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| **Variable** | **Reference** | **Patient Population** | **Outcome** | **Result** | **Quality of Evidence** |
| **Positive Predictor** |
| Time |
|  | <48 hours | Chaichana et al., 20081 | 23 non-ambulatory patients | Ambulation recovery | RR 2.9 | Low |
| Crnalic et al., 20132 | 45 non-ambulatory patients | Ambulation recovery | 64 vs 18% |  |
| Furstenberg et al., 20093 | 35 with neurologic deficits | ASIA | 71 vs 29% improvement, 0 vs 29% deterioration |  |
| Quraishi et al., 20134 | 121 patients with neurologic deficits | Frankel | 49 vs 36% improvement, 7 vs 13% deterioration |  |
|  | 3 & 10 days | Hessler et al., 20095 | 194 patients with neurologic deficits | Frankel | >15 days -- OR 1, 3-5 days OR 7.6, 1-3 days OR 10.2, <1 day OR 15.9 |  |
| Bladder Function | Furstenberg et al., 20093 | 35 patients with neurologic deficits | ASIA | 45 vs 0% improvement, 0 vs 7% deterioration | Low |
| MRC ≥III | Park et al., 20136 | 60 non-ambulatory patients | Ambulation recovery | 86 vs 22% | Low |
| Tokuhashi Score | Putz et al. 20087 | 35 patients with neurologic deficits | ASIA | Improved - mean Tokuhashi 9, No change - mean Tokuhashi 8, Deteriorated - mean Tokuhashi 7 | Very Low |
| **Negative Predictor** |
| Vertebral compression fracture | Chaichana et al., 20098 | 35 non-ambulatory patients | Ambulation recovery | 35 vs 50%\* | Very low |
| Thoracic compression fracture | Chaichana et al., 20081 | 23 non-ambulatory patients | Ambulation recovery | RR 0.003\*\* | Low |
| Preoperative RT | Chaichana et al., 20081 | 23 non-ambulatory patients | Ambulation recovery | RR 0.41 | Low |
| Prostate-specific factors |
|  | PSA ≥200 | Crnalic et al., 20132 | 45 non-ambulatory patients | Ambulation recovery | 64 vs 29% | Low |
|  | Hormone-naïve | Crnalic et al., 20132 | 45 non-ambulatory patients | Ambulation recovery | 79 vs 46% | Low |

\*p<0.09

\*\*p<0.07

**Supplementary Table 2.** Survey responses; results include 32 total responses with percentage and count described below.

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| **Question 1:** Please enter your name and affiliation |
| Names | 100.0 % | 32 |
| Affiliation | 90.6 % | 29 |

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| **Question 2:** What is your profession? |
| Spine surgeon | 40.6 % | 13 |
| Neurosurgeon | 37.5 % | 12 |
| Orthopaedic surgeon | 15.6 % | 5 |
| Radiation oncologist | 6.3 % | 2 |
| Medical oncologist | 0.0 % | 0 |
| Other (please specify) | 0.0 % | 0 |

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| **Question 3:** How many years have you been in practice? |
| Median (range) | 8 (1-38) |
| Mean (SD) | 11.8 (8.4) |

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| **Question 4:** What is your age? |
| Median (range) | 42.5 (32-65) |
| Mean (SD) | 44.8 (8.3) |

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| **Question 5:** Which functional outcome would justify surgery for MESCC?  Please pick the lowest function that would be considered a successful surgical result. |
| Independent ambulation on flat floor | 3.1 % | 1 |
| Ambulation with assistance/walking aid | 71.9 % | 23 |
| Ability to move legs, but unable to walk | 15.6 % | 5 |
| Sensory preservation without ability to move legs | 9.4 % | 3 |

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| **Question 6:** What is the shortest meaningful distance of ambulation? |
| 2 steps | 6.3 % | 2 |
| 4 steps | 21.9 % | 7 |
| 2 meters | 18.8 % | 6 |
| 4 meters | 6.3 % | 2 |
| 6 meters | 12.5 % | 4 |
| 10 meters | 21.9 % | 7 |
| 20 meters | 12.5 % | 4 |
| 50 meters | 0.0 % | 0 |
| 100 meters | 0.0 % | 0 |

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| **Question 7:** In a patient who lost the ability to ambulate secondary to a neurologic deficit caused by solid tumor MESCC, every effort should be made to perform surgical decompression as early as possible. |
| No | 15.6 % | 5 |
| Yes | 84.4 % | 27 |

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| **Question 8:** The age of the patient should be considered when trying to predict whether surgery would result in return of ambulation. |
| No | 34.4 % | 11 |
| Yes | 65.6 % | 21 |

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| **Question 9:** If yes, which age is going to make the patient less likely to recover ambulation after surgery?  Please pick the lowest age: |
| Older than 40 | 0.0 % | 0 |
| Older than 50 | 0.0 % | 0 |
| Older than 60 | 9.5 % | 2 |
| Older than 65 | 23.8 % | 5 |
| Older than 70 | 38.1 % | 8 |
| Older than 80 | 28.6 % | 6 |
| Other (please specify): | 0.0 % | 0 |

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| **Question 10:** If yes, which age should exclude the patient from surgery?  Please pick the lowest age: |
| Older than 40 | 0.0 % | 0 |
| Older than 50 | 0.0 % | 0 |
| Older than 60 | 0.0 % | 0 |
| Older than 65 | 0.0 % | 0 |
| Older than 70 | 15.0 % | 3 |
| Older than 80 | 20.0 % | 4 |
| I do not consider age as exclusion criteria | 65.0 % | 13 |

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| **Question 11:** The duration of non-ambulatory status should be considered when trying to predict whether surgery would result in return of ambulation. |
| No | 0.0 % | 0 |
| Yes | 100.0 % | 32 |

