Saudi Spine Society
1st Annual Conference Proceedings

December 17-19, 2017
Riyadh, Saudi Arabia
Introduction

On behalf of the Scientific Committee of the Saudi Spine Society first annual conference, we are pleased to present to you this wonderful work from a group of researches. These abstracts were accepted as podium or posters to be presented during the conference on 17-18 December, 2017. The abstracts were carefully reviewed by independent experts of researchers and they were chosen out of a hundred abstracts.

Please enjoy going through these 70 abstracts that were chosen. We are sure that you will find them of great value as they will definitely highlight important aspects in our spine practice.

We are looking forward for having more abstracts submission in the coming years. Together, the Saudi Spine Society will be the leading society in the region to promote evidence based spine practice.

Sami Al Eissa
President, Saudi Spine Society

Khaled AlAssiri
Chairman of the Scientific Committee
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Podium Abstracts
Abstract 1. A randomized superiority study of anular closure for lumbar discectomy: the initial German experience

Senol Jadik 1*, Stefan Rath 2*, Martin Barth 3*, Aldemar Hegewald 4*, Richard Bostelmann 5*, Peter Douglas Klassen 6*

* Department of Neurosurgery. 1 Universitätsklinikum Schleswig-Holstein, Campus Kiel. 2 Klinikum Deggendorf. 3 Universitätsklinikum Bochum. 4 Universitätsmedizin Mannheim. 5 Universitätsklinikum Düsseldorf. 6 St. Bonifatius Hospital, Lingen.

Introduction: Lumbar discectomy is a well-indicated procedure with good acute outcomes, but longer-term results are less positive. Recurrent herniation is a particular problem, with influencing factors including patient demographics, anular defect size and surgical technique. Patients with large anular defects reherniate at rates of 18-27% at two years. Closing the anular defect at the time of discectomy may allow for maintenance of more nucleus without the added risk of reherniation.

Objectives: We report the initial safety results from German centers participating in a multi-national randomized superiority study of lumbar discectomy with and without an anular closure device (ACD).

Methods: Between December 2010 and October 2014, patients were enrolled in six European countries in an RCT comparing lumbar discectomy with and without an ACD. Randomization was performed 1:1 intra-operatively, following limited discectomy. Key inclusion criteria include leg pain and ODI ≥40/100 and minimum 6 weeks conservative care. Key exclusion criteria include prior index-level surgery. All patients are followed at 6 weeks, 3 and 6 months, and annually until the last patient reaches 24 months.

Results: 554 patients were enrolled at 20 sites in Europe; almost half (243 or 44%) at 10 German sites. 93% of patients have been followed at 6 months, and the mean latest follow-up is 25 months with follow-up ongoing. The frequency of symptomatic reherniation was lower with ACD (5,1% vs. 21,6%, P<0.001). There were 11 reoperations in 10 patients in the ACD group and 33 reoperations in 23 control patients, with the majority of the increase due to reherniation (ACD: 3; Control: 21). The overall rates of AEs that were either device- or procedure-related were similar between ACD and Control.

Conclusion: In patients at high risk of herniation recurrence following lumbar microdiskectomy, anular closure with a bone-anchored implant lowers the risk of symptomatic recurrence and reoperation. The future research is based on the use of the anular closure in clinical practice and to become a standard of care in treating patients with lumbar disk herniation.

Ethical Approval: Ethic commission University of Christian Albrechts University Kiel

Acknowledgement: Intrinsic Therapeutics; ClinicalTrials.gov number, NCT01283438

Funding: Intrinsic Therapeutics; ClinicalTrials.gov number, NCT01283438

Abstract 2. Comparison of the Accuracy of Lumbar Pedicle Screw Insertion Using Intraoperative Computed Tomography Guided Navigation System and Conventional Fluoroscopy Method: A Prospective Clinical Study

Saleh Baeesa, Mohamed M. Alfiky, Ashwag Alqurashi, Mohamad Bakhaidar

King Abdulaziz University, Jeddah, Saudi Arabia.

Introduction: The accuracy of transpedicular screws placement has been the subject of many studies. The development of CT-guided neuronavigation methods has been proposed to show a significant decrease in the number of malpositioned screws.

Objectives: To assess the accuracy of pedicle screw placement using intraoperative computed tomography integrated navigation and conventional fluoroscopy for lumbar degenerative spine disease.

Methods: We have conducted a prospective study from 1st of March, 2016 till 30th of April, 2017. We compared two groups of patients who underwent an instrumented lumbar fusion using transpedicular screws. We compared the first group that was operated under intraoperative CT-guided navigation system to another group who were operated using conventional fluoroscopy.

Results: Fifteen patients were included in the first group and 42 patients in the second group. The median age of the first group was 59.3 years old (27-76 years) versus 45 years old (20-60 years) in the second group. The number of screws was 98 in the first
group and 220 screws in the second group. Degenerative spine disease was the most common indication for surgery in the first group (80%), followed by trauma (13.3%) and Infection (6.7%). In the second group, degenerative spondylolisthesis was the indication in 39 patients (92.86%) followed by traumatic fractures in 3 patients (7.14%). The number of accurate screws in the second group was found to be 157 screws (71.4%). None of the first group had to undergo any postoperative revisions. On the other hand, two patients of the second group developed new postoperative symptoms related to displaced screws and required surgery.

**Conclusion:** Intraoperative CT-guided navigation system has been showed to lead to a significantly more accurate placement of screws. Although statistically significant, the improvement in accuracy needs to be justified with cost-benefit analyses. In addition, looking at improvements in pain scoring, surgical outcomes and hospital stay with neuronavigation are warranted.

**Ethical Approval:** Ethical approval was obtained.

**Acknowledgement:** None.

**Funding:** None.

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**Abstract 3. Anatomical and technical factors associated with superior facet joint violation in lumbar fusion.**

Alisson R. Teles 1, Michael Paci 2, Gabriel Gutman 2, Fahad H. Abduljabbar 3, Michael H. Weber 1, Jean Ouellet 1, Jeff D. Golan 2

1 McGill Scoliosis and Spine Group, McGill University Health Centre, Montreal, Quebec, Canada. 2 Department of Neurosurgery, McGill University Health Centre, Montreal, Quebec, Canada. 3 Department of Orthopedic Surgery, King Abdulaziz University, Jeddah, Saudi Arabia.

**Introduction:** Cranial facet joint violation has been an underappreciated consequence of pedicle screw placement in the lumbar spine. Injury of the facet joint at the level adjacent to a fusion is associated with alteration in the load-bearing capability of the segment leading to accelerated degeneration of the joint, and ultimately adjacent-segment disease. The influence of the anatomy of the superior level in this complication is not well defined. Some authors have suggested that this complication could be more prevalent in lower levels of the lumbar spine (i.e. L4 and L5). However, to the best of our knowledge, no study identified the influence of anatomical variability of the facet joints in the occurrence of breach.

**Objectives:** To evaluate the anatomical and surgical risk factors for screw-related facet joint violation at the superior level in lumbar fusion.

**Methods:** A retrospective review of consecutive series of lumbar fusion performed by a single surgeon. Inclusion criteria was primary lumbar fusion of 1 or 2 levels for degenerative disorders. The following variables were analyzed as possible risk factors: surgical technique (percutaneous versus open screw placement), depth of surgical field, degree of anterior slippage of the superior level, pedicle and facet angle, and facet degeneration of the superior level. The postoperative CT was evaluated by two independent reviewers. Axial, sagittal, and coronal views were reviewed and pedicle screws were graded as intra-articular if they clearly interposed between the superior and inferior facet joints of the superior level. Multivariate logistic regression analyses were conducted to assess the factors associated with this complication.

**Results:** 131 patients were included. Inter-observer reliability for facet joint violation assessment was high (Kappa = 0.789). The incidence of superior facet joint violation was 12.59% per top level screw (N = 33 / 262). The rate of facet violation was 28.0% in MIS group (n = 14/50) and 12.3% in open group (n = 10/81), OR: 2.26; CI95%: 1.09 – 4.21; P = 0.024. In logistic regression analysis, independent predictors of facet violation were percutaneous screw placement (Adjusted OR: 3.31; CI95%: 1.42 – 7.73; P = 0.006), right side pedicle screw (Adjusted OR: 3.14; CI95%: 1.29 – 7.63; P = 0.011), and facet angle greater than 45 (Adjusted OR:10.95; CI95%: 4.64 – 25.84; P<0.0001).

**Conclusion:** This study confirms the hypothesis that percutaneous screw placement is associated with higher likelihood of facet joint violation at the superior level in a lumbar fusion. Most importantly, we identified that the anatomy of the joint plays a major role in the occurrence of this complication. Coronal orientation of the facets is a major risk factor for violation during pedicle screw placement. Adoption of fluoroscopic oblique views during per-
Abstract 4. Comparing outcomes between back pain dominant and leg pain dominant patient complaint in fusion surgery for adult isthmic spondylolisthesis
Nabeel Radhi Alnaghmoosh 1, Chris Bailey 2
1 Department of Neurosurgery, Dammam Medical Complex, Saudi Arabia. 2 Spine Unit, University of Western Ontario, Canada

Introduction: The Canadian Spine Society Registry were Reviewed. Patients were stratified according to their chief complain as radicular pain (RP) predominant or Low Back Pain (LBP) predominant

Objectives: Primary aim of this study was to compare long-term pain relief and quality of life in patients with isthmic spondylolisthesis (IS) according to their predominant pain location (radicular pain vs. back pain) who underwent posterior fusion

Methods: Patient characteristics, clinical outcome were compared between groups. Numeric Pain Rating Scale (NPRS), Oswestry Disability Index (ODI), Physical Component Summary (PCS) and Mental Component Summary (MCS) were used.

Results: 136 patients who were diagnosed with IS were included according to the inclusion/exclusion criteria. 87 (64 %) patients had predominant RP and 49 (64 %) had predominant LBP. Preoperative Back pain NPRS were 7.7± 1.5, 7.1 ± 2.1 for the LBP and LP groups respectively (p = 0.083). Preoperative Leg pain NPRS were 5.9 ± 2.6, 7.6 ± 1.7 for the LBP and LP groups respectively (p = 0.00001). There was no significant difference in outcome between the two groups in postoperative NPRS, ODI, PCS and MCS in long term follow up.

Conclusion: There was no significant difference in the outcome in patients with isthmic spondylolisthesis (IS) according to predominant pain location (leg pain vs. back pain) who underwent posterior fusion.

Ethical Approval: University of Western Ontario - Human Research Ethics
Acknowledgement: None declared.
Funding: None declared.

Abstract 5. Interlaminar discectomy in lumbar disc herniation: surgical experience and results
Ashraf Ahmad Elzarief
Faculty of Medicine, Cairo University, Egypt

Introduction: Interlaminar approach for lumbar Discectomy is a less invasive technique that allows accessibility to a herniated disc via resection of ligamentum flavum either partially or totally with preservation of other structures leading to better spinal stability

Objectives: To evaluate interlaminar discectomy in terms of accessibility, safety and clinical outcome.

Methods: This is a prospective study including 64 cases of lumbar disc herniation operated between August 2012 and February 2015. All cases were subjected to lumbar discectomy via interlaminar approach. Surgical technique based on resection of ligamentum flavum either unilateral or bilateral with foraminotomy before disc extraction. Patients were follow up for a period ranged from 3 to 18 months.

Results: Adequate exposure of herniated discs and involved roots obtained in 61 cases where partial laminectomy was need in 3 cases. In these 3 cases, the herniated disc showed cephalic migration. Bilateral resection of ligamentum flavum was done in 11 cases. All cases presented with sciatica showed excellent post-operative improvement, cases with foot drop showed no improvement. Early ambulation was done in all cases.

