

Expression Profile of Collagen Genes in Shoulder Instability

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Summary:

Collagens gene expression was compared among three sites of shoulder capsule of patients with shoulder instability. COL5A1 expression was reduced in antero-inferior compared to the antero-superior portion.

Abstract:

Introduction:

Shoulder instability is a common affection, especially in young male athletes.

In addition of a traumatic event, it has been demonstrated that a genetic component is involved in the etiology of shoulder instability. The investigation of genes differentially regulated in shoulder instability may help the improvement of prognosis determination and patient management.

Methods:

We have compared COL1A1, COL1A2, COL3A1 and COL5A1 gene expression among antero-inferior, antero-superior and posterior portions of shoulder capsule of patients with the diagnosis of traumatic anterior shoulder instability. Tissue samples were obtained from three different sites of glenohumeral capsule of 20 patients with shoulder instability. In addition, one fragment of the antero-superior shoulder capsule of a patient with acromioclavicular injury was obtained. Samples were collected during arthroscopic surgery. Tissue specimens were immediately immersed in RNAlater solution and then stored at -20 oC until RNA extraction. Collagens gene expression were evaluated by quantitative reverse transcription polymerase chain reaction with primers and TaqMan probes. ACTB and GAPDH genes were also evaluated as endogenous control genes. Relative quantification of gene expression was measured using delta-delta Ct method and the tissue sample of a patient with acromioclavicular injury as a calibrator. Expression data were z-score transformed and the outliers were excluded. Analyses of each gene expression were performed by paired sample T-test with Bonferroni adjustment for multiple comparisons.

Results:

In the present study, COL1A1, COL1A2 and COL3A1 expression did not differ among the three portions of shoulder capsule ($p > 0.016$). However, COL5A1 expression was significantly reduced in antero-inferior portion compared to antero-superior region of glenohumeral capsule in patients with shoulder instability ($p = 0.012$).

Discussion and Conclusion:

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The COL5A1 gene is related to the structural form of type I collagen (which is the most frequent type in the capsule tissue), and this pattern of expression may be related to a higher degree of laxity in the inferior capsule that could predispose anterior shoulder instability. This finding may represent a pathologic change in the intrinsic characteristics of the shoulder capsule in patients with shoulder instability.