were maintained to be important independent risk factors in the development of CES.
CONCLUSIONS: The findings presented here are in keeping with what limited research has been conducted regarding the incidence and epidemiology of CES. Our results document an incidence within the range of previous studies and postulate important risk factors for the condition such as age 30 and older, female sex, and white race. However, our findings were obtained using the largest series of patients with CES to be evaluated in the literature.
FDA DEVICE/DRUG STATUS: This abstract does not discuss or include any applicable devices or drugs.

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P5. Translateral Approach to C1-3 for Percutaneous Vertebroplasty

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BACKGROUND CONTEXT: Percutaneous vertebroplasty (PVP) affords significant pain relief and strengthens the bone. PVP is most typically performed successfully with patients with acute osteoporostic compression fractures, and also with lytic vertebral metastases. PVP in the upper cervical spine is a challenging procedure, The purpose of this study was to evaluate the feasibility, safety, and therapeutic effects of PVP for metastatic involved the upper cervical spines (C1, C2 and C3) from lateral approach via the space between carotid sheath and vertebral artery under CT guidance.
PURPOSE: To evaluate the safety and efficacy of PVP using a CT-guided translateral approach via the space between carotid sheath and vertebral artery for metastatic lesions of the upper cervical spines (C1, C2 and C3) under local anesthesia.
STUDY DESIGN/SETTING: Interventional therapy group in West China hospital
PATIENT SAMPLE: Fifteen cancer patients with osteolytic metastases of the upper cervical spines between January 2003 and September 2011.
OUTCOME MEASURES: Pain status, complications and quality of life before and after CT-guided PVP.
METHODS: Fifteen patients with upper cervical metastases had undergone cervical PVP from lateral approach via the space between carotid sheath and vertebral artery under CT guidance with local anesthesia.
RESULTS: Significant pain relief was achieved in 80%(12 of 15) patients after 24 hours, 83.3%(10 of 12) patients after 2 weeks, 90.9%(10 of 11) patients after 1 month, 100%(8 of 8) patients after 3 months, 100%(5 of 5) patients after 6 months, 100%(4 of 4) patients after 12 months, 100%(4 of 4) patients after 24 months.The mean volume of cement injected was 1.55 ml in C1(range,1.1-2.0 ml), 1.78 ml (range, 1.3-2.0 ml) in C2, 1.95 ml (range, 1.5-2.2 ml) in C3. No severe complications were observed. Mild complications included two cases (13.3%) of asymptomatic cement leakage into epidural space, one case(6.67%) of anterior leakage of vertebral body and two cases (13.3%)witha paravertebral leakage.Improvement of QOL was achieved in 26.7%(4 of 15) patients after 24 hours, 58.3%(7 of 12) patients after 2 weeks, 54.5%(6 of 11) patients after 1 month, 62.5%(5 of 8) patients after 3 months, 60%(3 of 5) patients after 6 months, 50%(2 of 4) patients after 12 months, 33.3%(1 of 3) patients after 24 months.
CONCLUSIONS: The safety and efficacy of CT-guided PVP using a translateral approach via the space between carotid sheath and vertebral artery were confirmed in patients with metastatic involvement ofthe upper cervical spines. CT-guided PVP via a translateral approach should become an available treatment option for such patients.
FDA DEVICE/DRUG STATUS: This abstract does not discuss or include any applicable devices or drugs.

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P6. Comparative Cost Between Vertebroplasty and Kyphoplasty for the Treatment of Vertebral Compression Fractures

