**Conclusion:** Posterior spinal osteotomies are effective techniques to restore an adequate balance in the thoracic spine.

**#ESA Abstracts 20180103**

**Direct Vertebral Rotation (Segmental and Enbloc) in Surgical Correction of Adolescent Idiopathic Scoliosis: Myth or Reality?**

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**Introduction:** Pedicle screw fixation with a simple rod derotation maneuver enables a powerful coronal and sagittal plane correction in scoliosis surgery. However, the ability of achieving rotational correction is still unclear. Direct vertebral rotation (DVR) maneuver was introduced to correct apical axial vertebral rotation. It is however still not well established how efficiently DVR affects results of scoliosis correction. This prospective comparative clinical study to introduce a new technique, direct vertebral rotation, and to evaluate the surgical results of direct vertebral rotation (DVR) with those of single concave rod rotation (SCR) using pedicle screw-only construct regarding apical vertebral rotation (AVR) and rib hump correction in adolescent idiopathic scoliosis (AIS) surgery.

**Methods:** Twenty-three adolescent idiopathic scoliosis patients treated with segmental pedicle screw fixation were analyzed. The first group (n = 12) was treated by direct vertebral rotation; the second group (n = 11) was treated by simple rod de-rotation. All patients had a minimum follow-up of 2 years. Having similar preoperative curve patterns, both groups were evaluated for the deformity correction, lower instrumented vertebral tilt, and spinal balance. Apical vertebral rotation was evaluated by computed tomography scans. Surgical techniques of direct vertebral rotation were as follows: a pre-contoured rod was inserted into segmental screws on the concave side in thoracic scoliosis; a simple rod de-rotation was performed; and then the screws on the juxta-apical vertebrae, both on concave and convex sides, were rotated opposite direction to the rod de-rotation. Then, all the screws were sequentially tightened.

**Results:** In the direct vertebral rotation group, the average preoperative apical vertebral rotation of 16.7° was corrected to 9.6°, showing 42.5% correction, whereas in the simple rod derotation group, the correction was negligible from 16.1° to 15.7° (2.4%). In the direct vertebral rotation group, the average preoperative thoracic curve of 55° was corrected to 12° (79.6%), and the lumbar curve of 39° was corrected to 7° (80.5%). In the simple rod derotation group, the preoperative thoracic curve of 53° was corrected to 17° (68.9%), and the lumbar curve of 39° was corrected to 16° (62.2%). The average lower instrumented vertebral tilt correction was 80.6% and 66.3% in the direct vertebral rotation and the simple rod de-rotation group, respectively. There were statistically significant differences in the coronal curve, lower instrumented vertebral tilt, and rotational correction (P < 0.05, Mann-Whitney U test). Thoracic kyphosis was improved in both groups. Mean total SRS-22 score values improved from 2.3 on pre-operative to 3.8 at the last available follow-up. Pre- correctional rib hump angle was 19.3°, after SCR 15°, and after DVR 12.3°. It was found that despite the lack of true de-rotation after SCR there was a significant 22.3% decrease of the rib hump P = 0.043. Although the rib hump decreased significantly 36.3% after DVR as well P = 0.023. No deformity progression or screw pull-out or non-union was recorded at the last available follow-up.
Conclusion: SCRR does not lead to AVD. True spinal de-rotation is possible only when DVR systems are used. The decrease of rib hump is achieved after both SCRR and DVR, but the improvement is significantly better after DVR.

**#ESA Abstracts 20180104**

**Dysphagia and Dyspnea Caused by Large Anterior Cervical Osteophyte**

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**Introduction:** Unfortunately, large anterior cervical osteophyte is a forgotten cause of dysphagia and dyspnea which can cause marked change in diet habits or interfere with patient daily activity and sleep without significant neck pain or radicular pain.

**Methods:** This study was conducted in Mansoura University hospital on nine patients presented with dysphagia, dyspnea or both of them caused by anterior cervical osteophytes. All of them were assessed by X ray, CT, MRI and underwent fiberoptic naso-endoscopy to assess posterior pharyngeal wall and other causes of upper airway obstruction. All of them had a trial of conservative treatment and five of them underwent surgery and one patient refused surgery.

**Results:** Conservative medical treatment and diet modification may be useful for these patients however surgery may be mandatory especially with severe progressive dysphagia with excellent results.

**Conclusion:** Although large anterior cervical osteophyte is a rare cause of Dysphagia and dyspnea it should be checked and excluded especially in elderly patients.

