MatrixRIB™ Care

Helping you advance treatment of rib-fracture patients with a suite of tools and resources that help enable surgeons and hospitals to improve outcomes, increase patient satisfaction, and reduce costs:

- Case studies
- Care pathways
- Patient education materials
- MatrixRIB™ Fixation System
BACKGROUND

Rib fractures are a common injury most commonly caused by blunt trauma to the chest as a result of motor vehicle accidents and falls.

- Rib fractures occur in ~10% of patients admitted to a trauma center and are a marker for severe injury\(^1\)
- Patients with multiple rib fractures or a flail chest frequently require ventilation; mortality rates of up to 33% have been reported in flail chest\(^1-4\)
- Prevalence of chronic pain of 22% and disability of 53% among patients with rib fractures\(^5\)
- More than 30% of patients require additional care in postacute settings\(^6\)
- Despite the clinical and economic impact of rib fractures, current treatment primarily consists of little more than supportive treatment including pain control, rest, and mechanical ventilation\(^3,7,8\) and the mortality and short-term morbidity have not improved appreciably during the last 4 decades\(^3,9\)
- Availability of rib fixation technology presents a potential option toward an effective approach to managing rib fractures

REFERENCES

Please visit www.matrixribcare.com for more information.
Background

Rib fractures are a common injury most commonly caused by blunt trauma to the chest as a result of motor vehicle accidents and falls.

- Rib fractures occur in ~10% of patients admitted to a trauma center and are a marker for severe injury.
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- More than 30% of patients require additional care in postacute settings.
- Despite the clinical and economic impact of rib fractures, current treatment primarily consists of little more than supportive treatment including pain control, rest, and mechanical ventilation, and the mortality and short-term morbidity have not improved appreciably during the last 4 decades.
- Availability of rib fixation technology presents a potential option toward an effective approach to managing rib fractures.

References

CLINICAL EVIDENCE SUPPORTING SURGICAL FIXATION

Results from 2 recent meta-analyses, each including >500 flail chest patients, have shown that compared to medical management (nonoperative), surgical fixation patients had:\(^1,^2\)

- 57-69% less likely risk of mortality
- 55-82% less likely to have pneumonia
- 4.5-7.5 fewer days of mechanical ventilation
- 3.4-4.8 fewer ICU days
- 3.8-4.0 fewer hospital days

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**CLINICAL EVIDENCE SUPPORTING SURGICAL FIXATION**

Operative Management is Associated with a Statistically Significant Lower Incidence of Mortality, Pneumonia, Tracheostomy, and Septicemia Compared to Non-Operative Management of Flail Chest\(^1,2\)

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<tr>
<td><strong>Surgical Fixation Had</strong>:</td>
<td><strong>Surgical Fixation Had</strong>:</td>
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| 57% Lower Odds of Mortality  
Pooled RR 0.43; 95% CI: 0.28-0.69 | 69% Lower Odds of Mortality  
OR 0.31; 95% CI: 0.20-0.48 |
| 55% Lower Odds of Pneumonia  
Pooled RR 0.45; 95% CI: 0.29-0.67 | 82% Lower Odds of Pneumonia  
OR 0.18; 95% CI: 0.11-0.32 |
| 75% Lower Odds of Tracheostomy  
Pooled RR 0.25; 95% CI: 0.13-0.47 | 88% Lower Odds of Tracheostomy  
OR 0.12; 95% CI: 0.04-0.32 |
| 64% Lower Odds of Septicemia  
OR 0.36; 95% CI: 0.19-0.71 |  |

*Septicemia not assessed.

REFERENCES

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CLINICAL EVIDENCE SUPPORTING SURGICAL FIXATION

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*Septicemia not assessed.

