

Biomechanical analysis of motion following sacroiliac joint fusion using lateral sacroiliac screws with or without lumbosacral instrumented fusion

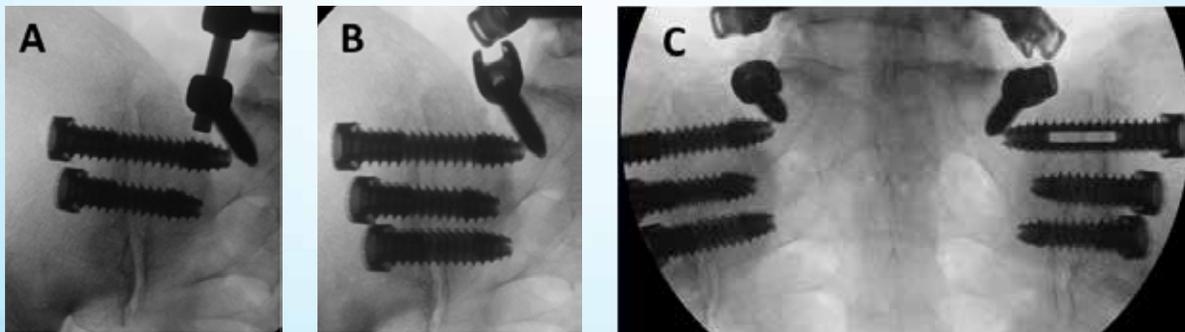
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OBJECTIVE: To assess sacroiliac joint (SIJ) range of motion after simulated adjacent lumbosacral instrumented fusion, with or without sacroiliac joint fixation, using lateral sacroiliac screws.

METHOD: In this in vitro biomechanical study, seven cadaveric specimens were tested on a 6 degrees-of-freedom machine under load control. Each specimen was tested in the following constructs: (1) Intact, (2) Iliosacral Ligament injury (L-ISL cut), (3) Posterior Transverse and oblique ligaments injured with L-ISL cut (LPL complex cut), (4) 2 SIJ screws, (5) 3 SIJ screws, (6) 6 SIJ screws. The influence of lumbosacral constructs on sacroiliac joint motion, with and without SIJ fixation, was studied.



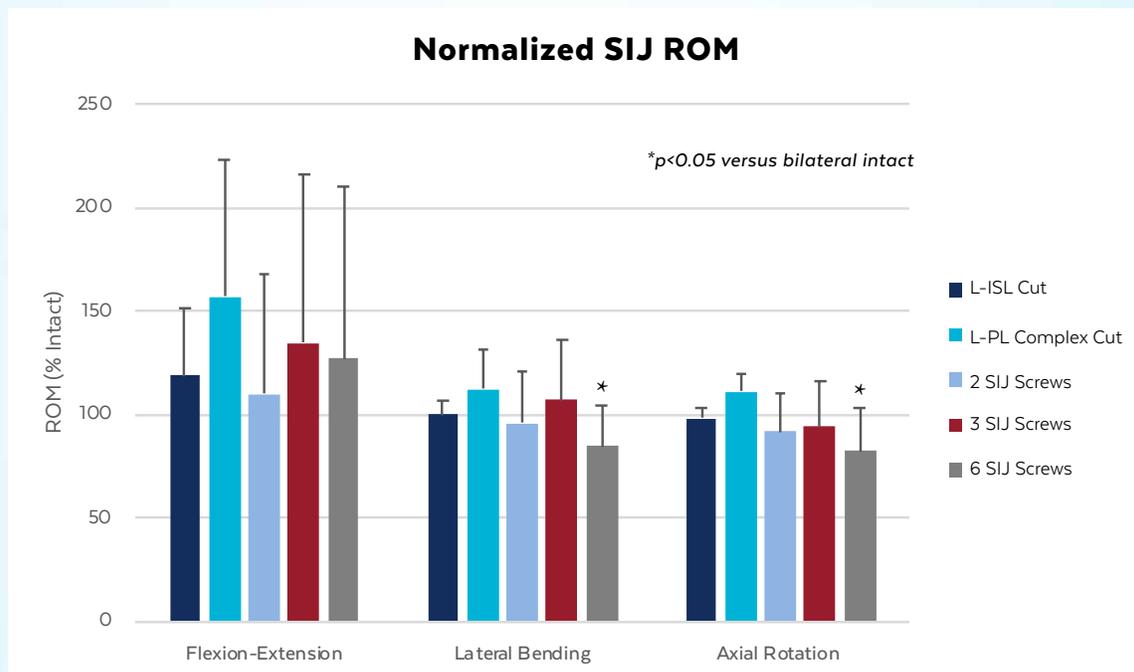
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Sacroiliac Joint Fusion System



(A) 2 SIJ screws, (B) 3 SIJ screws, and (C) 6 bilateral SIJ screws.

RESULTS:

- Sacroiliac joint range of motion, following ligament injury, increased to 157% of intact motion.
- Following SIJ injury and L5-S1 fixation, lateral sacroiliac screw fixation reduced flexion extension range of motion to 127% of intact motion.
- With 6 SIJ screws, range of motion was significantly less than intact bilateral range of motion in both lateral bending and axial rotation ($p \leq 0.05$).



Normalized (intact=100%) SIJ motion in flexion-extension, lateral bending, and axial rotation for each tested construct.

CONCLUSION: The placement of SIJ fixation, following posterior ligament injury, may help reduce the hypermobility induced by injury. Six bilateral SIJ screws biomechanically provided the most substantial lumbopelvic stability.