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BACKGROUND CONTEXT: There has been recent controversy regarding the effectiveness of vertebral augmentation (balloon kyphoplasty (BKP) and vertebroplasty (VP)) for treating vertebral compression fractures (VCFs). Limited cost comparisons of BKP and VP suggest thatinitial hospital costs are higher for BKP (Mehio 2011), however costs for subsequent postoperative care are unknown.
PURPOSE: The present study sought to characterize and compare the treatment costs for BKP and VP patients through 2 years post-surgery.
STUDY DESIGN/SETTING: The study utilized the 5% Medicare national claims data from 2005-2009.
PATIENT SAMPLE: BKP and VP patients were identified using ICD-9-CM and CPT-4 codes. A final cohort of 2,878 BKP and 1,609 VP patients was included.
OUTCOME MEASURES: Treatment costs (Medicare reimbursement/payment adjusted to June 2011 dollars) were compiled for all components of treatment during the 2-year follow-up.
METHODS: Length of stay (LOS) and treatment costs for BKP and VP patients were compared using logistic regression, adjusting for gender, age, census region, comorbidities (Charlson score), race, socio-economic status (Medicare buy-in status), cancer diagnosis (presence in prior 12 months) and year of surgery.
RESULTS: LOS was 3.5 +/- 4.1 days and 5.5 +/- 4.3 days for BKP and VP patients who had inpatient procedures, corresponding to 43% shorted LOS (adjusted) for BKP ($p<0.001$). There were no significant differences in average adjusted treatment costs for BKP and VP patients within the first 3 ($p=0.097$) and first 6 months ($p=0.142$). However, for the remaining periods, BKP patients had lower adjusted costs ($p<0.025$). At two years, the average adjusted costs were 7% lower for BKP ($p=0.005$).
CONCLUSIONS: Although BKP and VP patients in the Medicare population were found to have similar treatment costs within the first 6 months following surgery, BKP was found to be cost saving compared to VP subsequently over time through 2 years.
FDA DEVICE/DRUG STATUS: Vertebroplasty (Approved for this indication), Kyphoplasty (Approved for this indication)

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P7. Fiber Tractography as a Diagnostic Tool for Cervical Spondylotic Myelopathy

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BACKGROUND CONTEXT: Diffusion tensor fiber tractography is an emerging tool for visualization of spinal cord microstructure.
PURPOSE: This study aimed to develop a quantitative approach for fiber tractography analysis on cervical spondylotic myelopathy (CSM).
STUDY DESIGN/SETTING: A prospective study
PATIENT SAMPLE: A total of 22 volunteers were recruited in this study with informed consent, including 15 healthy subjects and 7 CSM patients.
OUTCOME MEASURES: Fiber morphometry (density and length)
METHODS: Diffusion MRI images were taken by 3.0-Tesla MRI scanner using pulsed gradient, spin-echo-echo-planar imaging (SE-EPI) sequence. Fiber tractography was generated via TrackVis with fractional anisotropy threshold set at 0.2and angle threshold at 40 degree. The spinal cord curvature was taken into consideration for quantitative analysis of fiber

tractography. Region of interest (ROI) was defined to cover C4 level only or the whole-length cervical spinal cord from C1 to C7 for analysis. The length and density of tracked fibers were measured for comparison between healthy and myelopathic spinal cords.
RESULTS: There was no significant difference in fiber length and density between healthy straight and curved spinal cord. It was found that fiber length of myelopathic cord (21.02± 4.83 mm) was much shorter than healthy straight (HS: 30.33±8.69 mm) or curved cord (HC: 25.32±8.77 mm) yet it failed to detect such disparity in fiber density between HC and CSM (HS: 0.87±0.03; HC: 0.78±0.24;CSM: 0.78±0.06).Moreover, ROI selection did not affect the trend in disparity between healthy and myelopathic cord.
CONCLUSIONS: The morphometric analysis of fiber tractography, i.e. fiber length, was a reliable approach to detect cervical spondylotic myelopathic lesions from healthy spinal cord.
FDA DEVICE/DRUG STATUS: This abstract does not discuss or include any applicable devices or drugs.

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P8. Early Failures Following Surgical Treatment for Spinal Stenosis with Lumbar Deformity