Conclusion: Interlaminar approach in lumbar discectomy is a safe and effective technique providing excellent accessibility in the majority of cases -even with higher levels like L3-4- with less post-operative back pain and early ambulation. Cases with cephalic migration of the herniated discs needs partial laminectomy

Ethical Approval: All patients signed a consent, allowing us to use their medical data in scientific research.
Acknowledgement: Prof.Dr. Algohary M. Algohary,
Abstract 6. The effectiveness of stabilization exercises in treating patients with chronic low back pain: a systematic review

Sultan Abdullah Alzubeidi
King Salman Military Hospital, Tabuk, Saudi Arabia

Introduction: Chronic low back pain is one of the biggest health problems around the world. It is considered as one of the main causes of disability, high medical expenses. Chronic low back pain can be treated indifferent ways. However, the efficacy of most of these treatments has not been studied so medical intervention for chronic low back pain varies widely. Stabilization exercise is one form of physiotherapy treatment recommended in some guidelines. However, there is an argument about the effectiveness of this intervention.

Objectives: This systematic review aimed to investigate the effectiveness of stabilization exercises on patients with chronic low back pain and disability.

Methods: An online research through the electronic databases, such as Ovid, Medline, CINHAL, Google Scholar, Cochrane library, Pedro database and PubMed was conducted. Citation searches within studies, as well as online tracking of references were also conducted in this review.

Results: Twenty studies met the inclusion criteria. Seventeen studies were randomized controlled studies; one was a study case series, one a cohort study, and one a comparative study. The most outcome measures among the studies were pain (numerical pain rating scale, visual analogue scale and short-form McGill pain scale) and disability (Ronald & Morris disability questionnaire and Oswestry disability questionnaire). The results show significant changes between the studies in terms of pain and disability. However, there is moderate evidence about effectiveness of the stabilization exercises for long term sufferers (>6 months).

Conclusion: Using stabilization exercises on patients with chronic low back pain is helpful to reduce pain and disability. However, there is no preference for this intervention over other physiotherapy interventions.

Ethical Approval: No ethical approval was needed.

Acknowledgement: None declared.

Funding: None.

Abstract 7. Pain intensity and fear avoidance explain disability related to chronic low back pain in a Saudi Arabian population

Dalia M Alemam 1,3, Niamh Moloney 2, Andrew Leaver 1, Hana I Alsobayel 3, Martin G. Mackey 1
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Introduction: Chronic low back pain (CLBP)-related disability is a multidimensional phenomenon, the role of psychosocial risk factors have been extensively examined (1, 2). There is growing interest in exploring psychosocial risk factors and CLBP-related disability in Saudi Arabia but research is limited in comparison to other countries.

Objectives: The aim of this study was to describe multi-dimensional profiles for people with chronic low back pain and to examine the associations between CLBP-related disability and individual, psychosocial and physical factors in a Saudi population.

Methods: Study design. A cross sectional study. Participants completed a suite of questionnaires including: demographic questionnaire, Oswestry Disability Index, Visual Analogue Scale, Back Beliefs Questionnaire, Fear-Avoidance Beliefs Questionnaire, Depression Anxiety Stress Scale and International Physical Activity Questionnaire. Participants also performed a standardized sequence of physical performance tests and the Pain Behaviour Scale was used to evaluate pain behaviours during performance of these tests. The relationships between disability and all variables were explored using Chi square tests & Pearson correlation coefficients. Potential risk factors were assessed using univariate & multivariate regression analysis.

Results: In univariate analyses, pain intensity and fear avoidance beliefs (physical activity and work) were moderately associated with disability(r= 0.56, 0.49, 0.52, respectively, p < 0.001). Psychological distress, back beliefs and severity of pain behaviours were weakly associated with disability (p
< 0.001). Participants’ age, body mass index (BMI), expectation about problematic LBP in the future, and severity of leg pain were also weakly associated with disability. Multivariable regression revealed that pain intensity, fear avoidance beliefs, psychological distress and participants’ age were all found to be associated factors of disability, accounting for 52.9% (adjusted R2= 0.529) of variability.

**Conclusion:** This study provides a unique insight into the clinical profile of people with CLBP in a Saudi Arabian population. To our knowledge this is the first study that explores different aspects of CLBP-related disability among Saudi, which indicated moderate disability level. This study supports the contention that CLBP-related disability is a multifactorial biopsychosocial condition. Implication. Pain intensity and fear avoidance beliefs have emerged as important contributors to disability in Saudi population. This result should encourage the researchers and health care practitioners to consider these factors for effective chronic pain management.

**Ethical Approval:** Ethical approval for this study was granted by The University of Sydney Health Science Research Ethics Committee (2015/771) and King Fahad medical city Ethics Committee (15-306E).

**Acknowledgement:** The authors are grateful to Caro Badcock for the statistical advice from the University of Sydney.

**Funding:** This research was funded by a scholarship grant from King Saud University.

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**Abstract 8. People with severe disability had negative beliefs about back pain**

Samia A. Alamrani 1, Ali H. Alnahdi 2, Hana I. Alsbayel 2

1 Department of Health Rehabilitation Science, College of Applied Medical Science, University of Tabuk, Tabuk, Saudi Arabia. 2 Department of Health Rehabilitation Science, College of Applied Medical Sciences, King Saud University, Riyadh, Saudi Arabia

**Introduction:** People with low back pain (LBP) experience persistent pain and significant disability. Despite the increasing acceptance of a biopsychosocial approach in the treatment of Low Back Pain,
Abstract 9. Efficacy of pulsed electromagnetic field on pain and function in chronic mechanical neck pain: a randomized controlled trial

Mohamed S Alayat 1, Mohamed M Ali 2, Amir A El Fiky 3, Mansour A Alshehri 4
1 Department of Basic Science, Faculty of Physical Therapy, Cairo University, Egypt. 2 Department of Orthopedic Physical Therapy, Faculty of Physical Therapy, Cairo University, Egypt. 3 Physical Therapy for Neurological Disorders and its Surgery, Faculty of Physical Therapy, Cairo University, Giza, Egypt. 4 Physiotherapy and Rehabilitation Department, Faculty of Applied Medical Sciences, Umm Al-Qura University, Makkah, Saudi Arabia.

Introduction: Mechanical neck pain (MNP) is a common neck disorders affecting middle-aged population. Magnetotherapy is considered as a safe and non-invasive physical therapy modality used in the treatment of musculoskeletal pain.

Objectives: The aim of this study was to investigate the effect of PEMF on pain and functional improvement in chronic MNP.

Methods: A total of 60 male patients participated in this study. Their mean age, weight, height, body mass index (BMI) and duration of illness were 23.03 (2.239) years, 63.43 (5.195) Kg, 1.662 (5.1092) cm, 22.98(1.879) Kg/m2, 4.483(1.228) months respectively. They were randomly assigned in to two groups. Group I (30 Patients) was treated with PEMF plus exercises (PEMF+EX) group and group II (30 Patients) treated with placebo magnetic plus exercises (PL+EX) group. Exercise program included active range of motion, muscle stretching and strengthening exercises applied two sessions/week for 6 weeks. PEMF was applied with 20 Hz, 0.8 mT for 20 minutes two sessions/week for 6 weeks. Pain level was measured by visual analog scale (VAS) and neck functions were measured by neck disability index (NDI). The level of significance was set at p< 0.05.

Results: Wilcoxon matched-pairs signed-ranks test revealed significant differences in VAS and NDI in PEMF+EXand PL+EX groups (p <0.0001). Mann-Whitney (MW) Test showed significant decrease in VAS and NDI scores both treatment (p <0.0001) with more significant decrease in PEMF group than PL+EX group.

Conclusion: PEMF combined with exercise was effective more than exercises alone in decreasing the scores of VAS and NDI in Chronic MNP.

Ethical Approval: The University’s Ethics in Research Committee (local registry number 43409007), Umm Al-Qura University, approved the study.

Acknowledgement: None declared.

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Ahmed Alalawi 1, Nicola Heneghan 2, Anneli Peols-son 3, Alison Rushton 2, Gunnel Peterson 3, Maria Ludvigsson 3, Alessandro Schneebeli 4, Marco Barbe-ro 4, Deborah Falla 2.
1 Umm Al-Qura University, Department of Physiotherapy, Makkah, Saudi Arabia. 2 University of Birmingham, School of Sport, Exercise and Rehabilitation Sciences, Birmingham, United Kingdom. 3 Linköping University, Department of Medical and Health Sciences, Linköping, Sweden. 4 University of Applied Sciences and Arts of Southern Switzerland, Department of Business Economics, Health and Social Care, Manno, Switzerland.

Introduction: Widespread pain, extracted from the patient’s pain drawing, was observed in patients with whiplash-associated disorders (WAD). However, the significance of larger pain extent for predicting the response to exercise has not been examined, although expanded distribution of pain is considered a sign of central sensitization, which may affect prognosis.

Objectives: The aim of this study was to investigate whether pain extent together with other self-reported features prior to participation in a neck-specific exercise intervention, were associated with ongoing pain and disability one and two years after the intervention.

Methods: A secondary analysis of a randomised controlled trial of 140 participants with chronic WAD was conducted. Subjects completed questionnaires about neck pain and disability which measured by Neck Disability Index (NDI), quality of life, psychological features, and pain drawings to quantify their pain extent. Participants then completed a 12-week
of exercise intervention and the results between the initial predictors and neck disability post-intervention was examined at one and two years, utilizing a multiple regression analysis.

**Results:** Seventy percent of the cohort were women with a mean age of 38.7 years, a baseline NDI score of 32.7 and a baseline pain extent of 6.8%. The regression models accounted for 31% and 25% of the variance in NDI scores at the one-year ($p < 0.001$; 95% CI: 0.34 – 1.13) and two-year ($p=0.034$; 95% CI: 0.04 - 1.06) follow-ups, respectively.

**Conclusion:** These results indicated that pain extent was partially predictive of medium and long term neck pain and disability following a neck-specific exercise with or without a behavioural approach in individuals with chronic WAD. These results provide an initial indication of the value of using pain drawings to predict outcomes in patients with chronic WAD.

**Ethical Approval:** The Regional Ethics Committee of Linköping, Sweden, and the University of Birmingham School of Sport, Exercise and Rehabilitation Sciences and the Ethics, Health and Safety Committee of the United Kingdom approved the study, which was conducted according to principles of the Declaration of Helsinki.

**Acknowledgement:** None declared.

**Funding:** None declared.

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**Abstract 11. Effect of stabilization exercise on back pain, disability and quality of life in adults with scoliosis: a systematic review**

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1 Department of Physical Therapy, Prince Sattam bin Abdulaziz University. 2 Department of Physical Therapy, University of Alberta.

**Introduction:** Adult Scoliosis (AS) is the most common spine deformity in the adult population. Back pain is the main symptom that leads patients to seek medical consultation. Stabilization exercise has been reported to be effective in reducing back pain but the literature has not been reviewed to examine the effects of such exercises on back pain, disability or quality of life in adults with scoliosis.

**Objectives:** To evaluate the effect of stabilization exercise on back pain, disability and quality of life in adults with scoliosis.

**Methods:** We conducted a systematic search in the following databases from inception up to March 9, 2017: Medline (OVID), CINAHL (EBSCO), Embase (OVID), SportDiscus (EBSCO) and Cochrane Central Register of Controlled Trials (CENTRAL). Selection criteria were as follows: Randomized controlled trials (RCTs), prospective controlled clinical trials, and retrospective controlled studies that compared core stabilization exercise to placebo, no treatment or any other type of treatment. Participants had to be diagnosed with AS and be 18 years of age or more. Studies with participants presenting any torso or lower extremity surgery, any injection in the last six months, any comorbidity that could affect the spine, red flag signs or with a history of spine trauma were excluded.

**Results:** We found 908 references, resulting in 630 articles after excluding duplicates. After screening the titles and abstracts, only 105 articles were included for full-text screening. A total of 98 full-text articles could be retrieved. Only one article fit the selection criteria and was included in this review. The main reasons for exclusion were study design and patient population. The included study presented a low risk of bias for all criteria except blinding. Authors also did not report if the timing of assessments was similar between groups.

