

PRIMARY STUDIES – EN BLOC VERSUS DEBULKING

I Study ID	II Method	III Patient characteristics	IV Intervention(s)	V Results primary outcome	VI Results secondary and other outcome(s)	VII Critical appraisal of study quality
<ul style="list-style-type: none"> Reference 	<ul style="list-style-type: none"> Design Source of funding Setting Sample size Duration 	<ul style="list-style-type: none"> Eligibility criteria A priori patient characteristics Group comparability 	<ul style="list-style-type: none"> Intervention(s) Comparator(s) 	<ul style="list-style-type: none"> Effect size Primary outcome 	<ul style="list-style-type: none"> Effect size secondary outcome(s) Effect size all other outcomes 	<ul style="list-style-type: none"> Level of evidence Dropouts Results critical appraisal
<ul style="list-style-type: none"> Ibrahim; J Neurosurg: Spine; 2008 	<ul style="list-style-type: none"> Consecutive prospective cohort funds from an educational grant from DePuy Spine (Johnson & Johnson). 6 tertiary Centres (Denmark, France, Germany, Italy, Japan, and the United Kingdom) En bloc (63), debulking (102, Palliative (58) 13-37 Months 	<ul style="list-style-type: none"> Adult patients (>18y) treated surgically for extradural spinal metastasis consent Excluded: primary spinal tumor, nonepithelial secondary tumors, highly radiosensitive tumors (multiple myelomas and lymphomas), previous operations for spinal tumors. 	<ul style="list-style-type: none"> En bloc (wide excisional margins through a variety of approaches: anterior, posterior, or combination) Debilking (intralesional piecemeal procedures or curettage without necessarily achieving wide excisional margins) Palliative (minimal level of resection mostly with simple posterior decompression and instrumented fixation.) 	<ul style="list-style-type: none"> Median survival En bloc: 18.8 months Debulking: 13.4 months (not sign) 3.7 months for the palliative group (sign different from excision) 	<ul style="list-style-type: none"> Complications were lowest for the debulking group (16%), followed by the palliative group (22%), and highest for the en bloc group (25%). Surgical complications alone were higher 16%) in the palliative surgery group than the en bloc or debulking groups (12%) Improvement in postoperative pain En Bloc 64% Debulking 80% Palliative 61% Improved to or maintained Frankel Grade D or E En Bloc 92% Debulking 	<ul style="list-style-type: none"> Prospective controlled No patients lost Unclear rationale for choice for surgical technique Confounding by indication can be present

					<p>92% Palliative 65%</p> <ul style="list-style-type: none"> Improved sphincter function En Bloc 100% (2/2) Debulking 50 Palliative 21 	
<ul style="list-style-type: none"> Fang, J Neurosurg Spine 2012 	<ul style="list-style-type: none"> Retrospective chart review This work was supported in part by the National Basic Research Program of China, the National Natural Science Foundation of China, the National High-Tech Research and Development Program, and the Shanghai International Science and Technology Partnership Program Single center (China) Mini-open anterior corpectomy (24), TES (17) 3, 6, 9, 12 months; half yearly. 	<ul style="list-style-type: none"> 2004 to 2010 surgical procedure for solitary metastases of the thoracolumbar spine. Patients with another concomitant metastatic disease or visceral metastases were excluded from the study. 	<ul style="list-style-type: none"> Mini-Open Anterior Corpectomy: piecemeal removal of the tumorous vertebral body, removal dorsal cortical wall, PMMA secured with Steinman pins or autograft, MACS-TL plate system (Aesculap) Total En Bloc Spondylectomy: en bloc laminectomy and en bloc corpectomy, anterior instrumentation with spacer grafting and posterior spinal instrumentation. Titanium mesh cage (MOSS-Miami, Depuy Spine) with autogenous bone. 	<ul style="list-style-type: none"> Survival. mini-open corpectomy: Mean survival 16.8 ± 8.2 months (6–35) (n=15) after surgery. follow-up surviving patients 14-35 months (n=9) (average 24.8 ± 7.7). 1-year and 2-year survival rates were $75.0\% \pm 8.8\%$ and $51.5\% \pm 10.6\%$. TES: Mean survival 12.6 ± 4.1 (n=10); follow-up surviving patients 12-24 months (average 17.0 ± 3.7 months). 	<ul style="list-style-type: none"> No difference in neurological improvement at 6 months (p = 0.063) No sign difference in 3 months VAS pain score No sign diff in complications TES showed lower recurrence rate (0/17 vs 5/24) 	<ul style="list-style-type: none"> Retrospective controlled Unclear rationale for choice for surgical technique Confounding by indication can be present