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| **Question 12:** If yes, which duration is going to make the patient less likely to recover ambulation after surgery?  Please pick the shortest duration: |
| 8 hours | 6.3 % | 2 |
| 24 hours | 25.0 % | 8 |
| 48 hours | 37.5 % | 12 |
| 3 days | 0.0 % | 0 |
| 4 days | 0.0 % | 0 |
| 5 days | 12.5 % | 4 |
| 7 days | 3.1 % | 1 |
| Other (Please specify) | 15.6 % | 5 |

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| **Question 13:** If yes, which duration should exclude the patient from surgery?  Please pick the shortest duration: |
| 8 hours | 0.0 % | 0 |
| 24 hours | 12.5 % | 4 |
| 48 hours | 18.8 % | 6 |
| 3 days | 9.4 % | 3 |
| 4 days | 3.1 % | 1 |
| 5 days | 12.5 % | 4 |
| 7 days | 3.1 % | 1 |
| I do not consider symptom duration as exclusion criteria | 40.6 % | 13 |

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| **Question 14:** The level of spinal cord compression (cervical/thoracic/lumbar) should be considered when trying to predict whether surgery would result in return of ambulation. |
| No | 53.1 % | 17 |
| Yes | 46.9 % | 15 |

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| **Question 15:** If yes, which level is most likely to recover? |
| Cervical | 6.7 % | 1 |
| Thoracic | 0.0 % | 0 |
| Upper lumbar | 93.3 % | 14 |

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| **Question 16:** If yes, which level is least likely to recover? |
| Cervical | 40.0 % | 6 |
| Thoracic | 60.0 % | 9 |
| Upper lumbar | 0.0 % | 0 |

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| **Question 17:** The level of compression (cervical/thoracic/lumbar) should be used to exclude the patient from surgery. |
| No | 96.8 % | 30 |
| Yes | 3.2 % | 1 |

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| **Question 18:** The number of contiguous compressed spinal cord levels should be considered when trying to predict whether surgery would result in return of ambulation. |
| No | 38.7 % | 12 |
| Yes | 61.3 % | 19 |

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| **Question 19:** If yes, how many levels of compression should exclude the patient from surgery? |
| 1 | 0.0 % | 0 |
| 2 | 0.0 % | 0 |
| 3 | 15.8 % | 3 |
| 4 or more | 47.4 % | 9 |
| I do not consider the number of compression levels as reason for exclusion | 36.8 % | 7 |

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| **Question 20:** The presence of a vertebral compression fracture at the level of MESCC should be considered when trying to predict whether surgery |
| No | 58.1 % | 18 |
| Yes | 41.9 % | 13 |

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| **Question 21:** The presence of a vertebral compression fracture at the level of MESCC should exclude the patient from surgery. |
| No | 100.0 % | 31 |
| Yes | 0.0 % | 0 |

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| **Question 22:** Prior radiation therapy to the region should be considered when trying to predict whether surgery would result in return of ambulation. |
| No | 71.0 % | 22 |
| Yes | 29.0 % | 9 |

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| **Question 23:** If yes, how many prior radiation treatments to the region of compression should exclude the patient from consideration for surgery? |
| 1 | 0.0 % | 0 |
| 2 | 6.5 % | 2 |
| 3 or more | 6.5 % | 2 |
| I do not consider prior radiation as reason for exclusion | 87.1 % | 27 |

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| **Question 24:** The severity of weakness should be considered when trying to predict whether surgery would result in return of ambulation. |
| No | 6.5 % | 2 |
| Yes | 93.5 % | 29 |

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| **Question 25:** If yes, which weakness severity is going to make the patient less likely to recover ambulation?  Please pick the highest strength in bilateral lower extremities, using Medical Research Council scale (MRC) |
| 5 - Muscle contracts against full resistance | 0.0 % | 0 |
| 4 - Strength reduced, but contraction can still move joint against resistance | 0.0 % | 0 |
| 3 - Strength further reduced such that joint can be moved only against gravity with examiner’s resistance completely removed | 3.3 % | 1 |
| 2 - Muscle can only move if resistance of gravity is removed | 16.7 % | 5 |
| 1 - Only a trace or flicker of movement is seen or felt, or fasciculations are observed | 40.0 % | 12 |
| 0 - No movement | 40.0 % | 12 |

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| **Question 26:** If yes, which weakness severity should exclude the patient from surgery?  Please pick the highest strength in bilateral lower extremities: |
| 5 - Muscle contracts against full resistance | 0.0 % | 0 |
| 4 - Strength reduced, but contraction can still move joint against resistance | 0.0 % | 0 |
| 3 - Strength further reduced such that joint can be moved only against gravity with examiner’s resistance completely removed | 0.0 % | 0 |
| 2 - Muscle can only move if resistance of gravity is removed | 0.0 % | 0 |
| 1 - Only a trace or flicker of movement is seen or felt, or fasciculations are observed | 23.3 % | 7 |
| 0 - No movement | 40.0 % | 12 |
| I do not consider muscle strength as reason for exclusion | 36.7 % | 11 |

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| **Question 27:** The presence of bladder dysfunction should be considered when trying to predict whether surgery would result in return of ambulation. |
| No | 62.1 % | 18 |
| Yes | 37.9 % | 11 |

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| **Question 28:** Improvement in muscle strength without ambulation recovery would justify decompressive surgery for MESCC. |
| No | 31.0 % | 9 |
| Yes | 69.0 % | 20 |

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| **Question 29:** Preservation of bowel/bladder without ambulation recovery would justify decompressive surgery for MESCC. |
| No | 10.3 % | 3 |
| Yes | 89.7 % | 26 |