**Conclusion:** This review provided limited evidence from this high risk of bias study that stabilization exercise (one 60-min session/week for 20 weeks of exercises developing motor control of the spine and pelvis) is effective for reducing back pain, disability and improving quality of life in adults with scoliosis. However, this review highlights the paucity of literature examining the effect of exercise on back pain in adult with scoliosis and strongly suggests that further experimental research is needed.

**Ethical Approval:** Ethical approval is not applicable. The protocol for this review is available in the PROSPERO database (CRD42017060805).

**Acknowledgement:** The authors would like to express their thanks to Dr. Sanja Schreiber for her help with covidence and the search and Liz Dennett our librarian for the search.

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Abstract 12. The role of melatonin and estrogen genes on the pathogenesis of adolescent idiopathic scoliosis. a review article
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Introduction: Idiopathic Scoliosis (IS) is the commonest spinal deformity that affect healthy children. Genetic factors are thought to play a role in the etiology of this condition, along with other factors. The occurrence of the condition in twins, its early onset, and its familial predilection all support the possibility of an underlying genetic cause. Over the years many studies were published looking at some candidate genes and their relationship with the pathogenesis of IS. Some of the most studied genes are estrogen and melatonin genes due to the observation that IS progression coincides with puberty for the former and that rats and chicken with low melatonin levels developed spinal deformity for the latter.

Objectives: The purpose of this review article is to extensively review the published studies that looked at the association of estrogen and melatonin genes and pathogenesis in IS, emphasizing the strength, weakness, and the results of each publication and to serve a

Methods: PubMed, Medline, Ovid, ProQuest, Science direct databases were searched from inception using the following keyword search string: (Adolescent idiopathic scoliosis OR familial idiopathic scoliosis) AND (estrogen receptor gene OR melatonin receptor gene). Reference lists of included studies were inspected for additional relevant studies. Language was restricted to English only. No publication date restriction. The last electronic search was performed on February 19, 2017

Results: None of the melatonin receptors 1A (MTNR1A) studies found an association with AIS predisposition or severity. Melatonin receptors 1B (MTNR1B) showed significant association only on pooled analysis of a large 2 stage study, and may contribute to the occurrence of AIS when synergizing with other candidate genes. Two articles found a significant association with xbal site on Estrogen receptors 1 (ESR1), and only one study found significant polymorphism in pvull site of the same gene. Alul site on Estrogen receptors 2 (ESR2) gave positive results in one study only. And random sites on the G-protein coupled receptor gene (GPER) was associated with AIS in one study. Although many researchers support this theory, studies kept on showing negative results in different populations with different sample sizes.

Conclusion: Estrogen receptor genes show more promising results, melatonin receptor studies were insufficient. More studies need to be conducted on the two receptor genes, in similar approaches. Only specific region samples have been studied, Larger populations with different ethnic background should be studies as different results may be obtained. To our knowledge, there were no studies conducted in the middle east on estrogen nor melatonin receptor genes. Candidate loci and other loci in these two genes should be studied on a middle eastern sample.

Ethical Approval: Not applicable.
Acknowledgement: None declared.
Funding: None declared.

Abstract 13. Role of anterior cervical disectomy and fusion in cervical caries spine
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Introduction: A number of pathologies can cause compression on the cervical cord resulting in different types of neurological signs and symptoms. Most common pathologies are trauma and caries followed by degenerative and metastatic or primary bone lesions.[1,2] Although the main symptoms of cervical spine tuberculosis are pain and limitation of cervical movements, compressing factors (pus, destructed vertebrae, granulation tissues) can cause the major problems of spinal tuberculosis like spinal deformity and neurological impairment.[3] Anterior cervical corpectomy offers the most direct approach for neurological decompression and effective reconstruction of weight bearing vertebral column, stabilization and reconstruction of the cervical spine. [4,5]. Anterior cervical fusion with plate fixation provides immediate stabilization, reduc-
es the risk of graft displacement, promotes higher fusion rates and obviates the need of prolonged postoperative immobilization thus allowing early return to normal activities. [6,7] The ultimate aim of any spinal surgery is improvement in neurological status of the patient, alleviation of pain and early rehabilitation. [6] This is achieved by adequate de-compression of the neural tissues, mechanical stabilization of the spine and bony fusion. [8]

**Objectives:** To assess neurological status of patients with cervical spine caries after anterior cervical decompression fusion and plating in terms of muscle power measured by MRC grade and functional status measured by Nurick's grade.

**Methods:** Design- Descriptive case series Sample size- 36 patients included meeting inclusion criteria Sampling technique-Non probability purposive sampling Outcome measure used-MRC grade and Nurick's grade preoperatively and postoperatively

**Results:** As compared to pre-operative MRC grades on every post-perative follow-up period, the muscle power had increased substantially with p<0.001 every time. The minimal power (pre-operative) was 2.7 on an average which had increased to 4.4 on the last follow up (6 month). On every increase in post-operative day there was positive increase in muscle power (positive correlation). As compared to pre-operative Nurick's grade on every post-operative follow up time, there was increase in Nurick's grade (0 being the best and 5 being the worst grade). Pre-operatively average Nurick's grade was 4.3 which on last follow up were 2.3, but still none of the patient got the grade of 1 or 0. In terms of pre-operative status all follow up improvements was statistically significant by correlation studies (p<0.001).

**Conclusion:** Anterior Cervical Fixation is common procedure in Neurosurgical practice. This procedure is relatively easy and there is significant improvement in neurological status of the patient, pain relief and early rehabilitation. So this procedure. It is feasible, cost effective, time bound to be conducted by junior Neurosurgeon.

**Ethical Approval:** Ethical approval was obtained from the university ethical committee of Advanced Research Board

**Acknowledgement:** With the grace of God, the study has been conducted under the guidance, continuous support and valuable suggestions in every stage. I would like to acknowledge Prof. Ashraf Shaheen, Head-department of Neurosurgery, KEMU for his valuable suggestions throu.

**Funding:** None declared.

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**Introduction:** Retrospective case cohort study done between 2002 and 2012. Overview of Literature: ACDF is the gold standard surgical treatment for cervical degenerative disease. The usual surgical practice is to use an anteriorly placed fusion plate with or without interdiscal cages.

**Objectives:** To assess the mid-term clinical and radiological outcomes of 1-level and 2-level anterior cervical discectomy and fusion (ACDF) with stand-alone trabecular metal cages.

**Methods:** Patients between 36 and 64 years of age diagnosed with cervical radiculopathy who underwent ACDF using stand-alone trabecular metal cages with at least 3 years follow-up were included in this study. Recorded clinical outcomes included residual axial neck pain, radicular arm pain, upper extremity weakness, and upper extremity altered sensation. Visual Analogue scores were also recorded. Fusion was assessed by lateral radiographs looking for bone breaching and radiolucent lines around the device at the latest follow-up.

**Results:** Ninety patients were included in the study. Fifty-one patients underwent 2-level surgery and 39 patients underwent 1-level surgery. Mean age was 44±10.4 years and mean follow-up time was 4.5±2.6 years. Patients reported excellent or good outcomes (90%), as well as improvements in axial neck pain (80%), radicular arm pain (95%), upper extremity weakness (85%), and upper extremity altered sensation. Visual Analogue scores were also recorded. Fusion was assessed by lateral radiographs looking for bone breaching and radiolucent lines around the device at the latest follow-up.

**Conclusion:** Anterior Cervical Fixation is common procedure in Neurosurgical practice. This procedure is relatively easy and there is significant improvement in neurological status of the patient, pain relief and early rehabilitation. So this procedure. It is feasible, cost effective, time bound to be conducted by junior Neurosurgeon.

**Ethical Approval:** Ethical approval was obtained from the university ethical committee of Advanced Research Board

**Acknowledgement:** With the grace of God, the study has been conducted under the guidance, continuous support and valuable suggestions in every stage. I would like to acknowledge Prof. Ashraf Shaheen, Head-department of Neurosurgery, KEMU for his valuable suggestions throu.

**Funding:** None declared.
spinal cord, which was treated with antibiotics. Recovery was complete at the 1-year follow up.

**Conclusion:** Mid-term results show that surgical treatment with ACDF with trabecular metal cages is a safe and effective treatment of single and 2-level cervical disc radiculopathy and neck pain.

**Ethical Approval:** Approved by the Ethical Committee at Cheltenham General Hospital, UK

**Acknowledgement:** Cheltenham General Hospital, UK

**Funding:** None declared.

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**Abstract 15. Spinal brucellosis: national prospective and ten year experience of a tertiary medical city in Saudi Arabia**

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**Introduction:** Brucellosis is an endemic disease especially in Middle East and Mediterranean region. Saudi Arabia had the highest incidence rate in the middle east until late 1990s when the government started aggressive eradicate programme. In spite of these efforts, ministry of health register more than 37000 case between 2004 and 2012.

**Objectives:** Up to our knowledge no study was publish from Saudi Arabia except sporadic case reports, in spite of high number of cases. We are aiming to retrospectively review all spine brucellosis cases, their clinical presentation, radiological appearance and the ou

**Methods:** This is A retrospective study conducted in King Abdulaziz Medical City, Riyadh, Saudi Arabia. Eighty patients with spinal brucellosis during a period of 10 years (2005–2015) were included. Diagnosis was based on clinical presentation, laboratory findings, radiographic evidence. The Brucellar etiology was considered when seroagglutination tests were positive at a titer of 1/160 or higher, and/or Brucella spp were isolated in the blood or sample cultures.

**Results:** The mean age of patients was 58.1 years (60 males, 20 females). Back or neck pain (90% of patients), fever (75%), and sweats (45%) were the most common symptoms. Cultures of blood specimens from twenty patients (25%) were positive for Brucella. Twenty patients (25%) had motor weakness or paralysis. Epidural masses, paravertebral masses and psoas abscesses were detected in 80%, 70% and 35% of patients, respectively. The lumbar vertebra was the most frequently involved region with 68 cases (85%), followed by 4 cases in the thoracic (5%), 4 cases cervical (5%) and 4 cases in lumbosacral (5%) segments. There were no deaths or severe deterioration in this study.

**Conclusion:** Brucellar spondylitis should be considered in patients with back pain and fever in Saudi Arabia. This will enhance early detection and diagnosis of spinal brucellosis. Therefore, early management carry a better outcome. Clinical presentation, laboratory finding, and radiological examinations help to confirm the diagnosis of spine involvement.

**Ethical Approval:** This study was approved by King Abdullah International Medical Research Center (KAIMRC) with approval No. RC16/048/R

**Acknowledgement:** None declared.

**Funding:** None declared.

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**Abstract 16. Assessment of spinal cord motion using MRI CINE-FIESTA Protocol**

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**Introduction:** Spinal cord motion (SCM) is related to pulsatile arterial blood flow. The assessment of SCM has several clinical implications. A completely free spinal cord on intraoperative ultrasound was found to correlate with better outcome. Furthermore, detailed knowledge on SCM motion is necessary in the assessment of accurate radiation therapy to the spinal cord. However, characterization of SCM in healthy individuals is not clear. Magnetic resonance imaging (MRI) has the potential for advancing the understanding of SCM in healthy and
diseased subjects. Few reports examined the value of MRI to characterize SCM.

Objectives: The aim of the current study is to investigate healthy volunteers for cervical and thoracic SCM.

Methods: SCM was examined in 23 healthy volunteers (10 males, 13 females; mean age 31 ± 10 years) with no history of neurologic disease or any comorbidity. The volunteers underwent MRI (Cine-FIESTA sequence) of the cervical and thoracic spine. SCM was examined at three levels (upper-mid-lower) of the cervical and thoracic region. The SCM was assessed at different directions including anteroposterior (AP), transverse (TR), and superior-inferior (SI). Quantitative assessment of SCM was done using an image processing software (Fiji). The spinal level that marks the inferior end of the spinal cord was assessed.

