Preinjury SI Joint Autofusion Results in a Higher Rate of LC2 Pelvic Ring Injuries

Michelle M. Lawson, MD*; Natalie L. Zusman, MD; Natasha S. McKibben, MD; Jason Agtarap, BS; Graham Dekeyser, MD; Darin M. Friess, MD; Zachary M. Working, MD*

Purpose: Pelvic ring injury patterns are likely determined by force magnitude, direction, and pelvic ring biomechanics. The presence of preexisting autofused sacroiliac joints (aSIJs) may alter ring stiffness and are anecdotally observed to influence fracture patterns. Our group previously established that aSIJ may impact acetabular fracture biomechanics; we therefore aimed to similarly analyze pelvic ring fracture patterns in the presence of aSIJs. The purpose of this study therefore was to compare lateral compression pelvis fracture patterns sustained in patients with and without preinjury aSIJs.

Methods: All adult patients receiving operative management of pelvis fractures (Level I trauma center; 2009-2018) were retrospectively reviewed. Injury radiographs and CT scans were examined to classify fracture patterns and identify preexisting aSIJ. Chi-squared tests determined the association between aSIJ and Young and Burgess pelvis fracture classification.

Results: A total of 332 patients were reviewed with diagnoses of lateral compression (LC)1 or LC2 pelvic ring injuries from our trauma system, with 128 (38.6%) demonstrating aSIJ, while 203 (61.1%) did not. Patients with preinjury aSIJ sustained a significantly higher rate of LC2 injuries when compared to LC1 injuries. In the aSIJ cohort, 26.6% of patients sustained LC2 patterns compared to 30.6% with LC1 patterns. In the non-aSIJ cohort, only 8.4% sustained LC2 patterns compared to 50.0% with LC1 patterns. This represents a 3-fold increase in the rate of LC2 fractures ($P<0.0001$).

Conclusion: In our cohort of pelvis fractures, patients with autofused sacroiliac joints sustained a tripled rate of LC2 injuries compared to patients without preinjury autofused SI joints. This suggests a clinically relevant change in posterior ring stiffness. We have identified an area of study that may benefit from biomechanical testing to further elucidate the difference between autofused and non-autofused SI joints as they relate to pelvis fracture patterns, and the effect on fixation patterns and strategies.

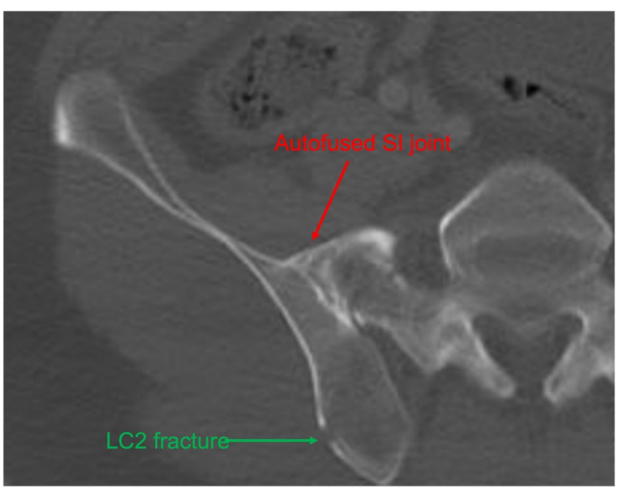

Figure 1: Typical pattern of LC2 type iliac wing fracture in the setting of autofused SI joint.