

## Outcomes Following Operative Reconstruction of Symptomatic Rib Nonunions

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**Purpose:** The majority of rib fractures can be treated nonoperatively, but a subgroup of patients have been reported to develop symptoms consistent with rib nonunion. There is a paucity of literature on the reconstruction of rib nonunions, and no clear consensus on treatment. The purpose of this study is to assess the outcomes of patients after rib nonunion reconstruction using plate and screw fixation augmented with autogenous iliac crest bone graft.

**Methods:** Between January 2007 and August 2019, 25 consecutive patients with 51 painful rib nonunions were treated for nonunited rib fractures at a Level I trauma center. Patient characteristics/demographics, mechanism of injury, number of rib nonunions, and postoperative radiographs were recorded and assessed. An author-derived patient outcome questionnaire evaluating satisfaction, patient-reported complications, and return to occupation and activity, as well as validated patient-reported general health measures, were completed.

**Results:** In 25 patients, 51 painful rib nonunions were treated for nonunited rib fractures. The average length from injury to surgical rib reconstruction was 25.1 months (range, 3-118 months; median = 12 months). Follow-up was obtained in 18 of 25 patients (72%) with a mean of 46.1 months (range, 13-139). All ribs went on to radiographic union at an average of 12.3 weeks (range, 8-24 weeks) after surgery. 16 of 18 patients (89%) reported satisfaction with surgery and 15 (83%) reported mild to no pain at final follow-up. Five patients had complications, of which 3 were major, although resolved after treatment.

**Conclusion:** Successful treatment of symptomatic rib nonunion is possible with satisfactory patient-reported and radiographic outcomes and with an acceptable rate of complications. Operative fixation with rib plates and bone grafting should be considered the primary treatment method for symptomatic rib nonunions.

