

Abstract

Purpose: The acetabular labrum plays an important role in joint lubrication, and damage to this structure leads to osteoarthritis. This study aimed to histologically classify the degree of degeneration of the acetabular labrum and to investigate the changes in gene expression induced by mechanical stretching.

Methods: We obtained acetabular labrum cells from patients with hip osteoarthritis during total hip arthroplasty ($n=25$). The labrum was stained with safranin O, and images were histologically evaluated using a new parameter, the red/blue (R/B) value. The samples were divided into the degenerated group (D group: $n=18$) and the healthy group (H group: $n=7$) in accordance with the Kellgren-Lawrence (KL) grade. The cultured acetabular labral cells were subjected to loaded uniaxial cyclic tensile strain (CTS). After CTS, changes in gene expression were examined in both groups.

Results: Spearman's correlation analysis revealed that the R/B value was significantly correlated with the KL grade and the Krenn score. The expression levels of genes related to cartilage metabolism, osteogenesis and angiogenesis significantly increased after CTS in the H group, while gene expression in the D group showed weaker changes after CTS than that in the H group compared to the nonstretched control group.

Conclusion: The degree of labral degeneration could be classified histologically using the R/B value and the KL grade. Mechanical stretching caused changes in gene expression that support the pathological features of labral degeneration.

Keywords: Acetabular labrum, Degeneration, Mechanical stretching, Calcification, Safranin O stain