Results: Considering all levels, the mean magnitude for SCM in AP direction was less in the cervical region compared to the thoracic area (0.25 0.23 mm vs. 0.30 0.18 mm respectively, P=0.241, no statistical significant). SCM in SI direction for thoracic area was found significantly higher than the cervical spine (0.42 0.23 mm vs. 0.23 0.21 mm, respectively, P< 0.0001). The TR cervical SCM, however, was found to be minimal with a mean value of 0.18 0.12 mm. The maximum AP SCM occurred in the majority of the cases at the lower thoracic spine, with a mean value of 0.35 0.18 mm. Furthermore, the maximum SI SCM was also found in the mid thoracic spine, with a mean value of 0.44 0.26 mm. Interestingly, patient’s age was found to have a negative correlation with AP cervical SCM, (P= 0.043). In addition, with increasing patient weight, cervical SCM has increased in all the directions, AP (P= 0.017), TR (P=0.003), and SI (P=0.002). With increasing patient height, cervical SCM has increased in all the directions, AP (P=0.002), TR (P=0.003), and SI (P=0.010).

Conclusion: SCM was found to be variable from one patient to another and from one level to another. SCM was largest in the SI direction of the thoracic spine and mainly the lower part of the thoracic spine. Studying the normal SCM may advance our understanding of spinal cord physiology and aid in applied therapies and/or prognosis of different spinal cord illnesses.

Ethical Approval: All volunteers provided informed consent before enrollment in the study, which had been approved by the institutional human research ethics board at King Saud University.

Acknowledgement: None declared.

Funding: No funding received.

Abstract 17. Spinal trauma in Saudi Arabia: national study
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Prince Sultan Military Medical City, Riyadh, Saudi Arabia

Introduction: The short summary covers the following aspects, prevalence, causes, characteristics including acute and chronic management, prehospital care including out side care and transportation, stem cells and olfactory mucosa implantation, socioeconomic status and Recommendation with guidelines.

Objectives: To find out the incidence of spinal cord trauma at national level of Saudi Arabia and to optimize the treatment and results of transplantation of olfactory mucosa.

Methods: This study was approved by KASCT. Our results will be concluded as follows Early transport of patient, early surgery if needed, good outcome in olfactory mucosa transplant and rehabilitation facility.

Results: During this study 11805 medical records were analyzed of Spinal Trauma in Major hospitals of KSA and from traffic police and Red Crescent Emergency Division. Our epidemiology studies showed majority of ST patient were Saudi male of 16 to 30 years of age. Road traffic accident (RTA) was the main cause of permanent disability in these youths. The major number of RTA occurred in the month of Ramadan and relatively higher accidents on Thursday.

Conclusion: This study help us at national level to improve the medical care for the spinal trauma cases at every level from transportation of the patients from the sit of injury to the hospital. To improve the acute management, chronic management to help in rehabilitation and the results of stem cells implantation also including olfactory mucosa transplantation. All the above mentioned factors will be discussed during the lecture with facts and figures.
Abstract 18. An audit of spinal injuries at PMAH
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Introduction: The World Report on Road Traffic Injury Prevention indicates that by 2020, road traffic injuries will be a major killer accounting for half a million deaths and 15 million disability adjusted life years. Kingdom has one of the highest rates of spinal cord injuries in the world with 62 people injured per 1 million, and the injuries are mostly due to traffic accidents. RTA is a major cause of spinal injuries. This presentation will highlight about major aspects of spinal trauma at PMAH.

Objectives: To know the epidemiology, types and causes of spinal injuries

Methods: All polytrauma patients associated with spinal injuries admitted in PMAH from September 2016 to September 2017 were included in this study. Patients with old spinal injuries, any previous spinal surgery, spine infection or concomitant diagnosed malignancies, osteoporotic collapse with or without falls were not included in this study. All patients underwent whole spine CT and in selective cases MRI of spine. All patients were assessed for any concomitant head, thoracic, abdomen and pelvic and long bone injuries. Initially all patients were kept in Philadelphia color until cervical injury had been excluded. Thoracolumbar brace was applied for all patients until MRI was done or decision for surgery was done.

Results: Out of 124 cases, 91.9% patients were male. 46% patients were in third decade. MVA were responsible in 83% cases. 50% were driver. 75% of passengers were without seatbelt. 70% spinal injuries were associated with other injuries. Chest injuries followed by orthopedic trauma were the most common. Cervical spine was involved in 43% cases followed by thoracic spine. 27% patients presented with fixed neurological deficit in form of quadriplegia or paraplegia. 78% patients needed MRI but yield of MRI was only 50%. Mortality rate was 1%.

Conclusion: This study showed that in KSA, MVA is a major cause of spinal injuries. Drivers and front seat passengers are most vulnerable. One fourth of spinal injuries are associated with spinal cord injuries. Nationwide program should be initiated to prevent live long disability in young population.

Abstract 19. Percutaneous treatment of vertebral compression fractures: comparative, prospective, randomized study; 3 year follow-up
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Introduction: Vertebral compression fractures (VCF) are a main health problem. There are several vertebral augmentation techniques in order to treat them in a percutaneous way.

Objectives: Our aim was to compare percutaneous vertebral augmentation procedures in the treatment of painful VCF in terms of safety, clinical and radiographic effectiveness.

Methods: We conducted a pilot, monocentric, investigator initiated, prospective randomized, comparative study. Patients should present a painful osteoporotic 1- or 2-segmental vertebral compression fracture (VCF < 3 months) between T7 and L3, according to detailed inclusion and exclusion criteria between March and December 2013. Patients were randomized 1:1 to receive an expansive intravertebral implant (EXP) or a balloon kyphoplasty (BK) in combination with PMMA bone cement. Examinations were performed preoperatively, at baseline (48h after surgery) and after 5 days, 1, 3, 6, 12 and 36 months. Safety parameters documented include cement leakage (Yeom classification), subsequent vertebral body fractures, need for a second surgery,
device related adverse events and adverse events. Clinical effectiveness was recorded in terms of pain using the VAS scale and analgesic intake, the ODI and EQ-VAS scores and ambulatory status. Radiographic analyses were performed independently applying a validated FXA™ software measuring height, VB kyphotic angle, Cobb angle and Gardner angle.

**Results:** 30 patients (24 female, 6 male; mean age 68 years) were enrolled, 15 in each group. EXP procedures were 30% faster than BK, but there was no statistically significant difference regarding injected cement volume (mean 5 ml) and hospital stay (median 1d). After 36 months all clinical effectiveness criteria improved clearly for both groups without statistically significant differences between treatments. Radiographically, differences were statistically significant regarding anterior and middle height restoration, and kyphotic angle restoration, whereas Cobb angle and Gardner angle restoration showed a tendency to be better in the EXP group without statistical significance. For safety analysis 1 asymptomatic C1 cement extravasation was reported (EXP), 4 subsequent fractures (3 adjacent: 1 after a fall (SAE), 1 EXP, 1 BK), no second surgery for VCF and no device related adverse events. Two patients died along the follow-up period.

**Conclusion:** BK and EXP are safe and effective in a clinical way. EXP is better in terms of anatomical restoration and radiological parameters. Vertebral body height and kyphosis improve much more with EXP.

**Ethical Approval:** Ethical approval was obtained from the local Clinical Ethics Committee.

**Acknowledgement:** None declared.

**Funding:** None declared.

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**Introduction:** The intravertebral expandable implant is developed for a specific purpose: for the anatomical restoration of vertebral compression fractures caused by an excessive craniocaudal unidirectional compression force. To reduce these VCFs, the device initially deploys a controlled opposing craniocaudal unidirectional distraction force while preserving the surrounding bone trabeculae as much as possible. Once the fracture has been reduced, the implant maintains the restoration of the fracture before cement injection.

**Objectives:** To show the feasibility of the device, rule out complications and demonstrate the superiority to other kyphoplasty techniques.

**Methods:** 49 patients with osteoporotic vertebral compression fracture between T6 and L5 were treated with the new implant and were retrospectively examined. A visual analogue scale and radiological analysis (i.e., X-ray and CT scan) were used to assess back pain, quality of life and complications and height restoration of the vertebral body.

**Results:** Significant reductions in anterior and central vertebral body heights were observed compared to other kyphoplasty techniques 4.41mm +/-1.55 vs. 0.49mm +/-0.35 (p=0.0002). In additional also A2.3 fractures could be treated with this device, which are usually considered not suitable for kyphoplasty.

**Conclusion:** The above mentioned technique provides a controlled craniocaudal expansion in vertebral compression fractures and maintains the restoration before the injection of cement and preserves bone trabeculae. Future Research is based on the Treatment of more complicated fractures, which are usually not considered for kyphoplasty.

**Ethical Approval:** Ethic Commission of Christian Albrechts University of Kiel

**Acknowledgement:** None declared.

**Funding:** None declared.

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**Abstract 20. The anatomical reduction of vertebral body compression fracture of traumatic origin with underlying pathology affecting the bone quality such as osteoporosis with an expandable implant.**

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Abstract 21. Safety and efficacy of polyaxial screw-rod system fixation in managing upper cervical instability
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Introduction: Upper cervical junction (UCJ) is a unique and complex structure because its discrete bony, ligamentous and vascular anatomy. Upper cervical instability (UCI) defined as loss of stability between the atlas and axis (C1–C2), resulting in loss of normal articulation that decrease the space for the lower brain stem and cervical cord and roots. It has different etiology traumatic, inflammatory, idiopathic, or congenital abnormalities.Upon that (UCI) have broad varieties of ultimate’s Clinical and radiological manifestations complex. In this study we consider the algorithm of ¬¬safety and efficacy of polyaxial Screw-rod System Fixation in managing upper cervical instability by C1 Lateral mass (C1L) and C2 pedicular screw fixation (C2PSF) either from congenital or acquired defect of the occipital bone, foramen magnum, or first two cervical vertebrae.

Objectives: To evaluate safety and efficacy of C1L-C2P polyaxial screw-rod system fixation in managing craniocervical instability of various etiologies.

Methods: A retrospective descriptive clinical case study Patients : 42 patients with atlanto-axial instability (UCI) due to various etiologies was done. The primary upper cervical pathology (UCP) in this series was in wide range of Congenital: Down’s syndrome,Os Odentadium,and Neoplastic: plasma cell myeloma, ABC and Traumatic, and idiopathic

Methods: Those were surgical treated based on reduction, decompression and fixation by poly axial screws and rods among occipito-atlanto- axial avenue. They were assessed pre- and postoperative and radiologically by; plain X-ray, 3D-Computed Tomography (3D-CT), Magnetic Resonance Image (MRI), and clinically using Japanese Orthopedic Score (JOA) Table-4.

Results: Forty twopatients , 26 males and 16 females,mean age 31.6±12 (range 4-52) years treated by C1 lateral mass (C1L) and C2 transpedicular poly axial screws fixation (C2PSF) and fusion had some follow-up mean of47±9 (range 12 to 72) months . None of the patients developed a new neurological deficit. Preoperatively5 patients had neoplasia, 10 patients had hangman 9 patients had rotatory subluxation (AARF),8 patients with Denis fracture type II, 4 with downs’ syndrome, and 3 patients had os odentadium and idiopathic instability each. At the final follow-up, the (JOA) score was: 30 normal(71.5%), 9 on grade I (Excellent), and 3 on grade II (good) (7%). None of the patients had neurological worsening during the follow-up.

Conclusion: This prospective cohort suggested that Lateral mass C1 and transpedicular-C2 polyaxial screws fixation can be safely and effectively used in different entities of upper cervical instability, to achieve good purchase and fusion after decompression and reduction, further prospective studies with longer follow-up are necessary to further establish its validity and safety.

Ethical Approval: Ethical consent had been obtained from all patients after thoroughly explain their medical condition and the surgical procedure from the patients themselves or their relatives.

Acknowledgement: None declared.

Funding: “None”

Abstract 22. Electrophysiological assessment of functional changes in spinal cord after cervical spinal cord injury
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Introduction: Traumatic spinal cord injury (SCI) evokes a complex array of cellular and molecular events. Apart from initial trauma some of these processes (secondary mechanisms) are thought to contribute to mechanisms of progressive damage. Whilst others concurrently promote limited repair. Functional outcome is the interaction of these two process (secondary damage and spontaneous repair. Secondary damage is assessed with anatomical studies and spontaneous recovery of function is normally assessed in animal models using behavioural observations. However, because compensatory changes in the brain are likely to contribute to recovery, these techniques cannot assess the degree to which function improves in spinal cord itself.
Objectives: An in vivo (direct) electrophysiological measurement in order to assess the function of the spinal cord in the vicinity of injury.

