Predicting Patient-Centered Outcomes from Spine Surgery Using Risk Assessment Tools: a Systematic Review

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Background

- Up to 40% of patients report poor outcomes after surgery for back pain
- 20-24% undergo reoperation rate
- Predictive risk assessment tools, enable clinicians to make data-driven clinical decisions
- Patient-reported outcome measures (PROMs) and demographic information are utilized in models to identify benefit-risk ratios of surgical candidates

Purpose

- Evaluate the available risk assessment tools utilized in cervical, thoracic, and lumbar surgery
- Identify tools that focus on the patient-centered outcomes

Methods

- DATABASES QUERIED
  - Embase
  - MEDLINE
  - Scopus
- INCLUSION CRITERIA
  - Age > 18
  - Cervical, thoracic or lumbar surgery
  - PROMs were used
  - Risk Assessment tool was created
- RISK OF BIAS
  - 8128 studies identified; 13 included
  - Prediction Model Risk of Bias Assessment Tool (PROBAST)
- 5 PRO DOMAINS IDENTIFIED
  - Return to Work
  - Back and Leg Pain
  - Physical Function and Disability
  - Quality of Life
  - Psychological Function

Results

<table>
<thead>
<tr>
<th>Articles</th>
<th># = number of models provided by study</th>
<th>Return to work (n=3)</th>
<th>Back and Leg Pain (n=9)</th>
<th>Physical Function and Disability (n=6)</th>
<th>Quality of life (n=5)</th>
<th>Psychological Disposition (n=2)</th>
<th>Time Points Measured</th>
<th>PROMs Utilized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical</td>
<td>Devin et al., (2018)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 mos.</td>
<td>NDI, VAS-AP and VAS-NP</td>
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<td></td>
<td>Lubelski et al., (2018)</td>
<td></td>
<td>1</td>
<td>2</td>
<td>12 mos.</td>
<td>EQ-5D, PHQ-9, PDQ</td>
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<td></td>
<td>Merali et al., (2019)</td>
<td></td>
<td>1</td>
<td></td>
<td>6, 12, 24 mos.</td>
<td>SF-6D, mJOA</td>
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<tr>
<td>Thoracolumbar</td>
<td>Genov et al., (2018)</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5-7 mos.</td>
<td>STRAI, BDI, TSK-17, PCS</td>
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<td></td>
<td>Sharma et al., (2019)</td>
<td></td>
<td>1</td>
<td></td>
<td>12 mos.</td>
<td>EQ-5D</td>
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<td>Lumbar</td>
<td>Hegarty &amp; Shorten, (2012)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 mos.</td>
<td>VAS, MPQ, RMDQ, HADS, PCS, SF-36</td>
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<td>McGirt et al., (2015)</td>
<td>1</td>
<td>2</td>
<td></td>
<td>12 mos.</td>
<td>ODI, SF-12, MSPQ, VAS-BP, VAS-LP, VAS-NP</td>
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<td></td>
<td>Lee et al., (2016)</td>
<td></td>
<td>1</td>
<td></td>
<td>3 and 12 mos.</td>
<td>EQ-5D</td>
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<td></td>
<td>Asher et al., (2017)</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>6 wks., 3 mos.</td>
<td>ODI, EQ-5D, NRS-BP, NRS-LP</td>
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<tr>
<td></td>
<td>McGirt et al., (2017)</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>12 mos.</td>
<td>ODI, ED-5Q, NRS-BP, NRS-LP</td>
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<td></td>
<td>Khor et al., (2018)</td>
<td>2</td>
<td>1</td>
<td></td>
<td>12 mos.</td>
<td>NRS-BP, NRS-LP, ODI</td>
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<td>Staartjes et al., (2018)</td>
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<td>1</td>
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<td>12 mos.</td>
<td>NRS-BP, NRS-LP, Dutch ODI</td>
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Clinical Relevance

- Risk-benefit ratio and postsurgical expectations are easily understood by clinician and patient
- Shared decision making can minimize risk prior to elective surgery
- Recommendations made for physical therapy and alternative treatments to low success ratios

Conclusions

- Maximize positive outcomes and increase outcome awareness when use in shared-decision making

Acknowledgements

- Need for more research: cervical and thoracic predictive modeling; noted PRO Domains
- Thanks to Brandi Tuttle for her assistance.