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CLINICAL EVIDENCE SUPPORTING SURGICAL FIXATION

Significantly Fewer Number of Ventilator Days, ICU Days, and Hospital Days with Operative Management Compared to Non-Operative Rib Fixation of Flail Chest

Leinicke et al, 2013

- Decrease in Ventilator Days with Surgery: -4.5
- Decrease in ICU Days with Surgery: -3.4
- Decrease in Hospital Days with Surgery: -3.8

Slobogean et al, 2013

- Decrease in Ventilator Days with Surgery: -7.5
- Decrease in ICU Days with Surgery: -4.8
- Decrease in Hospital Days with Surgery: -4.0

95% CI:

- Ventilator Days: −5.54 to −3.50
- ICU Days: −6.01 to −0.80
- Hospital Days: −7.12 to −0.54

REFERENCES

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CLINICAL EVIDENCE SUPPORTING SURGICAL FIXATION

REFERENCES


STUDIES WITH MatrixRIB™ FIXATION SYSTEM

Results from studies with MatrixRIB Fixation System demonstrated:

- MatrixRIB Fixation System patients (n=10) had a significant reduction in total ventilator days compared to the nonsurgical group (n=11, 4.5 vs 16.0; \(p=0.04\))\(^1\)
- 84% of patients (n=50) had no pain at 16 ± 1 month and patients who no longer had pain said their rib pain was completely gone at 5.4 ± 1.1 weeks post discharge\(^2\)
- The need for analgesia was significantly reduced after MatrixRIB fixation in patients (n=16) with multiple rib fractures\(^3\)
- Within 3 months MatrixRIB Fixation System patients (n=16) regained 84% Forced Vital Capacity (%FVC) and 77% Forced Expiratory Volume (FEV\(_1\))\(^4\)
- At 6 months, 7 of 15 patients that completed follow-up had returned to work\(^4\)
- In a 16-month survey, of patients who were employed, 33 of 36 (92%) patients returned to work at the same job that they did preinjury\(^2\)
STUDIES WITH MatrixRIB™ FIXATION SYSTEM

RESULTS

- MatrixRIB Fixation System patients (n=10) had a significant reduction in total ventilator days compared to the nonsurgical group (n=11, 4.5 vs 16.0; p = 0.04)¹
- 84% of patients (n=50) had no pain at 16 ± 1 month and patients who no longer had pain said their rib pain was completely gone at 5.4 ± 1.1 weeks post discharge²
- The need for analgesia was significantly reduced after MatrixRIB fixation in patients (n=16) with multiple rib fractures³
- Within 3 months MatrixRIB Fixation System patients (n=16) regained 84% Forced Vital Capacity (%FVC) and 77% Forced Expiratory Volume (FEV1)⁴
- At 6 months, 7 of 15 patients that completed follow-up had returned to work⁴
- In a 16-month survey, of patients who were employed, 33 of 36 (92%) patients returned to work at the same job that they did preinjury²

REFERENCES


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PATIENT-CENTERED OUTCOMES

Patient Satisfaction

9.2 on a scale of 1-10 is what patients rated their experience and the results of the procedure (1 = not satisfied at all, 10 = very satisfied)

94% would recommend the surgery to injured friends/family

Quality of Life

7 is the median Quality of Life and general health score according to the QLQ-C30

Return to Work

6 months post surgery 46% of patients returned to work

16 months post surgery 92% of patients returned to work

7.9 weeks is the mean time back to full-time work

Click here for more detailed information.

Please visit www.matrixribcare.com for more information.
PATIENT-CENTERED OUTCOMES

**Patient Satisfaction**
Majercik et al measured satisfaction with MatrixRib Fixation System on a scale of 1 to 10, with 1 being not satisfied at all, and 10 being very satisfied, patients (n=50) rated their experience with MatrixRIB Fixation System and the results of the procedure as 9.2 ± 0.2. Ninety-four percent stated that they would recommend the surgery to injured friends/family.

**Quality of life**
In patients who underwent surgery using the MatrixRIB Fixation System, Billè et al found the median Quality of Life and general health score (n=6) according to the QLQ-C30 were 7 (range 6-7).

**Return to Work**
Return to work was evaluated in two studies with MatrixRIB Fixation System. Bottlang et al showed that at 6 months, 7 of 15 patients that completed follow-up had returned to work. In a 16-month survey, Majercik et al found that of the patients who were employed, 33 of 36 (92%) patients returned to work at the same job that they did preinjury. Mean time to get back to full-time work was 7.9 ± 1.0 weeks.