Methods: Cervical contusion SCI model was made with the help of Infinite Horizon Impactor at the C6 level of the spinal. Lister Hooded rats (n=158) were divided into 7 groups depending on the duration post-injury (acute to 6 months). We recorded cord dorsum potentials (CDPs) evoked by supramaximal electrical stimulation of a radial nerve (to activate sensory fibres) or within the pyramids (to activate corticospinal fibres) and used these to measure changes in the function of these fibre systems in the vicinity of a spinal cord injury.

Results: We have compared CDPs from normal animals with recordings from animals up to six months after injury to characterise the temporal progression of changes in spinal cord function. Immediately following a contusion, sensory circuit function was profoundly depressed at the injury centre and further deterioration occurred over the following 3 days at the injury margins, especially above the injury (demyelination). A marked recovery occurred at the injury margins by 2 weeks (remyelination), and this was followed by a prolonged period of stability. However, a later phase of deterioration occurred below the injury between three and six months due to extension of cavity. CDPs evoked by pyramidal stimulation were, in many respects, affected in a similar way. They were profoundly depressed immediately following contusion and further deterioration at the rostral margin over the following 3 days was followed by marked recovery at 2 weeks and a period of stability. However, in addition, there was evidence of a spontaneous gain of function of spared corticospinal fibres projecting caudal of the injury site throughout the post-injury phase, indicating plasticity in the corticospinal fibres.

Conclusion: These findings suggests that maximum functional damage after contusion injury occurs at the time of impact. In addition, spontaneous recovery of function largely mitigates the small amount of the secondary damage. Therefore, injury due to high velocity impact might not be amenable to neuroprotective therapies. Furthermore, spontaneous plasticity is seen in spared CST fibres.

Ethical Approval: Study was approved by Ethical Review Process Application Panel of University of Glasgow.

Acknowledgement: 1. International Spinal Research Trust. 2. Khyber Medical University.

Funding: International Spinal Research Trust.

Abstract 23. Intradiscal injection of mesenchymal stem cells for the management of degenerative disc disease: a clinical trial.
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2 Instituto de Biología y Genética Molecular (IBGM), University of Valladolid, Spain.

Introduction: Degenerative disc disease may cause severe low-back pain, a large public health problem. Chronic cases often require surgery, which may lead to biomechanical problems and accelerate degeneration of the adjacent segments. Cell-based therapies may circumvent these problems and have exhibited encouraging results in vitro and in animal studies.

Objectives: We designed a pilot study to assess feasibility and safety and to obtain early indications on efficacy of treatment with allogenic mesenchymal stem cells (MSC).

Methods: Prospective, randomized, blinded clinical trial with two arms, 12 patients into both groups. Group A: intradiscal allogenic mesenchymal stem cells (MSV,PEI, Nº 10-134 (AEMPS), Group B: mepivacaine 1% into paraveterbal muscle. Clinical control: VAS, Oswestry SF36 at preop, 1 week postop, 1,3,6 and 12 months postop. Radiological control: MRI and Xrays preop, 1 month, 6 and 12 months postop.

Results: Statistically significant improvement of the VAS an Oswestry in the stem cell group compare to control group at 6 months. No infections reported, no foreign body reaction, no blood analisys changes.

Conclusion: We conclude that MSC therapy may be a valid alternative treatment for chronic back pain caused by degenerative disc disease. Advantages over current gold standards include simpler and
more conservative intervention without surgery, preservation of normal biomechanics, and same or better pain relief. The treatment with autologous MSC may be a valid alternative for treating chronic back pain caused by degenerative disc disease, as it is simpler and more conservative than the gold standard, but with no surgery and the same or better pain relief. The procedure is however logistically difficult and very expensive. We reasoned than treatment with allogeneic stem cells would be logistically more convenient and much cheaper, although it could pose immunological problems by reaction against the donor.

**Ethical Approval:** The study protocol was approved by the regional ethical committee.

**Acknowledgement:** None declared.

**Funding:** Instituto Carlos III de Madrid

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**Abstract 24. Case control series of intrathecal autologous bone marrow mesenchymal stem cell therapy for chronic spinal cord injury**


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**Introduction:** Autologous bone marrow mesenchymal cells that include stem cells (MSCs) are a clinically attractive cellular therapy option to try to treat severe spinal cord injury (SCI).

**Objectives:** To study the value of (MSCs) injected intra-thecally to enhance the repair process in patients with chronic SCIs.

**Methods:** 64 patients of SCI were included in this study with mean of 3.6 years following SCI. Forty-four subjects had received monthly intrathecal autologous MSCs for 6 months and the other 20 subjects served as controls. All subjects had received rehabilitation therapy program, 3 times weekly. Subjects were evaluated at entry and at 12 months after completing the 6-months intervention. ASIA Impairment Scale, ASIA grading of completeness of injury, Ashworth Spasticity Scale, Functional Ambulation Classification, and bladder and bowel control questionnaire were used for assessment.

**Results:** No differences were found in baseline measures between the MSC group and control group. Although a higher percentage of the MSC group increased motor scores by 1-2 points and changed from ASIA A to B , no significant between-group improvements were found in clinical measures. Many adverse effects were observed, included spasticity and a neuropathic pain was developed in 24 out of the 43 patients. One subject with a history of post-infectious myelitis developed encephalomyelitis after the third injection

**Conclusion:** Autologus MSCs may have side effects and may be contraindicated in patients with a history of myelitis. Their utility in treating chronic traumatic SCI needs further study in pre-clinical models and in randomized controlled trials before they should be offered to patients.

**Ethical Approval:** Ethical approval for this study was obtained from the ethical committee of National Cancer Institute. Cairo University.

**Acknowledgement:** Faculty of medicine- Cairo University Faculty of Physical Therapy- Cairo University

**Funding:** NONE

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**Abstract 25. The primary outcome of a prospective study: nucleoplasty with endoscopic microdiscectomy**

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**Introduction:** Lumbar disc herniation can cause central canal stenosis or spinal nerve root compression. The local inflammatory response and the anatomical features of the herniated disc and spi-
nal canal determine the resultant clinical syndrome which may include low back pain, and sciatica with or without neurological deficit. In nations like the United States, its prevalence is between 8% and 57%. According to the estimate provided by the experts, nearly 29% of individuals encounter a low back pain that could disable the individual at a certain stage of his or her life. In Saudi Arabia, seven studies were cross-sectional and found a prevalence and pattern ranging from 53.2% to 79.17%. Main-stay of treatment for patients with radicular pain due to lumbar disc herniation involves open lumbar discectomy, and has provided excellent outcome in over six decades. Nucleoplasty (percutaneous lumbar disc decompression) is a minimally invasive procedure that utilizes radiofrequency energy as a treatment for symptomatic lumbar disc herniation, against open microdiscectomy, which would be the mainstay treatment modality. The literature reports a favorable outcome in up to 77% of patients at 6 months.

**Objectives:** Evaluation of combined endoscopic microdiscectomy with Radiofrequent ablation Nucleoplasty where it is predicted to show more satisfying short term outcome, this includes shorter hospital stay, minimal blood loss, less operation time, less post-operative outcomes.

**Methods:** A consecutive cohort of 23 patients with lumbar discogenic back pain who underwent nucleoplasty with endoscopic microdiscectomy between December/13/2014 to July/6/2016 were included in this prospective study. Patients were operated by the one surgeon, who used the same surgical technique at the same institution for the study period. All cases (N=23) following up at the orthopedic department with confirmed diagnosis of contained lumbar discogenic back pain, who failed conservative treatment and fulfilled the criteria for surgical intervention, then underwent endoscopic microdiscectomy with nucleoplasty, and followed up by regular clinic visits for a period of one year maximum. Questionnaires with outcome measurements evaluating pain intensity and functional disability were completed preoperatively, at 1 months, at 6 months, and at the 1-year follow-up visit or during telephone interviews by the independent observer. At each follow-up, the pain intensity of the low back pain was measured using a visual analog scale (VAS, 0–10 points), and the functional status was assessed using the Oswestry disability index (ODI). All patients are instructed to fill VAS and ODI survey through every visit (Preoperational, 1 month post operation, 6 months post-operation, and 1 year post-operation), where they were instructed and assisted by healthcare professionals throughout the process. Data was collected through OAISIS electronic healthcare system where all of the information were documented and acquired by co-investigators and not the main surgeon himself. No exclusion based on BMI or preoperative history of trauma was done. All patients were contacted individually via telephone and e-mail for conformation and accurate input of data and outcome subjective satisfaction of the operation. Inclusive criteria include Intractable chronic low back pain without improvement after conservative treatment for 6 months, Central or posterolateral (paracentral) contained disc herniation (Grade I and II) on magnetic resonance imaging, No history of previous back surgery, Age range from 20 to 75 years old, Level of surgery range between L3 to S1. Exclusive criteria include Age below 20 and above 75, Lateral recess stenosis, sequestered disc, Fractures, tumors, or infections, Extruded or sequestered herniations on magnetic resonance imaging, Non lumber disc herniation, Concurrent back pain due to other pathologies, Congenital spinal anomalies, Cases with Oswestery more than 70, or less than 40. Primary outcome variables that are going to be used in the research is Visual analogue scale (out of 10), the Oswestry disability index (out of 100), and outcome subjective satisfaction. Secondary outcome variables that are going to be used in the research are length of operation, length of hospital stay, blood loss, postoperative infections, dural tear, reoperation, and nerve root injury. Other variables are age, gender, level of surgery, patient occupation, smoking, comorbidities, alcohol intake, history of trauma, use of steroids, sitting intolerance, and body mass index.

**Results:** These results suggested that the procedure has a significant effect on the Oswestry disability index. Specifically, the results show that individuals undergoing the procedure display a significant decrease in the reported ODI score over time. Further analysis of the other variables showed no significant relationship with age, gender, history of trauma, co-morbidities, usage of steroids, herniation only vs herniation and degenerative disc disease, single herniation vs grouped herniation. On the other
hand, results show significantly better results when the operation is done as a primary procedure, rather than a revision (Table 7). Results also displayed significantly better results with non-smokers and non-obese patients with regards to the disability index. **Conclusion:** In this minimal invasive approach, Nucleoplasty with Endoscopic Microdiscectomy, it showed promising short-term outcomes with less post-operative pain, hospital stay, minimal blood loss and no reported post-operative complication which can be an alternative option to the standard open Microdiscectomy.

**Ethical Approval:** The research committee at Dr. Soliman Fakeeh Hospital reviewed the proposal and an IRB was issued. Consent for the operation and research participation was obtained from all subjects. **Acknowledgement:** None declared. **Funding:** None declared.

**Abstract 26. Adult percutaneous hydrodiscectomy effectiveness surgery at King Abdulaziz Medical City: local experience at King Khalid Hospital – Jeddah**

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**Introduction:** Disc herniation is an abnormal migration of the disc content to the adjacent spaces which can mechanically or chemically irritates the nerve root. Conservative management is recommended as first line of treatment. If patient symptoms were severe and did not improve with the, then intervention option can be considered this include steroid injection, microsurgery or open surgery, etc. … . our aim in this study to evaluate hydrodiscectomy procedure in our institute and its effect in relief patients symptoms.

**Objectives:** This review is aimed at examining the efficacy of percutaneous nucleoplasty using the hydrodiscectomy water jet system (hydrodisectomy) in relieving the radiculopathy related to lumbosacral spine herniated contained disc.  

