

Lee et al. (2014) Korea Meta-analysis of published articles between 2005-2013 AMSTAR=6 N=5 studies	Methods: A comprehensive literature search was conducted. Inclusion criteria followed: adults with metastatic epidural spinal cord compression (MESCC), compared radiotherapy (RT) to direct decompressive surgical resection paired with RT (DDSR+RT), and reported ambulation status. Databases: MEDLINE, EMBASE, Cochrane Database of Systematic Reviews. Key terms included: epidural, metastasis/metastases, surgery, surgical resection, radiation, and radiotherapy (RT). Levels of evidence: <i>High quality:</i> RCTs. <i>Low quality:</i> observational studies. Questions/Measures/Hypothesis: To compare the effects of DDSR+RT to RT alone on ambulation status and survival rates for MESCC. Outcome measure: ambulation status, survival rate.	- A total of 238 participants underwent DDSR+RT therapy and 1137 for RT alone. - In DDSR+RT, the mean age was 63.3 yr and the most common site of tumor was lung (28.6%), prostate (12.4%) and breast (10.9%). - In RT alone, mean age was 66.8 yr and the most common site of tumor was lung (24.4%), prostate (23.2%), and breast (15.4%). - Preoperatively, the rate of participants that could move independently (Frankel Grade D) were 62.2% of DDSR+RT and 74.2% of RT alone. - Postoperatively, the DDSR+RT group improved significantly in ambulation status compared to RT alone ($p=0.001$), with moderate heterogeneity ($I^2=57.7\%$). - Ambulation status deteriorated in RT alone compared to DDSR+RT ($p=0.002$), with low heterogeneity ($I^2=7\%$). - Survival rate was significantly prolonged in DDSR+RT compared to RT alone by 6 mo ($n=5$ studies, $p<0.001$, small heterogeneity $I^2=34.3\%$) and by 12 mo ($n=4$ studies, $p=0.001$, moderate heterogeneity $I^2=48.3\%$).
Kim et al. (2012) USA Systematic review of published articles between 1970-2007 AMSTAR=2 N=33	Methods: A literature search of published articles reporting on the use of surgery, radiotherapy (RT), or both for treatment of spine metastasis. Inclusion criteria followed: surgery with stabilization, minimum 25 participants, multiple tumor types, and reported ambulation status. Databases: MEDLINE with key terms: metastasis, spinal cord compression, surgery, surgical decompression, radiotherapy, and radiation. Levels of evidence: Not reported. Questions/Measures/Hypothesis: To compare effectiveness of RT alone or in combination with surgical decompression and stabilization (S+RT) to improve clinical outcomes from pre to post treatment. Outcome measures: ambulatory status, pain relief, neurological function, survival rates.	- In total, 1249 individuals received S+RT and 1246 received RT. Spinal metastasis occurred most often in thoracic (65%), then lumbosacral (25%) and cervical (10%) spine. - Prostate cancer was most often treated with RT whereas genitourinary sarcoma was more likely to be treated with S+RT. - In non-ambulatory individuals, 64% were able to ambulate following S+RT compared to 29% following RT ($p\leq 0.001$). - In paraplegic individuals, 42% regained ambulation following S+RT compared to 10% following RT ($p\leq 0.001$). - Deterioration in ambulation status to pre-treatment levels was not common: 1% of S+RT and 9% of RT were non-ambulatory post intervention ($p=0.003$). - In 21 studies, 88% of S+RT compared to 74% of RT were relieved of pain ($p\leq 0.001$).

		- In 20 studies, the 30 day mortality rate for S+RT was 5%; reporting was limited for RT. - Lung cancer, melanoma, or tumor of unknown origin had poor survival rates regardless of treatment (1-8 mo). For all tumor types, the median survival rate was higher for S+RT than RT (17 versus 3 mo). - Regardless of treatment condition, ambulatory participants had 5-6 times greater survival than non-ambulatory participants.
Klimo et al. (2005) USA Meta-analysis of published articles between 1984-2002 AMSTAR=7 N=28 studies	Methods: A literature search of published articles reporting on the use of surgery, radiotherapy (RT), or both for treatment of spine metastasis. Inclusion criteria followed: published in English, retrospective or prospective cohorts, and reported ambulation status. Databases: MEDLINE with key terms: spine, metastases, radiation, surgery, treatment, cancer, decompression, and vertebrectomy. Levels of evidence: Moderate quality: Prospective cohort studies with internal controls; Low quality: Uncontrolled retrospective and prospective cohort studies. Questions/Measures/Hypothesis: To determine the effectiveness of surgery alone or with RT (S±RT) compared to RT alone on ambulation status. Outcome measures: Primary outcomes- ambulation status via success rate (maintained/regained) and rescue rate (regained). Secondary outcomes-pain control, sphincter function, survival rates.	- In S±RT, 999 individuals were treated, average age was 56.4 yr, 52% were male, and the three primary sites (>50%) of tumors were breast, kidney, and lung. - In RT, 543 individuals were treated, average age was 62.5 yr, 49% were male, and the three primary sites (>70%) of tumors were breast, lung, and prostate. - Thoracic spine (68%) was the most common metastatic location, followed by lumbosacral (21-33%) and cervical spine (6-11%). - Surgical approaches to the spine include: anterior (55%), posterior (39%), and combined (6%). RT was delivered in a dose that ranged from 2800-3200cGy for 7-12 days. - Success rate for ambulation was greater in S±RT than RT alone, with S±RT having 1.3 times greater chance of being ambulatory (p<0.001). - Ambulation rescue rate was superior in S±RT than RT, with a 2 times greater chance of regaining ambulation (p<0.001). - In 21 studies, an improvement in pain was noted in 90% for S±RT and 70% for RT. - Sphincter rescue rate was 66% in S±RT and 26% in RT; however this outcome was only reported in 5 studies. - One yr survival was an average of 41% in S±RT and 24% in RT, with breast and renal cancer having more favorable survival outcomes across all participants.