 博士（理学療法学）
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注：1 ページあたり 1,000 字程度（英語の場合 300 ワード程度）で、本様式 1～2 ページ（A4 版）程度とする。

Purpose

This study aimed to clarify the changes in the tissue thickness of the abnormal supraspinatus and biceps long-head tendons among elderly patients to select the treatment targets and evaluate the treatment effects in the freezing phase of adhesive capsulitis.

Participants and Methods

This observational cross-sectional study was conducted. The study population comprised 32 elderly patients (8 males, 26 females) aged between 69 and 79 years. The inclusion criteria were participants who reported shoulder pain and stiffness of more than one month’s duration, with localized pain over one shoulder.

Two examiners (Examiner A, B) performed the ultrasonographic evaluations. Tissue thickness was evaluated using the ultrasonic device in the SST (long axis) and BT (short axis). The ultrasound image was projected on the device monitor, without setting landmarks on the body. During SST and BT imaging, the participants were instructed to sit on a chair with the arm in a neutral position. SST imaging (long axis) was performed by placing the probe near the center of the acromion, parallel to the spine of the scapula. In BT imaging (short axis), the probe was moved up and down around the intertubercular groove and applied at the site where the nodule was trapezoidal and the subscapularis muscle was visible. In each participant, the measurement was performed twice for each tissue by the same examiner. The pain test measured resting and night pain using the visual analog scale (VAS). The orthopedic tests included the full can and drop arm tests for the evaluation of the SST and Speed’s and Yergason’s tests for the BT. The relative reliability of evaluations of the thickness of SST and BT by ultrasonography was examined using the intraclass correlation coefficient (ICC). The Bland–Altman analysis was performed by plotting the mean of the differences between the two measurements against their mean (d). The participants were classified into the normal group, abnormal group, and others. If both orthopedic tests were negative, they were assigned to the “normal group”. Further, participants whose one or more of the orthopedic tests was positive and those who had resting and night pain were assigned to the “abnormal group”. Those who tested positive in one or more of the orthopedic tests and did not have resting and night pain were assigned to the “other” category. In this study, participants with resting and night pain were treated as

corresponding to the freezing phase of AC. The thickness differences were calculated as the difference between the symptomatic and non-symptomatic sides. As the sample's normality and equal variance had been confirmed, the Student's t-test was used to assess the differences in tissue thickness of the SST and BT between the abnormal and normal groups.

Results

The ICC (1.1) of SST thickness was 0.99 for examiner A and 0.98 for examiner B. Conversely, the ICC of BT thickness was 0.98 for examiner A and 0.96 for examiner B. In this study, the results of the Bland–Altman plot analysis indicated that 95% CI of values for the SST and BT thicknesses included zero elements.

Both thickness differences between the symptomatic and non-symptomatic sides in the SST and BT were found to be significantly higher in the abnormal group than in the normal group ($p<0.01$).

Conclusion

This study clarified the changes in tissue thickness of the abnormal supraspinatus and biceps long-head tendons among elderly patients to select the treatment targets and assess the treatment effects in the freezing phase of adhesive capsulitis. The study results suggest the usefulness of ultrasound for selecting the treatment targets for analgesia and assessing the treatment efficacy in cases of adhesive-capsulitis freezing phase.