**#ESA Abstracts 20180105**

**Combined Approach for Cervical Schwannomas with Large Extrarafiminal Extension**

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**Introduction:** About 75% of Spinal schwannomas are intradural, 10% intra-extradural and 15% are completely extradural. These tumors are usually slowly growing and reach a large size before becoming symptomatic. When these tumors have large extrarafimal part, we can do combined approach for complete excision.

**Methods:** This study was conducted in Mansoura University Hospital on 6 patients with cervical spinal schwannomas with large lateral extra foraminial component. All patients were assessed clinically and radiologically using CT, MRI, and angiography before surgery. Posterior approach through a hemilaminectomy with facet preservation for the intraspinal part and anterolateral approach for the extraspinal extension.

**Results:** Combined approach was done for all patients with complete excision of the tumors. One patient developed CSF Leake after surgery that stopped after lumbar drain insertion. There was no mortality.

**Conclusion:** Cervical spinal schwannomas with large lateral extra foraminial component need combined approach to achieve complete surgical excision.

**#ESA Abstracts 20180106**

**Combined Percutaneous pedicle screw fixation and minimal access open posterior decompression for treatment of unstable thoracolumbar fractures**

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**Introduction:** Percutaneous fixation of unstable thoracolumbar fractures is increasingly used as alternative to open surgery. The complexity of the fracture pathology and spine dynamics affects the indications of percutaneous treatment. This study aims to evaluate the percutaneous pedicle screw fixation combined with posterior minimal access decompression of neural canal in unstable thoracolumbar fractures.

**Methods:** 10 patients with unstable thoracolumbar fractures with significant neural compression who are indicated for both fixation and neural canal decompression were treated with this technique. Patient both neurologically intact or with deficit with only single vertebral fractures are included. All patients underwent percutaneous fixation and decompression. The procedure is assessed for the effectiveness of the decompression and surgical events.

**Results:** Effective percutaneous fixation can be done in all patients. Effective dural and root decompression can be achieved. No infection or hardware related problems encountered. No deterioration of pre-operative neurologic status. No blood transfusion given.

**Conclusion:** Percutaneous fixation of unstable fractures with minimal access decompression of neural canal is an effective and safe technique for treatment of single level unstable thoracolumbar fractures.

**#ESA Abstracts 20180107**

**Staged Complex Spine Surgery, Does It Differ?**

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**Introduction:** Complex spine surgery represents a constellation of complex procedures performed by senior spine surgeons to correct multiple malalignments affecting the spinal column. These corrective spine procedures can be challenging, and commonly require multiple index procedures and potential revisions. There is a paucity of data comparing the outcomes of single session versus two (staged) sessions for complex spine surgery. Study of surgeon- and patient-reported outcomes will be particularly helpful in determining the utility and effect of staging long spinal fusions for complex spine deformities. This study aimed to compare intraoperative, perioperative, and 1-year outcomes of single stage versus two stage surgery correcting complex spine deformities. Study Design: prospective clinical case study.

**Methods:** Patient sample: A total of 16 patients of adolescent spinal deformity were included (8 one stage, 8 two stages). Outcome measures: intra-operative, peri-operative and one year post-operative clinical and radiological data was statistically calculated to assess morbidity and mortality rates. Data included was blood loss, operative time, percentage correction of deformity within one year and one year complication rate. Surgimap software version 2.2.12 was used to calculate percentage correction of deformities.

**Results:** There were no significant differences between the 2 groups as regards blood loss (3250 ml one stage, 3500ml two stage; p=0.554), operative time(300 min one stage, 360 min two stage; p=0.350), percentage correction within one year (66% one stage, 60% two stage, p=0.526), one year complication rate (62.5% one stage, 75% two stage, p=1.000). However, neurological complications was significantly higher in one stage operation (20%) than in staged operation (0%), p= 0.001.

**Conclusion:** Staged spine surgery should be considered in any complex procedure performed by senior spine surgeons to correct complex procedures.

**#ESA Abstracts 20180108**

**Revision of Single-rod Instrumentation in the Treatment of Adolescent Idiopathic Scoliosis: Carving in Rock**

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**Conclusion:** Staged spine surgery should be considered in any complex spinal operation as the morbidity regards neurological function was lower than one stage long operation.
Introduction: Odontoid fractures are the most common cervical fractures, specially type II. Anterior odontoid screw fixation has many advantages with low incidence of surgical complications. This prospective clinical case series aims to evaluate the role of single odontoid screw fixation in surgical treatment of odontoid fracture type II.

Methods: Twelve patients with acute traumatic odontoid fracture type II were surgically treated by anterior single odontoid screw fixation. The visual analogue scale (VAS) and neck disability index (NDI) were used to evaluate the functional outcome among our patients. Plain radiography and CT cervical spine were done in all cases preoperatively and during our period of follow-up (6 months).

