Clinical Efficacy and Safety of Minimally Invasive Sacroiliac Joint Fusion: A Retrospective Cohort Study

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Abstract

Sacroiliitis, inflammation of one or both sacroiliac (SI) joints, is estimated to account for 15% to 30% of cases of chronic low back pain. Conservative treatments - such as physical therapy, medications, and corticosteroid injections - are the first-line treatment options for these patients. However, when they fail to provide lasting relief, surgery may become necessary. The purpose of this study is to evaluate the clinical outcomes of minimally invasive sacroiliac joint fusion (MI SIJF), specifically focusing on pain improvement and post-operative complication rates at the 6-month follow-up. A retrospective analysis of 17 patients who underwent minimally invasive SI joint fusion was conducted. Patient-reported outcomes, including pain scores via the Visual Analog Scale (VAS), were collected at baseline, 10 days, 6 weeks, 10 weeks, and 6 months post-operatively. Complication rates and time to symptom relief were also recorded. From the data collected, the average percent pain relief at 6 months post-SI fusion was 74.7%. The mean VAS pain score improved significantly from a baseline of 75.8 to 17.8 at 6 months. While initial symptom relief was noted as early as 10 days post-operatively, maximal improvement was realized by the 6-month mark. No major complications were observed within the cohort.

Introduction

The sacroiliac (SI) joint, which connects the sacrum and ilium of the pelvis, is a frequent yet often underrecognized source of chronic low back pain. Sacroiliitis, defined as inflammation of one or both SI joints, is estimated to account for 15% to 30% of non-radicular back pain.[1, 2] When conservative treatments—such as physical therapy, medications, and corticosteroid injections—do not yield sufficient relief, surgery may be indicated. Sacroiliac joint fusion is the definitive surgical intervention for sacroiliitis, eliminating micro-motion by stabilizing and fusing the joint. Historically performed via open surgery with extensive soft-tissue dissection, the standard now favors minimally invasive sacroiliac joint fusion (MI SIJF).[3, 4]

Clinical evidence increasingly supports the efficacy of MI SIJF over continued conservative care. High-level evidence from the INSITE trial[5], a randomized controlled trial, demonstrated that surgical patients experienced a four-fold greater improvement in pain scores compared to those receiving non-surgical management. Furthermore, the iMIA study [6] demonstrates that approximately 78.8% of surgical patients had a reduction in VAS pain by 20 points or more at 6 months. Longitudinal data suggest that the success rate may be even higher, with 91.9% of patients achieving a "Substantial Clinical Benefit," defined by the authors as either a reduction in VAS pain of more than 25 points or reaching a low absolute pain score of 35 or less at their 12-month follow-up.[7]

The magnitude of pain reduction is equally compelling. Recent meta-analyses and response studies indicate an average pain reduction of 53.5% to 65.9%. [8] Notably, while some patients experience initial symptom relief as early as the 6-week follow-up, maximal pain improvement and functional recovery are typically realized around 6 months post-operatively. [9] With the increasing prevalence of SI joint fusion, it is critical to further investigate the nuances of post-operative recovery and the specific variables that predict long-term clinical success.

Methods

A retrospective chart review of 17 patients who underwent minimally invasive sacroiliac joint fusion (MI SIJF) procedures between January 2024 and August 2025 was conducted. Two of the participants underwent bilateral SI fusions at separate time points, resulting in a total of 19 MI SIJF procedures in the cohort. Patient-reported outcomes, including pain scores via the Visual Analog Scale (VAS), were collected at baseline, 10 days, 6 weeks, 10 weeks, and 6 months post-operatively. Complication rates and time to symptom relief were also recorded.

Statistical analyses were performed after data collection using paired t-tests to assess improvements in VAS scores following treatment. Specifically, the continuous variable (VAS score) was compared from baseline to 10-day, 6-week, 10-week, and 6-month follow-up using a paired t-test. A p-value of <0.05 was considered statistically significant. All analyses were performed using Excel.