2 Specific objectives:  

**Methods:** This was a retrospective study which was performed in national guard hospital, Jeddah, Saudi Arabia data collected in May – July 2017 for patients who underwent hydrocision procedure between 2013 – 2016. this study was approved by the local ethics committee (no.: SP17/048/J) and all patients informed about the study methods and objectives. The study population was comprised of 22 patients aged between 22 to 77 years. they were included in this study if they were adults with contain disc in the lumber reign not more than 1 or 2 levels who performed the procedure in the past 5 years with no follow up operations for the same condition. the participants’ essential data obtained from their files which were name, age, gender, contacts and the measure of the bulged disc recorded as it calculated in the MRI. the patients phone called and asked to complete a questionnaire that included other information regarding their medical history, duration of the symptoms, the compliance of the rehabilitation program post OP and lumber or radiating pain existence. surgical failure was considered to have occurred when radiating pain that was equal to or more intense than that experienced pre op and never subside. The statistical analysis was performed with the Statistical Package for Social Sciences (SPSS) software, version 22.0 for Windows.

**Results:** back pain: 22 patients were asked about their back pain after the HC procedure. a 9 patients (40.9%) answered the pain is better than before, 6 patients (27.3%) answered they don't have any pain.

Radieating pain: Regarding radieating pain of 22 patients 10 patients (45.5%) answered it is better than before, 5 patients (22.7%) answered no radieating pain at all.

**Conclusion:** In this study preliminary results prove that percutaneous hydrodiscectomy is a viable treatment option with least risk of complications for patients who have contained discogenic radiculopathy. Short-term clinical success was 68.2% with no complications as 95.5% reported. Percutaneous hydrodiscectomy should be considered one of the treatment option between unsuccessful conservative therapy and surgical intervention. further prospective studies are needed to substantiate the long-term benefits.
Abstract 27. Segmental surface referencing during intraoperative three-dimensional image-guided spine navigation: an early validation with comparison to automated referencing
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Introduction: Intraoperative three-dimensional (3-D)-guided navigation improves spine instrumentation accuracy. However, image acquisition may need to be repeated with segment hypermobility or distant target from reference frame (RF).

Objectives: The current study evaluates the usefulness of internal metal fiducials (IMFs) as surface references in enhancing registration accuracy and avoiding repeating imaging.

Methods: Interventional human cadaver study. Six fresh-frozen cadaveric human torsos were utilized. Posterior C1–T2 exposure was done, and three IMFs were inserted per level; intraoperative 3-D images were then acquired. Two registration methods were utilized: autoregistration (AR, group 1) and point registration using IMF (IMFR, group 2). Registration accuracy was checked by identifying IMFs in both groups. Pedicle screws inserted into C2, C4, C5, and C7 based on the two registration methods (three cadavers each) with RF on C7 and then on C2.

Results: The mean registration error was lower with IMFR compared with AR (0.35 +/- 0.5 mm versus 2.02 +/- 0.85 mm, p < 0.0001). Overall, 34 pedicle screws were inserted (AR, 18; IMFR, 16). Final screw placement was comparable using both techniques (p = 0.58). Lateral screws violations were observed in four IMFR screws (1 to 2mm) as compared with five in AR group (2 to 3mm). Reregistration after moving RF to C2 was possible using surface screws in IMFR group, thus avoiding new 3-D image acquisition.

Conclusion: Intraoperative 3-D navigation in spine procedures, surface fiducial registration using IMF provided superior accuracy over automated registration. It allowed repeat registration without repeating radiation during long spine segment instrumentations. More studies are needed to clarify both practical and clinical application of this method.

Ethical Approval: Institutional ethical approval was obtained prior the the start of the study.
Acknowledgement: We would like to thank both Mr. Basil Sakabani and Mr. Lutfi Shaar for their technical assistance in using the intraoperative 3-D device and Navigation. We are grateful for AMICO (Al-Amin Medical Instruments Co. Ltd., Riyadh, Saudi Arabia) and Medtronic.
Funding: None declared.
cialty training.

**Objectives:** To assess the frequency of utilization and satisfactory rate of image-guided spine navigation surgery versus free-hand's screw placement among spine surgeon in Saudi Arabia.

**Methods:** An internet-based survey was sent to all surgeons and postgraduate trainees in orthopedics and neurosurgery that are currently practicing spine surgery in government or private hospitals in Saudi Arabia. The survey is composed of 18-item online questionnaire that collected information related to demographics, academics, and utilization of image guided navigation. - Statistical Analysis: Survey responses were de-identified and then collected into a Microsoft Excel database. We converted responses to nominal categorical or ordinal variables. We used Pearson Chi-squared tests or Fisher Exact tests for comparisons between categorical variables. Partitioned Chi-squared analyses with Bonferroni correction were used to compare multiple proportions. All statistical tests were performed using SPSS (version 21; IBM, Chicago, IL, USA).

**Results:** Among 99 responses (response rate: 50.2%), 60% were from Riyadh province. The majority of responses were from attending physicians (50%). Response rate was higher from orthopedics (60%) compared to neurosurgery (40%). The presence of navigation systems in Saudi hospitals was high (77%) and there were no differences between specialties (orthopedics vs. neurosurgeons) in the availability of navigation at their hospitals (81% vs. 73%, p=0.472). However, there was a significant difference between specialties in the preference of using navigation (23% for orthopedics vs. 81% for neurosurgery, p<0.001) and routine utilization in surgical spine cases (88% for neurosurgery vs. 50% for orthopedics, p<0.001). Majority of responders from neurosurgery learned to use navigation during residency compared to orthopedics responders (51% vs. 29%, p=0.001). More than 30% of orthopedics responders expressed they never learned navigation compared to only 4% of neurosurgery responders. The comfort level >75% with performing surgery using navigation (25% for orthopedics vs. 46% for neurosurgery) and whether it should be used as a standard of care tool (21% for orthopedics vs. 58% for neurosurgery) were also significantly different between specialties (p<0.001).

**Conclusion:** The current study highlights significant differences in the utilization of image-guided navigation for spine surgery in Saudi Arabia. Enhancing surgical exposure and education of postgraduate trainees to use these tools, especially within orthopedics, could increase utilization and comfort level rates.

**Ethical Approval:** The project was approved from the Research Ethics Committee at King Faisal Specialized Hospital and Research Center - Riyadh

**Acknowledgement:** Mr. Mishari Alhamid Ms. Fatiema Alnahari Ms. Nusaybah Morya Ms. Raghad Alwajdani

**Funding:** None declared.

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**Abstract 29. Modern Luque Trolley: self-growing rod construct to manage EOS while maintaining spontaneous spinal growth**

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**Introduction:** The ultimate goal in the surgical management of early onset scoliosis (EOS) is to prevent curve progression while maintaining longitudinal spine growth. Although current surgical techniques (dual growing rods, VEPTR) may prevent curve progression, repetitive interventions are required to lengthen the implants. The Modern Luque Trolley technique has been described in which no repetitive surgery is required for spinal growth. The construct consists of the standard proximal and distal fixed anchors found in dual growing rod with additional gliding spinal anchors capturing the apex of the curve.

**Objectives:** The aim of this study was to further assess the safety and efficacy of this self-growing rod construct in patients with EOS.

**Methods:** In this retrospective study, we reviewed x-rays and clinical chart of fifteen patients (including the original five) who underwent this self-growing rod construct between 2003 and 2014. Spontaneous spinal growth was measured
on anteroposterior x-rays (from T1-L5), and was compared to the expected spinal growth predicted by Demiglio methods. Demographics, underlying diagnosis, follow-up length, correction and maintenance of deformity, number of procedures, and complications were all recorded. 

**Results:** The mean age at surgery was 8.8 years (95% CI: 7.4-10.2) and the average follow-up length was 4.2 years (95% CI: 3.3-5.1). The average cobb angle measurements were 64.39 degree pre-operatively (95% CI: 54.18 - 75.68) and 24.79 degree post-operatively (95% CI:18.88-30.69). The average spontaneous spine growth was 1.1cm per year of follow-up (95%CI: 0.5-1.8), while the average Cobb angle progression (recurrence) after surgery was 0.31 degrees per year (95% CI: 0.21-0.41). The cohort achieve 65.3% of their expected spinal height with a 95% CI of 50-80%. Six out of fifteen cases grew to the expected growth for their age, while two failed to self- grow and were converted to a non-self-growing construct. The cases that had poor growth had large initial deformities, and large post surgery deformities. We found a moderately inverse correlation between the post-operative Cobb angle and amount of spontaneous height gain (Pearson’s R: 0.575, p 0.012). Three cases outgrew their construct requiring revision surgery to lengthen their rods. 

**Conclusion:** Self-growing rod construct is an option for managing EOS without the morbidity of repetitive surgery. Patient selection is critical to ensure good out- come. To optimize spontaneous spinal growth, apical vertebra must be brought to midline by achieving maximal Cobb correction. However, questions such as the effect of wear debris and the risk of spontaneous fusions still remain.

**Ethical Approval:** Ethical approval was obtained from McGill University Health Centre. 

**Acknowledgement:** None declared. 

**Funding:** None declared. 

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**Abstract 30. Fenestrated pedicle screws and cement augmentation in patients with bone softening**

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**Introduction:** The growing number of surgical procedures performed in the spine has highlighted the problem of screws loosening in patients with osteoporosis, infection and/or tumours. 

**Objectives:** This prospective study was designed to evaluate the middle-to long-term purchase of cement-augmented fenestrated pedicular screws in patients with poor bone quality. 

**Methods:** From May 2015 to January 2016, 25 patients with a poor bone stock condition underwent posterior stabilisation by fenestrated pedicle screws and PMMA augmentation. Pain improvement and long-term clinical outcome were assessed by visual analogue scale (VAS) score and Oswestry low back disability questionnaire (Oswestry disability index ODI). Implant stability was evaluated by plain radiography. Complications were evaluated in all cases. 

**Results:** All patients were clinically and radiographically followed up for a mean of 12.84 months. VAS scores and ODI questionnaire showed a statistically significant reduction in pain and improvement in the quality of life. No radiological loosening or pulling out of screws was observed. In two cases, cement leakage occurred intraoperatively. 

**Conclusion:** Fenestrated screws and cement augmentation provided effective and lasting purchase in patients with poor bone quality. The only clinical complication strictly related to PMMA screw augmentation did not require further surgery.

**Ethical Approval:** Approved from Ethical Committee of Faculty of Medicine, Cairo University 

**Acknowledgement:** Prof. Dr. Yasser Hassan Elmiligui Prof. Dr. Wael Tawfiq Koptan Dr. Ahmed Maher Sultan Cairo University 

**Funding:** None declared. 

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**Abstract 31. Comparative study of two skin incisions for microscopic lumbar discectomy**

*Waeel Ossama Hamouda*

Cairo University School of Medicine and Teaching hospitals, Egypt. 

**Introduction:** Microscopic lumbar discectomy is a common minimally invasive surgery. A transverse skin incision has sound theoretical cosmetic advantages in comparison to the classic vertical one. 

**Objectives:** To compare transverse and vertical skin incisions for microscopic discectomy regarding cos-
metric outcome, postoperative pain and the provided surgical cutaneous inlet.

**Objectives:** To compare transverse and vertical skin incisions for microscopic discectomy regarding cosmetic outcome, postoperative pain and the provided surgical cutaneous inlet.

**Methods:** Eighty-six patients were randomly enrolled prospectively in the study, divided among a vertical incision group (V group) and a transverse incision group (T group). Maximum surgical cutaneous inlet provided was measured in two diameters. Post-operative pain was recorded using a numeric patient rating scale from 0 to 10 as zero indicating no pain at 1st, 3rd and 7th days postoperatively. Cosmetic appearance of the wound was evaluated by a plastic surgeon and by the patients to fall within five categories (excellent, very good, good, fair and poor).

**Results:** In comparison to vertical incisions, transverse incisions provide a similar surgical cutaneous inlet, causes higher pain score on the 1st and 3rd postoperative days but similar score on the 7th day, and ensure a significantly better wound cosmesis.

**Conclusion:** Transverse skin incision for microscopic lumbar discectomy is applicable alternative to the classic midline or paramedian vertical incisions with better aesthetic results.