Results: The study included 12 patients, four of them (33.3%) were females and 8 (66.7%) were males with a mean age of 41.7±11.4 years. All patients had acute traumatic odontoid fracture type II, oblique fractures (from anterior-superior to postero-inferior) in 10 (83.3%) cases and horizontal fractures in 2 (16.7%) cases. All cases operated for anterior single odontoid screw fixation. During our period of follow-up VAS and neck disability index were improved in all cases. There were 5 cases (41.7%) with transient dysphagia which improved in one month. Solid fusion was achieved in all cases except in one patient (8.3%) (fibrous union).

Conclusion: Single odontoid screw fixation is useful and safe procedure in surgical treatment of odontoid fractures type II. Careful attention to the technical aspects of the procedure and selection of patients are essential for a good outcome.

#ESA Abstracts 20180109
The Role of Single Odontoid Screw Fixation in Treatment of Odontoid Fracture Type II
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Introduction: Odontoid fractures are the most common cervical fractures, specially type II. Anterior odontoid screw fixation has many advantages with low incidence of surgical complications. This prospective clinical case series aims to evaluate the role of single odontoid screw fixation in surgical treatment of odontoid fracture type II.

Methods: Twelve patients with acute traumatic odontoid fracture type II were surgically treated by anterior single odontoid screw fixation. The visual analogue scale (VAS) and neck disability index (NDI) were used to evaluate the functional outcome among our patients. Plain radiography and CT cervical spine were done in all cases preoperatively and during our period of follow-up (6 months).

Results: The study included 12 patients, four of them (33.3%) were females and 8 (66.7%) were males with a mean age of 41.7±11.4 years. All patients had acute traumatic odontoid fracture type II, oblique fractures (from anterior-superior to postero-inferior) in 10 (83.3%) cases and horizontal fractures in 2 (16.7%) cases. All cases operated for anterior single odontoid screw fixation. During our period of follow-up VAS and neck disability index were improved in all cases. There were 5 cases (41.7%) with transient dysphagia which improved in one month. Solid fusion was achieved in all cases except in one patient (8.3%) (fibrous union).

Conclusion: Single odontoid screw fixation is useful and safe procedure in surgical treatment of odontoid fractures type II. Careful attention to the technical aspects of the procedure and selection of patients are essential for a good outcome.

#ESA Abstracts 20180011
Intramedullary Epidermoid Cysts of the Upper Thoracic Spinal Cord
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Introduction: Epidermoid cysts grow slowly so the symptoms would present with slowly progressive course and delay in the diagnosis that may extend up to years. Presence of neurological symptoms and signs is usually detected that might be associated with local mild but persistent back pain. This is a case report of intradural thoracic an epidermoid cyst to describe a case presentation of spinal epidermoid cyst.

Methods: Our case was a forty-year-old male patient presenting with left lower limb motor weakness. He had a 5-month history of slowly progressive left lower limb weakness and not associated with sphincter disturbance. Magnetic resonance imaging of the spine demonstrated an intradural lesion of the thoracic part of the spinal cord.

Results: The lesion was excised totally and 14 days after the surgical removal, the motor power of the left lower limb showed marked improvement up to grade 4 on MRC scale.

Conclusion: The diagnosis of intradural epidermoid cyst could be considered in patients with slowly progressive lower limbs weakness and mild persistent back pain.
#ESA Abstracts 20180112

**Pars Repair in Isthmic Spondylolysis in Young Adults**

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**Introduction:** Spondylolysis remains the most common identifiable cause of low back pain in children and adolescents and in young adults. Conservative measures are successful in managing most patients but those who remain symptomatic often benefit from operative treatment. There are different techniques of pars repair such as Buck’s technique, Scott wiring, modified Scott wiring, sublaminar hook with facet or pedicle screw, and V-shaped rod technique which is the most recent one. V-shaped rod technique had the most favorable outcome.

**Methods:** This prospective study reports 10 young adult patients with isthmic spondylolysis at L4 or L5 who don’t respond to conservative measures. They operated between 2015-2017 for pars repair using V-shaped rod technique (smile face technique). They followed clinically and radiologically for at least one year to prove fusion occur at the pars defect with iliac crest bone graft impeded at that defect.

**Results:** Excellent results were achieved in 70% (7 patients with no pain return back to normal occupation and sports), 20% (2 patients had good outcome with occasional pain after strenuous activities with less sports), 10% (one patient had poor outcome with persistent pain and can’t return to occupation).

