ORAL PRESENTATION 1-2

통증 및 근골격재활
발표일시 및 장소 : **10 월 26 일(금) 14:15-14:25 Room B(5F)**

OP1-2-1

Optimal Elbow Positions for Identifying the Radial Collateral Ligament

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Introduction
Ultrasonographic localization of the radial collateral ligament (RCL) is important to determine the presence of RCL tears in the setting of lateral epicondylosis. At present, the standard position of examining the lateral elbow under ultrasound is a “slightly flexed” position. However, since the RCL is more deeply attached on the lateral epicondyle than the common extensor tendons, an anisotropic artifact of the RCL could be observed by the ultrasonography in the conventional slightly flexed position, making it difficult to fully visualize the RCL to determine the presence of RCL tears. The purposes of this study are to determine optimal elbow positions for identifying the RCL, and further to illustrate the ultrasonographic landmarks of the RCL using ultrasonography.

Methods
Healthy individuals without history of elbow pain were recruited. The RCL was evaluated using ultrasonography with six different elbow flexion positions (0°, 30°, 60°, 90°, 120°, and 140°). Depth interval was defined as the depth of the humeral capitellum subtracted by the depth of the radial head in ultrasonographic images, and was measured in each flexion angle of elbow (Figure 1). The presence of ultrasonographic landmarks (eg. superior and anterior tubercles and hyperechogenic line) for the RCL were assessed, and the frequency rate of the landmarks were calculated. Statistical comparisons were performed by one-way analysis of variance (ANOVA) with Bonferroni post-hoc analysis. P values <0.05 were considered significant.

Results
A total of 40 healthy elbows of 10 men and 10 women were evaluated by ultrasonography. The average of age and a maximal angle of elbow flexion were 30.1 (SD, 2.9) years, and 142.4° (3.2), respectively. The depth interval between the capitellum and the radial head was significantly decreased according to increased flexion angle of elbow (p for trend<0.001; Figure 2). The subjects with flexion angle of 140° showed the lowest depth interval among six flexion angles (Bonferroni post hoc test, all p<0.05). The groups with the depth interval near to zero were shown in the groups with flexion angle of 90°

and 120° as 0.4 (0.3) mm and 0.3 (0.4) mm, respectively. The frequency rate of superior tubercle and anterior tubercle were 100% and 70%, respectively. Furthermore, the frequency rate of the hyperechogenic line was 100%.

Conclusion

The present study demonstrates that the optimal elbow positions to visualize the RCL with the least possibility of anisotropism are 90° and 120° of flexion of elbow under ultrasound, implicating that the elbow should be flexed far more than the conventional "slightly flexed" position. In the optimal elbow positions, the ultrasonographic landmarks to identify the RCL such as the hyperechogenic line and tubercles are distinctively observed.

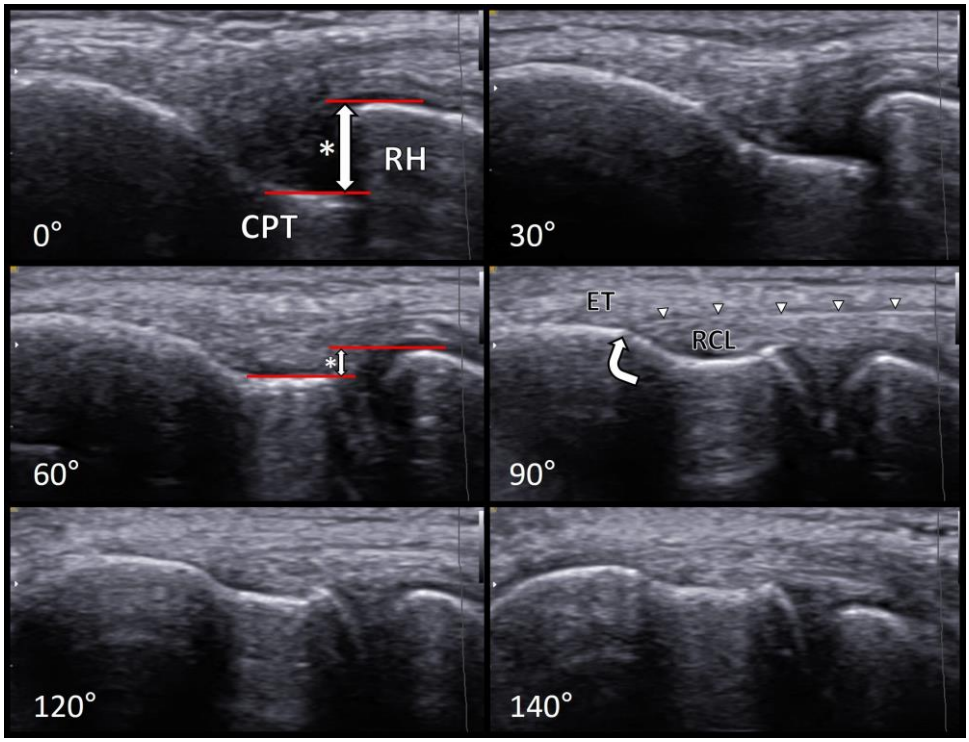

Figure 1. Ultrasonographic images of the radial collateral ligament (RCL) at 6 elbow flexion angles. Depth interval (asterisk) was defined as the depth of the capitellum (CPT) subtracted by the depth of radial head (RH) on the ultrasonography (US). Hyperechogenic line (arrow head) and a superior tubercle (curved arrow) are shown on the US image of a 90° flexed elbow, separating RCL from extensor tendon (ET).

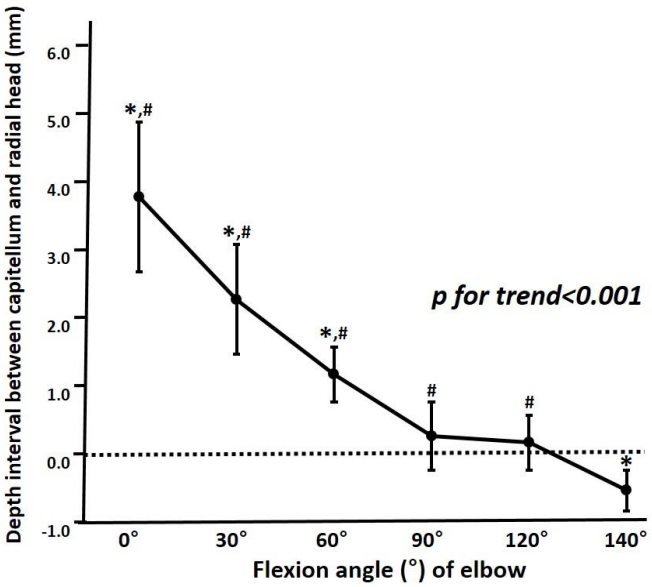

Figure 2. Means of depth interval (mm) between the capitellum and the radial head using an ultrasonography according to elbow flexion angle. *<0.05: vs group with elbow flexion of 120° on Bonferroni method. #<0.05: vs group with elbow flexion of 140° on Bonferroni method.