**Ethical Approval:** Cairo university
**Acknowledgement:** None declared.
**Funding:** None declared.

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**Abstract 32. In vivo assessment of spinal cord elasticity using shear wave ultrasound in dogs**

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**Introduction:** Background: Evaluation of living tissue elasticity has wide applications in disease characterization and predicting prognosis. Only few attempts previously reported to characterize spinal cord elasticity (SCE), all done ex vivo. Recently, tissue elasticity assessment has been clinically feasible using ultrasound shear wave elastography (SWE).

**Objectives:** The current study aims at characterizing SCE in healthy dogs in vivo utilizing SWE and address SCE changes during compression.

**Methods:** Methods: Ten Greyhound dogs (mean age 14 months, mean weight 14.3 kg) were anesthetized with tracheal intubation, hemodynamic monitoring, and neuromonitoring. Three-levels mid-cervical laminectomy was performed. SCE was assessed at baseline then following sequential application of 8 and 13 mm-balloon compressions placed ventral to the spinal cord.

**Results:** Results: The mean SCE was 18.57 kPa. Elasticity of the central canal, pia mater, and dura mater were 21.79.6 kPa, 26.114.8 kPa, and 63.211.5 kPa, respectively. As expected, the spinal cord demonstrated less elasticity compared to dura mater (p<0.0001) and pia mater (trend toward significance, p=0.08). Notably, the application of 13 mm-balloon compression resulted in a stiffer spinal cord compared to baseline (23373 kPa Vs. 18.57 kPa, p<0.0001) and to the 8 mm balloon compression (23373 kPa Vs. 18568 kPa, p<0.048).

**Conclusion:** In vivo SCE evaluation using SWE was feasible and is comparable to previously published data utilizing physical methods of spinal cord sectioning. Compressed spinal cord was stiffer than a free spinal cord with a linear increase in SCE with increasing mechanical compression. Studying SCE may advance our knowledge of spinal cord biomechanical properties with potential implications for disease management and prognosis.

**Ethical Approval:** Institutional Ethics Review board at King Saud University approved the study protocol.

**Acknowledgement:** The SuperSonic Imagine’s Aixplorer® machine used in the study was provided by Gulf Medical Co. Ltd. (Saudi Arabia). However, there was no financial support provided by the company to any of the authors.

**Funding:** Dr. Albakr received a research grant from the Saudi Association of Neurological Surgery (SANS), Riyadh, Saudi Arabia.
Posters Abstracts
**Poster 1. Tumoral fractures of the spine; treatment with percutaneous procedure and long term results**
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**Introduction:** Vertebroplasty and percutaneous kyphoplasty have played essential roles in the treatment of painful vertebral metastasis, although there are few reports with long survivorship that have evaluated the long-term efficacy, adjacent fractures and vertebral body (VB) recollapse associated with these procedures.

**Objectives:** The objective of our study was to evaluate the efficacy, feasibility and safety of a percutaneous anatomical vertebral body reduction for the treatment of VCF (vertebral compression fracture) linked to malignancy.

**Methods:** The retrospective study examined 32 patients with osteolytic VCF due to malignant infiltration of the vertebral body (VB). A visual analog scale, the EQ5 and radiological analysis (i.e., X ray and CT scan) were used to assess back pain, quality of life, results and complications.

**Results:** Statistically significant reductions in anterior and central vertebral body heights (6.2 mm-19.6 ± 4.2 mm- and 5.8 mm-16.7 ± 7.8 mm-, respectively) that resulted in reductions of the regional Cobb angles exceeding 30% were observed. There was also a statistically significant improvement in quality of life. The average survivorship was longer than those reported in most published articles, and the average follow-up period was 30.9 months.

**Conclusion:** The present study indicated that anatomical restoration (i.e., cortical ring reduction with endplate rebalancing) is potentially beneficial for a well-selected group of patients with spine metastases and long life expectancies because this procedure avoids the complications typical of these types of treatments (e.g., leakage, adjacent fractures and re-collapse).

**Ethical Approval:** Ethical approval was obtained from the local Clinical Ethics Committee.

**Acknowledgement:** None declared.

**Funding:** None declared.

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**Poster 2. O-Arm navigation in pedicle screw positioning and radiation evaluation**
Fernando Moreno Mateo 1, Silvia Santiago Maniega 1, Ardura F 1, Hernández R 1, Luengos V 1, Sánchez-Lite 1 2, Toribio B 2, Corredera R 2, Noriega D 1.
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**Introduction:** Pedicle screw malposition is very common and may cause neurological, vascular and visceral injuries. Image-guided surgical techniques have reduced the risk of serious complications.

**Objectives:** The purpose of this study was to compare the malposition rate between intraoperative navigation and free-hand fluoroscopy-guided techniques for placement of pedicle screw instrumentation.

**Methods:** Prospective observational study. All consecutive patients with degenerative disease (degenerative disc disease, listhesis, scoliosis, lumbar stenosis), with instrumentations between T10-S1, who underwent surgical procedures using the free-hand or intraoperative navigation technique for placement of transpedicular instrumentation were included in the study. Radiological analysis of the position of the transpedicular screws was performed using a 1-mm spinal CT scan. Evaluation of axial slices as well as sagittal and coronal reconstructions were carried out. Analysis of screw position was assessed using the Heary classification. Breach severity was defined according to the Gertzbein classification. Radiation doses were evaluated using thermoluminescent dosimeters (TLD) and estimates of effective dose and organ dose were made based on the scan technical parameters.

**Results:** A total of 114 patients were included; 58 were operated on using assisted surgery and 56 using free-hand fluoroscopy-guided surgery. A total of 625 screws were implanted (575 below L3 and 50 between T10 and L2): 52% in the navigation-assisted surgery group and 48% in the free-hand surgery group. The total number of malpositioned screws was: 11 (3.6%) in the navigated surgery group (right side: n=7, left side: n=4) and 33 (10.3%) in the free-hand group (right side: n=23, left side: n=10)
(p<0.001). There was only one symptomatic case in the conventional surgery group. The radiation received per patient was 5.8 mSv (4.8-7.3). The median dose received by patients in the free-hand fluoroscopy group was 1 mGy (0.8-1.1). There was no detectable radiation level in the navigation-assisted surgery group whereas the effective dose was 10 µGy in the free-hand-fluoroscopy surgery group.

**Conclusion:** The malposition rate, both, symptomatic and asymptomatic, in spinal surgery is reduced when using navigation assisted transpedicular instrumentation compared to placement under fluoroscopic guidance, with radiation values within the safety limits for health. Larger studies, especially in levels above L1, which are the ones that may benefit most from navigated surgery, are needed to determine risk-benefit in these patients.

**Ethical Approval:** Ethical approval was obtained from the local Clinical Ethics Committee.

**Acknowledgement:** None declared.

**Funding:** None declared.

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**Poster 3. Robot-assisted vertebral body augmentation: interest of robotics in mini invasive management of dorso-lombar vertebral body fractures A comparative study**

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CHU d'AMIENS, France

**Introduction:** Background: Treatment of corporeal fracture by intra-vertebral augmentation (IVA) is reliable mini invasive method for vertebral body fracture type A of magerl classification. However, accurate correction of kyphotic angulation resulting from this fracture, risk of cement leak and significant radiation exposure to the surgeon, operating room staff and patient remain significant issues.

**Objectives:** Objective: To assess the interest of robot assisted technic (Ra-T) performing IVA for dorso-Lombar body fracture.

**Methods:** We performed a retrospective, single-center study of patients having undergone IVA for thoraco lumbar fracture with the ROSA Spine robot compared to fluoroscopic technic (F-T). Installation and operative Time, accuracy of guidance, degree of local residual kyphosis, percentage of restoration of vertebral body height, incidence of cement leak, morbidity, hospital length stay were compared. Radiation related data are reported.

**Results:** Results: 30 patients were operated by Ra-T and were compared with 30 performed with F-T during the same period with identical surgical indications but different surgeons. For Ra-T; average installation time was 24 mn (SD:7.5); non significantly shorter with F-T and average operative time was 52 minutes (SD: 11) and was significantly longer than F-T. All Robotic guidance was grade A (no pedicular effraction) such as F-T. Average local residual kyphosis after surgery was 6,54° (SD: 3,15) and percentage of restoration of vertebral body height was 58,9% (SD: 21,4) and was significantly better than F-T which was 8,5° (SD: 5,4) and 33,8% (SD: 34). Cement leaks were significantly lower with the Ra-T. Hospital stay after surgery was 3.2 days for both techniques. No complication related to the surgery occurred in both techniques. Mean radiation exposition for the patient was 438 mcGycm (SD:147) and surgeon exposure was 30 mcGy (SD: 17).

**Conclusion:** CONCLUSIONS: Robot-assisted IVA is giving better vertebral body fracture correction, minimal cement leak and lesser radiation for surgical team but also for the patient treated comparing to conventional method.

**Ethical Approval:** yes, from authority center of the hospital

**Acknowledgement:** None declared.

**Funding:** none

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**Poster 4. The Effectiveness of physiotherapy interventions for sacroiliac joint dysfunction: a systematic review**

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**Introduction:** Sacroiliac joint dysfunction (SIJD) has...
been assumed to be a common cause of low back pain (LBP) [1]. The stated incidence of SIJD between patients with low back pain varies between 16% and 30% [2]. The sacroiliac joint is a diarthrodial synovial joint. The anterior segment is a true synovial joint and the posterior segment is a syndesmosis comprising of, gluteus minimus and medius muscle, piriformis muscle and sacroiliac ligament. Because all of these muscles are shared with the hip joint, the SI joint cannot function independently.

Objectives: The aim of this study is to investigate the effectiveness of physical therapy interventions in the treatment of sacroiliac joint dysfunction (SIJD).

Methods: MEDLINE, PUBMED, CINAHL, AMED, PEDro, and CIRRIE databases were searched and only relevant data from studies that matched the inclusion criteria were included. CASP tools for critical appraisal were used to assess the quality of studies included.

Results: Nine articles met the inclusion criteria; three studies examined the effect of exercise on SIJD, 3 studies used Kinesio tape and 4 studies examined the effect of manipulation. The outcomes used within the studies were: Visual analogue pain scale (VAS), Oswestry disability questionnaire (ODQ), Numerical pain rating scale (NPRS) and pelvic position measurement (PALM, Pelvimeter and photogrammetry). The quality of included studies ranged from low to average as the CASP tools revealed several limitations that affect the validity of the studies. The results show that physical therapy interventions are effective in reducing pain and disability of associated with sacroiliac joint dysfunction. It also shows that Manipulation is the most effective approach and most commonly used within physical therapy clinics.

Conclusion: Manipulation, Exercise and Kinesio Tape are effective in the treatment of pain, disability and pelvic asymmetry in sacroiliac joint dysfunction. Further studies are needed to create exercise treatment protocol consists of the most effective exercises. Future studies should also investigate manipulation and exercise effect on pelvic position and symmetry and compare it with Kinesio Tape results.

Ethical Approval: There is no ethical approval of this type of studies (systematic review!)

Acknowledgement: None declared.

Funding: There is no funding

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Poster 5. Morphometry of lumbar pedicles based on 670 measurements
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Introduction: Pedicle screws are the most used system for spinal arthrodesis. Pedicle is responsible for 80% of the stiffness of the system and for 60% of the traction forces in the screw-pedicle interface. The size of the pedicle is not always regular despite in clinical practice we choose screws as if they were.

Objectives: The objective of our study is to improve surgical planning through the knowledge of the variables that can influence the different morphology of pedicles.

Methods: Prospective observational study, in which we included 67 patients. Measurements were done on 670 lumbar pedicles on CT acquired previously including: intracortical and extracortical longitudinal diameter in the anterior, medium and posterior part of the pedicle, and internal and external transverse diameter in the anterior, medium and posterior part of the pedicle. We also included real and effective length and pedicle angle. We classified each pedicle according to the measurements in 4 grades: A (anterior diameter > medium > posterior), B (posterior diameter > medium > anterior), C (anterior and posterior > medium) and D (any other possibilities). We analyzed the relationship between pedicle morphology and age, sex, side, body mass index and comorbidities. We obtained mean and standard deviation for quantitative variables and frequencies distribution for qualitative ones. Rest of statistical analysis was carried out.