**Conclusion:** Pars repair with pedicle screw and v shaped rod technique is a good method for fusion of pars defect in isthmic spondylolysis as it preserves the motion segment without interruption with ligaments and discs. We are still in need of bigger studies on larger No. of cases to allow this method to be the alternative method for traditional fixation in the near future.

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#ESA Abstracts 20180113

**Severe AIS, Is Anterior Release Still Mandatory?**

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**Introduction:** The classic treatment of severe rigid adolescent idiopathic scoliosis (AIS) was performed by combined anterior and posterior surgery which carry higher morbidity to the patient. Recently, posterior only surgery using all pedicle screws has been used for treatment of severe AIS with many advantages over combined approaches. This study aims to evaluate the safety and effectiveness of high-density pedicle screws through posterior only approach in correction of severe cases of adolescent idiopathic scoliosis (AIS) with curves > 70°.

**Methods:** Between 2012 and 2014, fourteen patients were surgically treated for severe AIS with curves > 70° and were prospectively followed up for a minimum of 1 year (range 1-4 years). Major and minor curves Cobb angle as well as sagittal parameters were measured on whole spine X-rays. High density pedicle screws and multiple Ponte osteotomies were used in all patients. Five patients required asymmetrical pedicle subtraction osteotomy due to very rigid curve.

**Results:** This study included 14 patients (8 females, 6 males). The mean age at time of surgery was 17.4 years (range 14-24 years). The mean correction rate for the coronal Cobb angle of the major and minor curves was 73.7% and 68.7% respectively. The mean thoracic kyphosis angle was 44.2° preoperatively, 28.55° postoperatively and 28.1° at latest follow up. No cases of pseudarthrosis, metal failure or neurological deficits were encountered. One patient with asymmetrical PSO developed hemothorax that was managed with chest tube insertion and follow up.

**Conclusion:** High density pedicle screws through posterior only approach is a safe and effective method in treatment of severe AIS. It can achieve coronal curve correction comparable to combined anterior and posterior approaches without the morbidity of combined approaches. It also restores the sagittal profile leading to good functional outcomes and better quality of life.

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#ESA Abstracts 20180114

**First Results of a New Vacuum Plasma Sprayed (VPS) Titanium-Coated Carbon/PEEK Composite Cage for Lumbar Interbody Fusion**

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**Introduction:** The aim of this study was to assess the performance of a new vacuum plasma sprayed (VPS) titanium-coated carbon/polyetheretherketone (PEEK) cage under first use clinical conditions.

**Methods:** Forty-two patients who underwent a one or two segment transfornaminal lumbar interbody fusion (TLIF) procedure with a new Ca/PEEK composite cage between 2012 and 2016 were retrospectively identified by an electronic patient chart review. Fusion rates (using X-ray), patient’s satisfaction, and complications were followed up for two years.

**Results:** A total of 90.4% of the patients were pain-free and satisfied after a follow up (FU) period of 29.1 _ 39 months. A mean increase of 3.1° in segmental lordosis in the early period (p = 0.002) returned to preoperative levels at final follow-ups. According to the Bridwell classification, the mean 24-month G1 fusion rate was calculated as 93.6% and the G2 as 6.4%. No radiolucency around the cage (G3) or clear pseudarthrosis could be seen (G4).

**Conclusion:** In conclusion, biological properties of the inert, hydrophobic surface, which is the main disadvantage of PEEK, can be improved with VPS titanium coating, so that the carbon/PEEK composite cage, which has great advantages in respect of biomechanical properties, can be used safely in TLIF surgery. High fusion rates, good clinical outcome, and low implant-related complication rates without the need to use rhBMP or additional iliac bone graft can be achieved.

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#ESA Abstracts 20180115

**The Sagittal Thoracic Modifier Component of the Lenke Classification System in Moderate and Severe Adolescent Idiopathic Scoliosis. (Reliability and Reproducibility of Measurements Among 5 Observers)**

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**Introduction:** As the importance of the spinal sagittal profile becomes increasingly evident, there is a need to ensure that the measuring methods used to evaluate TK are both accurate and reproducible. As such, the objective of the following study was to determine the intra-observer and interobserver variability of measurement of the sagittal profile in moderate and severe thoracic scoliosis.

**Methods:** Five experienced Faculty spine surgeons independently reviewed thirty standing long 30-inch cassette lateral radiographs of preoperative moderate and severe curves ≥ 50 of adolescent idiopathic scoliosis (AIS) patients on two different occasions. The parameters measured were the vertebral endplate clarity and measurability of the sagittal angle from D5 – D12.
Results: The interobserver percentage of agreement for the Sagittal modifier was 58% in both trials. The mean kappa coefficient value was only moderate 0.43 (range, 0.14 – 0.66) for both trials. The number of vertebral endplates that were difficult to identify was 201 out of 300 measurements (67%). There was a predominance of difficulty to identify vertebral endplate clarity in all kyphotic curve types.

