

The Incidence of and Factors Affecting Iliosacral Screw Loosening in Pelvic Ring Injury

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Background/Purpose: Iliosacral screw fixation has been commonly used for stabilization of the posterior ring in unstable pelvic fractures. However, loosening of the screw may develop with or without redisplacement of the fracture, and there is a paucity of published information regarding the incidence of and factors affecting iliosacral screw loosening. This study was undertaken to evaluate the incidence of iliosacral screw loosening and to identify predictive factors.

Methods: 110 patients whose posterior pelvic ring was stabilized with iliosacral screws from September 2001 through December 2012 were enrolled in this study. There were 61 men and 49 women, with a mean age of 45.2 years. The mechanism of injury was traffic accident for 55 patients, a fall from a height for 38 patients, and a work-related crushing injury for 17 patients. According to the Young-Burgess classification, there were 9 cases of anteroposterior compression, 64 cases of lateral compression, and 37 cases of vertical shear (VS) injuries. Among those with posterior pelvic ring injuries, 95 had sacral fractures (zone I, n = 52; zone II, n = 43, Denis classification) and 15 had sacroiliac joint dislocations. For 82 patients, both anterior and posterior rings were stabilized, whereas the remaining 28 patients underwent only posterior ring fixation with iliosacral screws. Screws were fixed to the anterior one-third region of the first sacral (S1) body in 46 cases, and to the middle one-third region of the S1 body in the remaining 64 cases. If loosening of the iliosacral screw influenced the pelvic ring stability and revision surgery was required, it was considered a failure. The relationship between iliosacral screw loosening and age, fracture pattern, operative method, location of the screw within the S1 body, and the type of the sacral fracture were analyzed using Pearson chi-square test with significance set at $P < 0.05$.

Results: All fractures healed at an average period of 15 weeks after surgery (range, 12-20 weeks). 19 of 110 patients (17.3%) were found to have loosening of the iliosacral screw at an average of 25.3 days (range, 10-70 days) after the index operation. The incidence of iliosacral screw loosening was significantly higher in those with VS injury (29.7%, $P = 0.014$), in those with the screw fixed to the middle one-third region of the S1 body (23.4%, $P = 0.044$), and in those with VS injury combined with zone II sacral fracture (43.5%, $P = 0.019$). Patients with VS injury also had a higher incidence of failure. (21.6%, $P = 0.036$).

Conclusion: Although iliosacral screw fixation is a reasonable method for posterior pelvic ring stabilization, caution should be taken to prevent screw loosening in VS injury. Screw fixation to the anterior one-third of the S1 body can decrease the incidence of loosening. Furthermore, alternative methods of fixation should be considered in VS injury, especially when combined with zone II sacral fracture.