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BACKGROUND CONTEXT: As our population ages, we are seeing an increasing number of patients with symptomatic lumbar spinal stenosis associated with lumbar deformity, such as degenerative spondylolisthesis or degenerative scoliosis. The surgical treatment options have traditionally been limited to laminectomy alone or laminectomy and fusion. Interspinous Process Spacers (ISPs), developed to treat straightforward spinal stenosis, have been increasingly utilized in this group of patients in hopes of limiting surgical morbidity and complications. To our knowledge there have been no published studies comparing these surgical treatments in patients with stenosis and deformity.
PURPOSE: The purpose of our study was to evaluate and compare early treatment failures of three procedures used to treat patients with symptomatic lumbar spinal stenosis and mild degenerative spondylolisthesis (Grade I) or scoliosis (<30°).
STUDY DESIGN/SETTING: Retrospective cohort study
PATIENT SAMPLE: Consecutive patients treated surgically at a single institution for symptomatic lumbar spinal stenosis associated with degenerative lumbar spondylolisthesis or degenerative scoliosis.
OUTCOME MEASURES: Early failure, defined as return to the operating room at less than 2 years for recurrence of symptoms or adjacent segment degeneration.
METHODS: We reviewed 61 consecutive patients (25 male and 36 female), mean age 70 years, treated at a single institution with minimum 2 year follow-up (mean 48.4 months) for symptomatic spinal stenosis associated with lumbar deformity. The patients were treated with either ISP device placement, laminectomy alone, or laminectomy and short-segment fusion. Early failure was defined as return to the operating room for revision of the index level or adjacent segment within 2 years.
RESULTS: Early failure was noted in 14 of 61 patients (23%) within 2 years. There was a significantly higher rate of same level recurrence leading to early failure in the ISP group (43%), as compared with the laminectomy and lami/fusion groups ($p<0.0001$). Early failure due to adjacent segment degeneration (ASD) was more common in the lami/fusion group (17%). Kaplan Meyer analysis revealed significantly lower survival for the ISP devices and highest survival in the laminectomy alone group ($p=0.01$).
CONCLUSIONS: Early failure with recurrent stenosis requiring revision surgery was significantly more common in patients treated with an ISP device for spinal stenosis and lumbar deformity, while ASD was more common in patients treated with laminectomy and fusion. Laminectomy alone had the highest rate of survival. These results should be considered along side surgical morbidity when treating patients with spinal stenosis and associated lumbar deformity.
FDA DEVICE/DRUG STATUS: Pedicle screws (Approved for this indication), Interspinous process spacers (Approved for this indication)

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P9. Can Large Cervical and Lumbar Disc Herniations Producing Radiculopathies Be Intentionally and Rapidly Improved?

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BACKGROUND CONTEXT: In patients with cervical or lumbar radiculopathies, rapid and complete non-surgical recoveries often occur when pain centralization (PC) is elicited during a Mechanical Diagnosis & Therapy (MDT/McKenzie) examination, as long as treatment consists of end-range spinal movements in the single direction that elicited PC during the examination. Scannell et.al. (2010) illustrated a possible mechanism for PC by reducing cadaveric intervertebral disc herniations (IVDH) using repetitive asymmetrical loads.
PURPOSE: To document any immediate changes in IVDH size to explain intentional PC accompanied by simultaneous improvement in range-of-spinal-motion, neurologic status, and tension signs.
STUDY DESIGN/SETTING: Case series
PATIENT SAMPLE: Patients with cervical or lumbar radiculopathy and neurologic signs or symptoms referred for MRI imaging
OUTCOME MEASURES: Body pain drawings, visual analog pain scales, neurological status, tension signs, range-of-spinal-motion, MRI imaging, Roland Morris Disability Questionnaire
METHODS: After initial MRI imaging, all outcome measures were completed followed immediately by an MDT examination consisting of repeated end-range testing conducted in the MRI suite. All outcome measures, including MRI, were promptly repeated. Imaging and outcome measures were repeated 3 mon. later. MRIs and outcome measures were compared at all datapoints.
RESULTS: Each patient had a large baseline cervical or lumbar IVDH. A single direction of end-range movement was identified that completely and rapidly centralized and abolished all pain with immediate substantial reduction in the size of the IVDH and improvement of all other outcomes. Patients remained asymptomatic and regained full function within two weeks. MRI findings improved substantially.
CONCLUSIONS: Mechanical spinal testing that monitors patterns of pain response and MRI imaging are two diverse forms of patient evaluation that together appear to provide new and unique insight into the dynamic mechanism by which both lumbar and cervical intervertebral disc herniations causing radiculopathy can be rapidly and non-invassively corrected. This correction resulted in simultaneous and full pain centralization and abolition, restoration of normal spinal range-of-motion with elimination of related nerve tension signs and neural deficits. Further studies are clearly warranted.
FDA DEVICE/DRUG STATUS: This abstract does not discuss or include any applicable devices or drugs.

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P10. MRI Utilization in a Six-Man Orthopedic Group Before and After Acquisition of an In-Office MRI Scanner

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BACKGROUND CONTEXT: In-office MRI acquisition has been questioned by critics as leading to overutilization of diagnostic imaging.