Conclusion: The results of this study yielded poor to moderate interobserver reliability of the Sagittal profile component of the Lenke classification system in moderate and severe AIS and was attributed to the difficulty in identification of the vertebral endplates. The current sagittal radiograph routinely used in AIS with moderate and severe thoracic scoliosis patients, has inherent difficulties and limitations. To visualize, identify and analyze thoracic endplate.

### ESA Abstracts 20180116

Unfavorable Radiological Outcome with PEEK Cages in Posterior Lumbar Interbody Fusion (PLIF)

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Introduction: Few recent reports had revealed end plate abnormalities due to PEEK cages. The aim of the current study was to investigate the interobserver variability in a comprehensive assessment of end plate changes after PEEK cages in PLIF.

Methods: A retrospective CT-based analysis of end plate cavities and fusion status following PLIF with PEEK cages by two independent observers. Vertebral endplate cavities were assessed according to the size, multiplicity, location, and presence or absence of sclerosis.

Results: There were 86 fixed levels in 65 consecutive patients, with a mean age of 35.44 ± 19.60 years. The mean follow up was 16.5 months ± 10.1 (6- 57 months). The overall rate of definite fusion was seen in 56 levels (65.12 %) by observer 1, versus 44 levels (51.16) by observer 2. The strength of agreement was moderate.

The prevalence of end plate cavities was observed in 42 levels (48.84 %) by observer1, versus 47 levels (54.65 %) by observer, with a fair agreement. The strength of agreement for the locations, multiplicity and size were moderate, fair, and poor respectively.

Conclusion: There is high rate of unfavorable radiographic findings in the form of end plate cavities in PLIF cases with a PEEK cage, which may affect the interbody fusion. The interobserver agreement of the cavities characteristics was only poor to moderate.

Attempts should be made to improve the stability, biocompatibility and osteointegration of the PEEK cages. A better universal classification for end plate changes morphology and characteristics after PEEK cages should be made.

### ESA Abstracts 20180117

The Role of Combined Posterior and Anterolateral Retropertitoneal Approach in the Treatment of Posttraumatic Burst Lumber Fractures

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Introduction: Combined posterior and anterolateral retropertitoneal approach is very important for treatment of unstable burst lumbar fractures with retro-pulsed fragments for the following reasons; 1) spinal canal decompression to facilitate neurological recovery 2) anterior column reconstruction and restoration of alignment 3) prevention of progressive post-traumatic deformity 4) early ambulation and rehabilitation due to rigid fixation 5) avoid long segment fixation. This retrospective clinical case series aims to evaluate the role of combined posterior and anterolateral retropertitoneal approach in treatment of unstable burst lumbar fractures.

Methods: This study included 41 patients with unstable lumber burst fractures with retro-pulsed fragment. Frankle scale and Denis’ pain scores were used to evaluate the functional outcome among our patients. All patients were surgically treated using combined posterior and anterolateral retropertitoneal approach in the same operation. They were followed for one year post-operatively.

Results: All patients were operated in prone position by using combined posterior and anterolateral retropertitoneal approach. Posterior decompression, fusion and anterior decompression and reconstruction by titanium mesh were done for all cases. As regards Frankle scale and Denis’ pain scores, the functional state of all patients improved after surgery during the period of follow-up (one year). According to Frankle scale score; Frankle C in 18 patients (43.9%), Frankle E was present in 16 patients (39%), Frankle B in 7 patients (17.1%) with a significant improvement in patients’ scores post-operatively compared to pre-operative ones (P value=0.001). Denis pain score revealed that; P5 (severe) was present in 20 patients (48.8%), P4 (moderate to severe) in 17 patients (41.5%) and P3(moderate) in 4 patients (9.8%), with a significant improvement in patients’ scores post-operatively compared to pre-operative scores (P value=0.001). Visceral manifestations were present in 16 cases (39.6%) with complete improvement post-operatively except for two cases. Unintended durotomy occurred in 6 cases treated by stitching using absorbable sutures and fat graft. Wound infection was present in two cases treated by antibiotics and daily dressing. A solid fusion was achieved in all cases.

Conclusion: Combined posterior and anterolateral retropertitoneal approach is feasible and effective in surgical exposure and treatment of unstable burst lumber fractures with retro-pulsed fragments.