**REFERENCES**
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PATIENT-CENTERED OUTCOMES

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HOSPITAL ECONOMICS

Based on the results from 2 recent published meta-analyses,\textsuperscript{1,2} for every 25 flail chest patients treated with rib fixation:

- Hospital costs could potentially be reduced by approximately $453,375-$792,786
- These savings may be due to reductions in ICU days, mechanical ventilation days, and incidence of pneumonia

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Based on the results from 2 recent published meta-analyses, 1,2 for every 25 flail chest patients treated with rib fixation:

- Hospital costs could potentially be reduced by approximately $453,375-$792,786
- These savings may be due to reductions in ICU days, mechanical ventilation days, and incidence of pneumonia.

**REFERENCES**


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COST SAVINGS

Potential Cost-savings per 25 Flail Chest Patients Undergoing Rib Fixation Surgery

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<tr>
<td><strong>Overall Cost Savings</strong></td>
<td>$(453,375)</td>
<td>$(792,786)</td>
</tr>
<tr>
<td>ICU Cost</td>
<td>$(292,500)</td>
<td>$(413,011)</td>
</tr>
<tr>
<td>non-ICU Cost</td>
<td>$(13,982)</td>
<td>$27,964</td>
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<tr>
<td>MV Cost</td>
<td>$(394,055)</td>
<td>$(656,758)</td>
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<tr>
<td>Pneumonia Cost</td>
<td>$(73,864)</td>
<td>$(72,056)</td>
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<tr>
<td>Cost of Surgery</td>
<td>$106,875</td>
<td>$106,875</td>
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<tr>
<td>Cost of Device</td>
<td>$214,200</td>
<td>$214,200</td>
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MatrixRIB™
FIXATION SYSTEM

The MatrixRIB Fixation System is indicated for the fixation and stabilization of rib fractures, fusions, and osteotomies of normal and osteoporotic bone.

Please visit www.matrixribcare.com for more information.
MatrixRIB™ FIXATION SYSTEM

The MatrixRIB Fixation System is comprised of:

- Precontoured titanium alloy locking low-profile 1.5 mm thick plates with 2.9 mm diameter locking screws
- The plates are pre-contoured to fit the average rib shape, minimizing intraoperative bending
- Plate stiffness of MatrixRIB Fixation System is similar to cadaveric osteoporotic rib, allowing for flexibility of the rib cage
- The precontoured plates are long enough to fixate multiple and comminuted/oblique fractures
- Anterior plating technique designed to avoid surgical disruption of intercostal soft tissues, and intramedullary splints allow minimally invasive procedures
- Instruments that enable rib stabilization of sub-scapular fractures

Please visit www.matrixribcare.com for more information.
EXPERT POINT OF VIEW

Discussion of “how do you manage rib fracture(s)” is much more important than “who is an operative candidate” and in my mind a true rib program is what’s needed.

– Dr. Doben

It just makes sense that rib fractures be treated just like any other broken bone.

– Dr. Shiroff

Please visit www.matrixribcare.com for more information.
MatrixRIB™ CARE PROGRAM

MatrixRIB Care Educational Tool Suite:
- Value Analysis Briefs
- Surgeon Consensus White Paper
- Surgeon Testimonials
- Case Studies
- Protocols
- Provider Education (ppt slides)

MatrixRIB Fixation System Training:
- Surgeon Training and Certification
  - DePuy Synthes Institute Thoracic Trauma Courses
- Hospital and Operating Room Personnel Training
  - Contact your local DePuy Synthes Companies Sales Consultant or call 800-523-0322

Please visit www.matrixribcare.com for more information.
RESOURCES


Healthcare Cost and Utilization Project. 2012. Hospital discharges with International Classification of Diseases, Clinical Modification, 9th Revision (ICD-9-CM) for flail chest (807.4) as a primary diagnosis.


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DSUS/CMF/0115/0280(1) 04/15

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