

## Low Socioeconomic Indicators Correlate with Greater Preoperative Glenoid Bone Loss

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**INTRODUCTION:** Increased preoperative shoulder dislocations are associated with recurrent instability and greater glenoid bone loss. Initial instability events can result in 6.8% glenoid bone loss and subsequent instability episodes can result in greater than 20% glenoid bone loss. Greater glenoid bone loss is a risk factor for instability recurrence and poorer outcomes following labral repair. Indicators of lower socioeconomic status (SES), such as high Area Deprivation Index (ADI) and non-commercial insurance status, are linked to more emergency room visits and longer delays to specialized care across orthopaedic subspecialties. ADI is a validated and publicly available measure ranking neighborhoods by socioeconomic disadvantage using 17 variables from the American Community Survey Five Year Estimates. Recent studies have found that the combination of ADI and insurance status estimates the largest variability in the social deprivation of orthopaedic patients. Therefore, the purpose of the study is to assess the correlation between ADI, insurance status, and preoperative glenoid bone loss. We hypothesized higher national ADI and non-commercial insurance would be correlated with greater levels of radiographic glenoid bone loss.

**METHODS:** A total of 339 patients who underwent Bankart repair were identified. Data obtained included demographics, national ADI percentile, insurance status, and percentage of glenoid bone loss. National ADI percentile was obtained utilizing the Neighborhood Atlas Website and patients' home addresses. In total, 113 patients were excluded for prior ipsilateral shoulder surgery or lack of viewable imaging. Thirty-four patients were excluded due to low-quality magnetic resonance imaging (MRI). Glenoid bone loss was measured using the Best-fit circle method on high-quality MRIs (i.e., Fast imaging employing steady-state acquisition (FIESTA)). Using three-dimensional alignment, images were triangulated in both the axial and coronal planes to best view the glenoid en face in the sagittal sequence. Researchers were blinded to the patient's ADI and insurance status during radiographic analysis and inter- and intra-observer reliability testing. Glenoid bone loss was compared between insurance types using one-way ANOVAs. Prior to evaluating the association between national ADI and glenoid bone loss, a scatterplot was generated to qualitatively assess the nature of the relationship (Figure 1). A curve fitting tool determined that non-linear regression with a quadratic function was most appropriate to characterize the association between national ADI and glenoid bone loss.

**RESULTS:** A total of 192 patients (23% female; 23.9±7.5 years of age; national ADI = 16.7%±16.0%) were included in retrospective chart review. On average, patients experienced 9.50±6.59% glenoid bone loss. A significant quadratic association between national ADI and glenoid bone loss ( $R^2 = 0.483$ ,  $p < 0.001$ ) was observed (Figure 1). Individuals with non-commercial insurance experienced greater glenoid bone loss compared to those with commercial insurance (commercial = 8.80±6.46%, other = 12.52±6.36%,  $p = 0.003$ ). Interobserver reliability was .910, while intraobserver reliability was .948.

**DISCUSSION AND CONCLUSION:** Our findings indicate a positive association between Area Deprivation Index and MRI-measured glenoid bone loss in patients with anterior shoulder instability. Patients with low SES indicators, such as high ADI and non-commercial insurance, are more likely to have greater glenoid bone loss and could be at risk for increased rates of pre- and postoperative instability. While a correlation between low SES indicators and glenoid bone loss has been demonstrated; the association of SES with surgical complexity and functional outcomes in this context should be explored further.

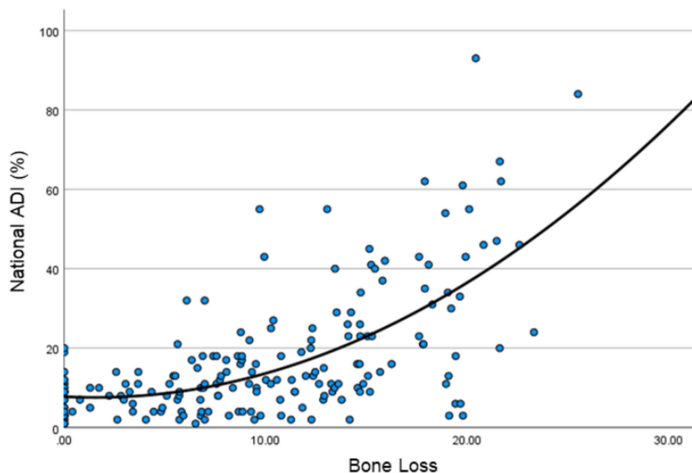


Figure 1: Non-linear regression association between glenoid bone loss and national ADI