

Optimizing the Biomechanics of Iliosacral Screw Fixation: The Importance of Washers and Avoiding Lateral Cortex Perforation

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Purpose: Percutaneous iliosacral screws are frequently used to stabilize posterior pelvic ring injuries and can be placed with or without washers. Because the cortical bone of the outer table of the posterior ilium is thin, it is possible for the surgeon to unintentionally perforate this cortex during screw insertion, theoretically compromising fixation. The purpose of this study was to detail the biomechanical consequences of washer use and iliosacral screw intrusion.

Methods: Partially threaded 7.0-mm cannulated screws with and without washers were placed through a synthetic bone test block fabricated to approximate the cortical and cancellous bone of the posterior ilium. A load cell was used to measure the compression generated before and after perforation of the outer cortex. 24 screws were tested under three different conditions: with a washer, without a washer, and with a washer after intrusion.

Results: Screws inserted with washers generated significantly more compressive force than screws inserted without washers before screw intrusion. After intrusion, compressive force decreased significantly under all conditions but screws inserted with washers maintained greater compressive force than screws inserted without washers. After intrusion of screws without washers, screws with washers reinserted through the same holes produced almost as much compressive force as screws inserted with washers primarily.

Conclusion: Screw intrusion during iliosacral screw insertion can compromise fixation quality. Washers are advantageous in that they allow for more compression to be generated before intrusion occurs and can be used to salvage intruded screws initially placed without them. Washers can also be monitored fluoroscopically as they seat against the ilium, providing an additional safeguard against intrusion.

Alumni

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