INTRODUCTION:
The glenoid labrum is peripherally elevated tissue surrounding the edge of the glenoid fossa, and is known to improve the stability of the glenohumeral joint by adding extra depth to the glenoid cavity. Several authors have described different variations in size and shape of the labrum depending on the location of the glenoid rim. Paying attention to its important function, the arthroscopic repair techniques have recently become more popular as a treatment for labrum injuries, including Bankart lesion. Therefore, for successful outcome of surgical repair it is necessary to understand the anatomical variations of the labrum. However, there have been few studies to investigate the size and length of insertion on the labrum by quantitative analysis. The purpose of the present study is to measure the length of the attachment of the labrum and demonstrate the regional variations of the glenoid labrum in histology.

METHODS:
Twelve cadaveric shoulders (three male and nine female, mean age, 83.1 years; range, 36-103 years) without significant arthritis were used for this study. The skin, rotator cuff muscles, and the coracoid process were removed from the scapula. The capsule, the tendons of the long head of the biceps brachii, the glenohumeral ligaments and the glenoid labrum were left intact. After macroscopic observation, all specimens were fixed in 10% formaldehyde and decalcified. The glenoid of each specimen was divided into 6 pie-slice pieces from the center of the glenoid perpendicular to the articular surface by radial incision at the 0, 2, 4, 6, 8, and 10 o’clock position (Fig. 1-A). And each section was embedded in paraffin (Fig.1-B). Each piece was stained with hematoyxline eosin (HE), Safranin-O and Azan-Mallory. The extent of the fibrocartilagenous area (FCA) adjacent to the articular surface and the length of attachment site on the glenoid rim were measured using Image J 1.40 (National Institute of health, USA) (Fig.1-C). For statistical comparison between two regions of the labrum, data were analyzed by one-way analysis of variance followed by post-hoc test, with significance at P < 0.05.

RESULTS:
The average length of the attachment of the labrum was 4.7 mm (SD, 1.4). The shorter length of the attachment was 3.4 mm (SD, 0.7) at anterosuperior region (2 o’clock) (Fig.2-A). In contrast, the average size of FCA was 7.2 mm² (SD, 5.1). The minimum size of FCA was 5.2 mm² (SD, 2.5) at anterosuperior region (Fig.2-B). Significant differences were found in both FCA and the length of labrum attachment to the glenoid rim at anterosuperior region (2 o’clock) in comparison with anteroinferior and inferior regions (4 and 6 o’clock).

DISCUSSION:
Several studies have shown the varied morphology of the glenoid and the pattern of labrum attachment around the rim of the glenoid.1,2,3 In addition, one study demonstrated the quantitative measurement of the length of labrum attachment to the glenoid rim depends on each region.4 However, they measured the distance between both edges of the labrum attachment. In contrast, we evaluated the length of the insertion by using the image analysis combined with histology, which was a more anatomical and accurate method. Moreover, we measured the FCA that was histologically important as transition zone or connective tissue between the labrum tissue and articular cartilage. Our results show that anterosuperior region between the labrum and the glenoid had narrower attachment of the labrum to the the glenoid rim than anteroinferior and inferior regions. Moreover, the inferior part included wide attachment to the glenoid rim in comparison with superior part. As a result, our findings agreed with the suggestions of the previous study in regard to the labrum attachment. Additionally, the present study shows the similar tendency as concerns the size of FCA.

REFERENCES:

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