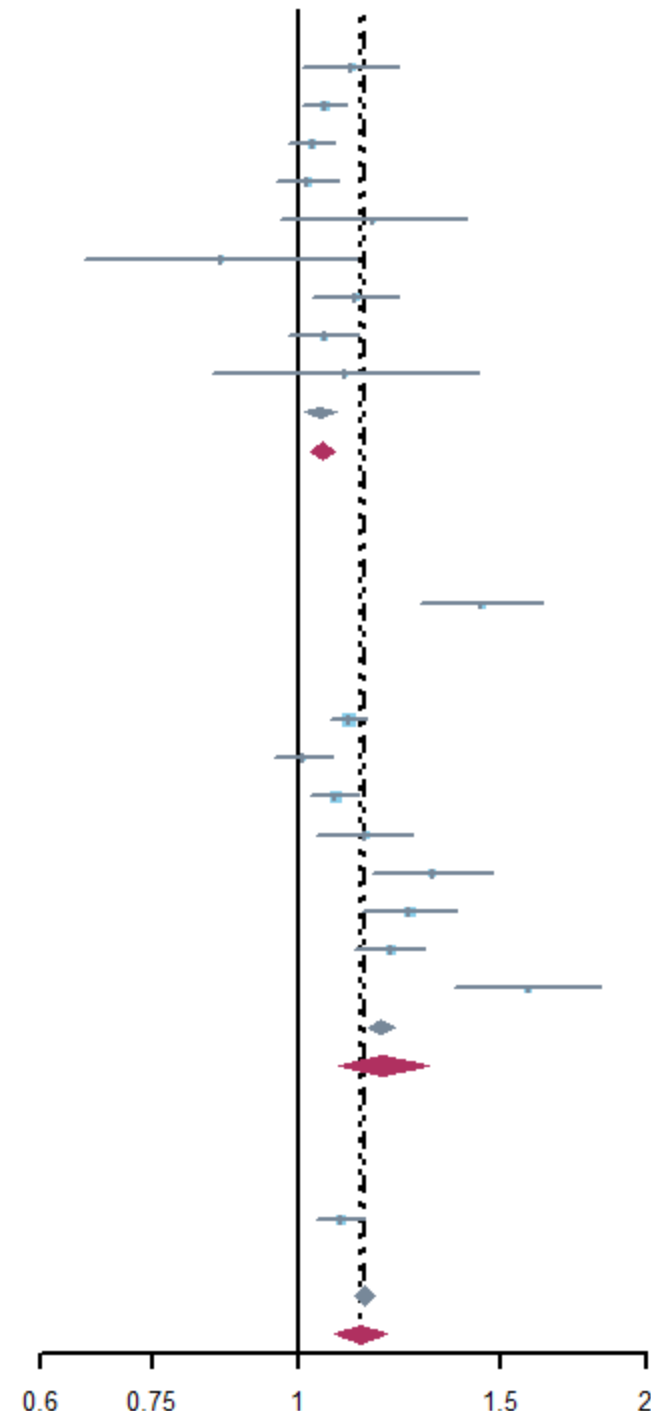


| Study | Robot-assisted | | Freehand | | Risk Ratio | RR | 95%-CI | Weight (common) | Weight (random) |
|---|----------------|-------------|----------|-------------|------------|-------------|---------------------|-----------------|-----------------|
| | Events | Total | Events | Total | | | | | |
| Spine = Lumbar | | | | | | | | | |
| Cui, 2021 | 87 | 92 | 85 | 100 | | 1.11 | [1.01; 1.22] | 3.2% | 5.4% |
| Feng, 2019 | 167 | 170 | 162 | 174 | | 1.06 | [1.01; 1.10] | 6.3% | 6.3% |
| Hyun, 2017 | 127 | 130 | 133 | 140 | | 1.03 | [0.98; 1.08] | 5.0% | 6.3% |
| Kim, 2018 | 148 | 158 | 158 | 172 | | 1.02 | [0.96; 1.08] | 5.9% | 6.1% |
| Li, 2019 | 29 | 32 | 39 | 50 | | 1.16 | [0.97; 1.40] | 1.2% | 3.6% |
| Ringel, 2012 | 56 | 146 | 68 | 152 | | 0.86 | [0.65; 1.12] | 2.6% | 2.4% |
| Huang, 2020 | 106 | 112 | 108 | 128 | | 1.12 | [1.03; 1.22] | 3.9% | 5.6% |
| Tian, 2016 | 99 | 102 | 81 | 88 | | 1.05 | [0.98; 1.13] | 3.4% | 5.9% |
| Li, 2020 | 42 | 58 | 29 | 44 | | 1.10 | [0.84; 1.43] | 1.3% | 2.4% |
| Common effect model | | 1000 | | 1048 | | 1.05 | [1.01; 1.08] | 32.9% | -- |
| Random effects model | | | | | | 1.05 | [1.03; 1.08] | -- | 44.0% |
| Heterogeneity: $I^2 = 9\%$, $\tau^2 = < 0.0001$, $p = 0.36$ | | | | | | | | | |
| Spine = Cervical | | | | | | | | | |
| Fan, 2020 | 163 | 186 | 124 | 204 | | 1.44 | [1.28; 1.63] | 4.6% | 4.8% |
| Spine = Thoracolumbar | | | | | | | | | |
| Han, 2019 | 507 | 532 | 503 | 584 | | 1.11 | [1.07; 1.15] | 18.8% | 6.4% |
| Roser, 2013 | 71 | 72 | 39 | 40 | | 1.01 | [0.96; 1.07] | 2.0% | 6.1% |
| Wang, 2021 | 232 | 240 | 226 | 252 | | 1.08 | [1.03; 1.13] | 8.6% | 6.3% |
| Wang, 2022 | 105 | 112 | 105 | 128 | | 1.14 | [1.04; 1.26] | 3.8% | 5.4% |
| Xu, 2018 | 127 | 132 | 78 | 106 | | 1.31 | [1.16; 1.47] | 3.4% | 4.9% |
| Zhai, 2019 | 238 | 276 | 176 | 255 | | 1.25 | [1.14; 1.37] | 7.2% | 5.4% |
| Yang, 2019 | 203 | 208 | 164 | 202 | | 1.20 | [1.12; 1.29] | 6.5% | 5.9% |
| Cao, 2021 | 173 | 212 | 112 | 217 | | 1.58 | [1.37; 1.83] | 4.3% | 4.4% |
| Common effect model | | 1784 | | 1784 | | 1.18 | [1.15; 1.21] | 54.7% | -- |
| Random effects model | | | | | | 1.19 | [1.09; 1.30] | -- | 44.9% |
| Heterogeneity: $I^2 = 87\%$, $\tau^2 = 0.0144$, $p < 0.01$ | | | | | | | | | |
| Spine = Thoracic | | | | | | | | | |
| Hou, 2021 | 225 | 230 | 194 | 216 | | 1.09 | [1.04; 1.14] | 7.8% | 6.2% |
| Common effect model | | 3200 | | 3252 | | 1.14 | [1.12; 1.16] | 100.0% | -- |
| Random effects model | | | | | | 1.13 | [1.07; 1.19] | -- | 100.0% |



Heterogeneity: $I^2 = 81\%$, $\tau^2 = 0.0107$, $p < 0.01$
 Test for subgroup differences (common effect): $\chi^2_3 = 48.56$, $df = 3$ ($p < 0.01$)
 Test for subgroup differences (random effects): $\chi^2_3 = 30.44$, $df = 3$ ($p < 0.01$)