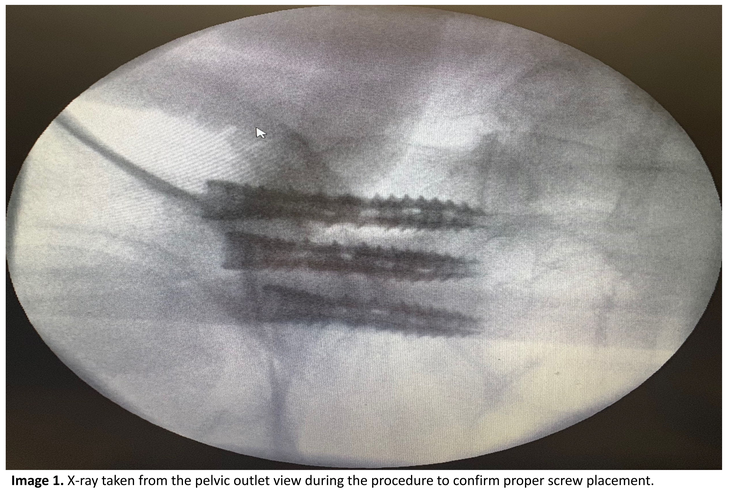

Image 1. X-ray taken from the pelvic outlet view during the procedure to confirm proper screw placement.

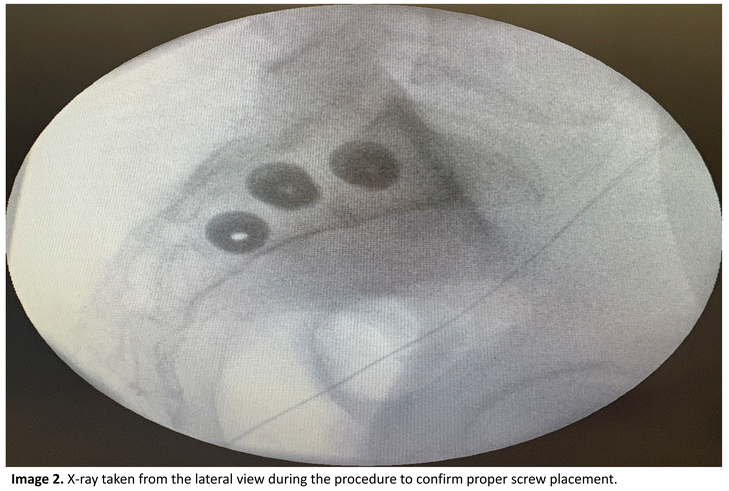

Image 2. X-ray taken from the lateral view during the procedure to confirm proper screw placement.

Results & Discussion

Metric	Our Study Results	Literature Benchmark	Reference
Success Rate (MCID)	94.4%	78.8% – 90.0%	Dengler (2017); Sachs (2014)
Success Rate (SCB)	94.4%	92%	Sachs (2014)
Mean Pain Reduction (VAS)	74.7%	53.5% – 65.9%	Calodney (2024); Dengler (2017); Polly (2016)
Significant Relief (Time)	10 days- 6 months	6 weeks – 6 months	Kucharzyk (2022)

Table 1. Our study's results compared to the benchmarks set by the current literature on MI SIJF. MCID is defined as a reduction in VAS pain greater than or equal to 20. SCB is defined as either a reduction in VAS pain of more than 25 points or reaching a low absolute pain score of 35 or less.

The most notable finding is the 74.7% mean reduction in VAS pain scores observed at the 6-month follow-up. The high efficacy in our cohort is further reflected in the success rates for both the Minimal Clinically Important Difference (MCID) and the Substantial Clinical Benefit (SCB). Our study identified a 94.4% success rate for MCID and a 94.4% success rate for SCB. These results suggest that the surgical technique and patient selection criteria employed in this series provide a highly predictable and significant clinical benefit.

A distinguishing feature of this study is the rapid onset of symptom relief. While the EVoluSIon study[9] identifies a recovery curve typically beginning between 6 weeks and 6 months, patients in our cohort reported significant relief as early as 10 days post-operatively.

While the clinical outcomes of this study are compelling, several limitations must be acknowledged to provide a balanced interpretation of the data. First, the retrospective nature of this chart review introduces potential selection and information bias. Second, the sample size (n=19) is small compared to large multicenter trials, which may limit the generalizability of the results. Finally, because all procedures were performed by a single surgeon, these results may reflect a high level of technical consistency that might vary across different surgical settings.

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