				<p>(n=7). 1-year and 2-year survival rates were 64.7% ± 11.5% and 22.6% ± 17.1%</p> <ul style="list-style-type: none"> not significantly different 		
<ul style="list-style-type: none"> Kwon, Yonsei Med J, 2009 	<ul style="list-style-type: none"> Retrospective chart review The authors have no financial conflicts of interest. Single center (Japan) Gross total resection (28), Subtotal resection (59) Average fu 17.6 months 	<ul style="list-style-type: none"> August 1997 to February 2008 Surgical intervention Advanced spinal metastasis that extended beyond the anatomical barrier (Tomita's classification ≥ type 4) Exclusion: unknown primary origin, follow-up < 1 year, treatment with only biopsy or vertebroplasty. 	<ul style="list-style-type: none"> Gross total resection meant that no tumor mass remained attached to the surrounding normal tissues via thorough debulking and removal of the marginal barriers or total en bloc spondylectomy via a posterioronly or anterior-posterior combined approach. Subtotal resection, laminectomy or internal decompression with/ without instrumentation was performed. 	<ul style="list-style-type: none"> Responsive to adjuvant therapy: Statistically different (p=.049) Not responsive to adjuvant therapy: Not statistically different (p=.115) 	<ul style="list-style-type: none"> - 	<ul style="list-style-type: none"> Retrospective controlled Unclear rationale for choice for surgical technique Confounding by indication can be present
<ul style="list-style-type: none"> Holman, J Neurosurg Spine, 2005 	<ul style="list-style-type: none"> Retrospective chart review No conflict of interest statement 	<ul style="list-style-type: none"> Between August 1, 1994, and April 30, 2001. suspected 	<ul style="list-style-type: none"> Not described 	<ul style="list-style-type: none"> Median Survival Operative approach no 	<ul style="list-style-type: none"> - 	<ul style="list-style-type: none"> Retrospective controlled Unclear rationale for choice for

	<ul style="list-style-type: none"> Single center (US) Anterior (54), Posterior (63), Combined (22). 1, 3, 6, 12 months; half yearly. 	<ul style="list-style-type: none"> metastatic disease lumbar spine or thoracolumbar junction who underwent surgery 		<ul style="list-style-type: none"> factor in univariate analysis (Posterior vs Anterior: $p=0.62$) 		<ul style="list-style-type: none"> surgical technique Confounding by indication can be present
Single primary location						
<ul style="list-style-type: none"> Alzenberg, J Neurosurg Spine, 2012 	<ul style="list-style-type: none"> Retrospective review of prospective data 1 author receives teaching honoraria from Medtronic and Stryker Single center (US), University hospital GTR (27, STR (23) 3, 6, 12 months 	<ul style="list-style-type: none"> patients undergoing surgery metastatic spine tumors from a UPT between June 1993 and February 2007 biopsy-proven metastatic disease to the spine no clearly defined primary tumor diagnosis (including, minimally chest, abdomen and pelvic CT scan and PET scan) 	<ul style="list-style-type: none"> GTR = gross-total resection; STR = subtotal resection 	<ul style="list-style-type: none"> Average survival 6.4 months [95% CI 0–13.2] for STR vs 8.1 months [95% CI 0–18.5] for GTR; $p = 0.18$ 	<ul style="list-style-type: none"> - 	<ul style="list-style-type: none"> Retrospective controlled (although prospective data) GTR or STR depending on the surgeon's impression at operation) Confounding by indication can be present
<ul style="list-style-type: none"> Demura, J Neurosurgery Spine, 2011 	<ul style="list-style-type: none"> Retrospective chart review The authors report no conflict of interest Single center (Japan) Debulking surgery 	<ul style="list-style-type: none"> spinal metastases from thyroid carcinoma 	<ul style="list-style-type: none"> Debulking surgery such as piecemeal excision or eggshell curettage Total en bloc spondylectomy 	<ul style="list-style-type: none"> survival at 5 years TES 90% Debulking 63% Not significant ($p = 0.13$) 	<ul style="list-style-type: none"> local recurrence in 8 (57%) after debulking surgery vs 1 (10%) after TES ($p < 0.01$) 	<ul style="list-style-type: none"> Retrospective controlled strategy was based on a prognostic scoring system (Tomita) Confounding by indication can be

	such as piecemeal excision or eggshell curettage (14), Total en bloc spondylectomy (10) <ul style="list-style-type: none">• Average 55 months					present
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