Results: The most frequent morphology was type C. We found an association between external and internal diameters of 99.6% for transversal diameter and 86.5% for longitudinal diameter. Association between transversal and longitudinal morphology was 86.1% for internal diameters, and 81% for external ones. We found statistically significant differences between left and right pedicles (p<0.05) in 10 out of 12 L1 vertebrae measured, 7/12 L2, 1/12 L3, 2/12
L4 and no L5. Correlation between size of pedicles and height, weight and body mass index were statistically significant.

**Conclusion:** Pedicles’ morphology has a great range of variation. We must use tools to choose the correct screw for every pedicle, in order to achieve optimal results.

**Ethical Approval:** Ethical approval was obtained from the local Clinical Ethics Committee.

**Acknowledgement:** None declared.

**Funding:** None declared.

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**Poster 6. Tractography: relationship between idiopathic adolescent scoliosis and alterations in brain white substance connections**

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**Introduction:** Abnormal connections and brain alterations have been described in idiopathic scoliosis.

**Objectives:** Our aim was to study the possible relationship between adolescent idiopathic scoliosis and the findings of brain connectivity alterations comparing diffusion Magnetic Resonance Images (MRI) between a group of patients (P) and a group of healthy controls (HC).

**Methods:** We included healthy teenagers and idiopathic scoliotic adolescents. We obtained T1 weighted and diffusion 3 teslas MRIs. For diffusion acquisitions we used 32 gradient directions, b=1000s/mm2, a voxel size of 1.66x1.66x2mm and a matrix of 144x144 with 140 slices covering the whole brain and cervical area. Data was analyzed building a connectivity matrix among 84 cortical and subcortical areas, using Freesurfer, FSL and MRTrix software. Two million lines of tractography were obtained per subject. Fractional Anisotropy was used to evaluate connectivity. We obtained 3570 connections. We chose for later statistical analysis, those with a minimum of 500 lines of tractography present in all subject analysis. For this analysis, we used general lineal model, and we have studied the influence of age, sex and scoliosis or control. Statistical significance was established for p<0.01.

**Results:** We included 18 HC (8 women; mean age: 12.33 years DS 2.43) and 22 P (17 women; mean age: 14.73 years DS 3.03). Out of the initial 3570 connections, 159 were over the 500 minimum established and were selected for statistical analysis. Global connections after age and gender adjustment, were statistically significant different between HC and P. One by one connection comparison showed significant differences between caudal-middle-frontal cortex (left hemisphere) and superior-frontal cortex (left hemisphere). Same differences were found concerning the isthmus of the left cingulate turn, and also in the connections of the right cerebellum cortex.

**Conclusion:** Our findings are still preliminary, but we found alterations in brain connectivity in scoliotic patients. This alterations may be involved in the genesis of the disease itself, as other researchers have already reported. Treatment strategies could benefit also from these findings. Former studies must be conducted in this line of investigation.

**Ethical Approval:** Ethical approval was obtained from the local Clinical Ethics Committee.

**Acknowledgement:** None declared.

**Funding:** None declared.

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**Poster 7. Imaging techniques in the evaluation of disc survival after a vertebral fracture**

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1 Department of Orthopaedic Surgery, University Clinical Hospital of Valladolid, Spain. 2 Department of Radiology, University Clinical Hospital of Valladolid, Spain.

**Introduction:** The purpose of our study was to determine the water diffusion in the thoracolumbar discs adjacent to a previous vertebral fracture. By using the mean apparent diffusion coefficient (ADC),

**Objectives:** The aim of this work was to analyze if a relationship exists between disc ADC and MR findings of adjacent disc degeneration after thoracolumbar fractures treated by anatomic reduction.
Methods: A series of 20 non-consecutive voluntary patients treated because of vertebral fractures (mean age, 50.7 years; range, 45-56) were included in the study. There were 10 A3.1 and 10 A1.2 fractures (AO classification). Surgical treatment was applied in 14 cases, and conservative in 6. The intention of surgery was the anatomic restoration of the vertebral endplates by placement of expandable implants into the vertebral body through a minimally invasive transpedicular approach. MRI T2-weighted images and mapping of apparent diffusion coefficient (ADC) of the intervertebral disc adjacent to the fracture segment were performed after a mean follow-up of 32 months. A total of 60 discs, 3 per patient, were analyzed: infra-adjacent, supra adjacent and a control disc one level above the supra-adjacent. As compared to surgically treated patients, discs at the supra-adjacent fracture level showed statistically significant lower values in cases treated orthopedically (p<0.001).

Results: There were no differences between patients surgically treated and those following a conservative protocol regarding the average ADC values obtained in the 20 control discs analyzed. Taken all cases together, the average ADC in the supra-adjacent level was lower than in the infra-adjacent (1.53 ± 0.06 versus 1.35 ± 0.12; p<0.001). Average ADC values of the disc used as a control were similar than those of the infra-adjacent level (1.54 ± 0.06). as compared to surgically treated patients, discs at the supra-adjacent fracture level showed statistically significant lower values in cases treated orthopedically (p<0.001). The variation in the delay of surgery had no influence on the average values of ADC at any of the measured levels.

Conclusion: ADC measurements of the supra-adjacent disc after a mean follow-up of 32 months following thoracolumbar fractures showed that restoration of the vertebral collapse by minimally invasive vertebroplasty prevent posttraumatic disc degeneration.

Ethical Approval: Ethical approval was obtained from the local Clinical Ethics Committee.
Acknowledgement: None declared.
Funding: None declared.

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Poster 8. Osteoarthritis and degenerative disc disease: does HLA matching influence on the final outcomes of allogeneic mesenchymal stromal cell therapies?
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2 Instituto de Biología y Genética Molecular (IBGM), University of Valladolid, Spain.

Introduction: The necessity for more effective therapies for chronic osteoarticular diseases has led to the development of treatments based on mesenchymal stem cells (MSCs), the natural precursors of musculoskeletal tissue. Treatments with autologous MSCs yielded excellent results, with nearly 70% improvement of pain and disability in osteoarthritis and degenerative disc disease. Using allergenic MSCs is logistically more convenient and would widen the pool of eligible patients, but potential immune rejection should be considered. In this context, MSCs are purportedly immune evasive and better tolerated than other cell types.

Objectives: To determine how HLA matching influence on the final outcomes of allogenic cellular therapies.

Methods: We used samples collected during the performance of 2 randomized clinical trials using allergenic bone marrow MSCs for treatment of osteoarthritis (NCT01586312) and degenerative disc disease (NCT01860417). Serum samples were used to determine anti-HLA antibodies, whereas either blood or MSC samples were used for HLA typing of recipients and donors, respectively. Algofunctional indexes were used as indicators of clinical evolution, and the correlation between the number of donor-host HLA mismatches and the efficacy of treatment was determined.

Results: Immune response was weak and transient, with reactivity decaying during the first year. Consistently, better donor-recipient HLA matching did not enhance efficacy.

Conclusion: This lack of reactivity is presumably due to the cooperation of 2 factors, (1) downregulation of the host immune responses by the transplanted MSCs and (2) effective insulation of these cells inside the articular cavity or the intervertebral disc, respectively. Interestingly, better HLA matching did not enhance efficacy. These observations
have medical relevance as they support the clinical use of allergenic cells, at least as a single-dose administration. Multiple-dose applications will require further research to exclude possible sensitization.

**Ethical Approval:** Ethical approval was obtained from the local Clinical Ethics Committee.

**Acknowledgement:** None declared.

**Funding:** Instituto de Biología y Genética Molecular (IBGM), University of Valladolid, Spain.

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**Poster 9. The Saudi society knowledge level about spine injury**

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**Introduction:** The incidence of Traumatic Spinal Cord injuries (SCI) has been recorded to be in the range of 2.5 to 57.8 per million annually, Saudi Arabia is one of the highest rates countries recorded in spinal cord injuries as per Saudi Ministry of Health (MOH) mostly resulting from Road Traffic Accidents (RTAs).

**Objectives:** The aim of this study is to assess the Arabic speaking community in Saudi Arabia knowledge about the spinal cord in general and spinal cord injury in specific.

**Methods:** A cross sectional survey, where a questionnaire was designed to assess the knowledge of Arabic speaking population from different aspects of spinal cord injuries. These aspects including the gender, age, level of education, then anatomical and physiological knowledge, causes of SCI, clinical features, investigations and treatment of SCI. The questionnaire was distributed electronically through the social media. This study was done between October 2016 and February 2017. The results were tabulated in an excel sheet. The result was then summarized for the central tendencies in term of the mode for the non-parametric values. A correlation was used between different values using the Spearman correlation method. The multiple regression analysis was used for the values. The odd ratio (OD) was calculated for different significantly correlating values to assess the risk of exposure and different outcomes. All the statistical analysis was done through SPSS software (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp). A p value< 0.05 was considered significant.

**Results:** The total number of responses was 501. All the responses were included. There were 154 (30.7%) males and 347 (69.3%) females. The most common age was between 21 to 30 years. The male gender had a potential for getting exposed to spine injury OR =1.98, 95% CI (1.15-3.39), p =.012. As well, for being a male there is a potential risk for the knowledge about loss of motor and sensory functions to be incorrect OR =3.54, 95% CI (1.86-6.73), p = .001 Participants that did not know the basic histology of the spinal cord, did not know the importance of MRI in spine injury as well OR =3.47, 95% CI (1.62-7.43), p =.001 and the importance of CT OR =2.75, 95% CI (.99-7.66), p = .044. The participant knew the basic anatomy of the spinal cord are likely to know the basic function as well OR =8.45, 95% CI (3.11-23), p = .001. People that lack the knowledge of function of the spinal cord are likely to lack the knowledge of the symptoms of the spinal cord injury OR =4.31, 95% CI (1.98-9.37), p = .001. Participants that reported positive history of spine injury choose the incorrect answer for the immobilization of the spine injured patients OR =3.47, 95% CI (1.35-8.93), p = .007. However, this group knew better about the surgical care OR =2.02, 95% CI (1.15-3.54), p = .013. Participants that lack the knowledge of immobilization of SCI patient may think that the loss of consciousness is part of SCI OR =1.98, 95% CI (.93-4.19), p = .023. On the other hand, the participants that knew the importance of immobilization they knew the importance of CT scan as well OR =3.25, 95% CI (1.22-8.65), p = .038. People that had a misconception of loss of consciousness in SCI are likely to lack the knowledge of the vital signs changes in this type of injury as well OR =2.8, 95% CI (1.95-4.04), p = .001. Not knowing the importance of MRI carried a risk of not knowing the importance of physiotherapy OR =2, 95% CI (1.04-3.8), p = .033. And having the incorrect knowledge about the role of surgery in the SCI is a potential for not knowing the importance of physiotherapy as well OR =1.67, 95% CI (1.01-2.75), p = .046. The level of education affected the knowledge in term of the primary and secondary level of educated people lack the basic structure of the spine P=.019, the causes of spine injury R2=.051, F(3,497)=8.93, p<.001, and the symptoms of spine injury p =.01 .
Conclusion: The initial feedback we obtained from the participants shows significant results regarding their knowledge level about the spinal cord and its injury. If we use these results properly, we can address a well educational plan to aware the society more as form of “Primary Intervention”. Our findings support the value of centering a national program in the Ministry Of Education to aware the population about the SCI especially in younger male aged group as it’s our main recommendation. The success of the program is based on the ability to find the targeted population and doing variety of continues surveys, campaigns and assigned curriculum objectives to assure covering all the important points regarding SCI.

Ethical Approval: This study was approved by the biomedical ethics research committee of King Abdulaziz University (reference No.341-16).

Acknowledgement: None declared.

Funding: None declared.

Poster 10. Percutaneous imaging-guided screw fixation of osteoporotic transverse fractures of the lower sacrum with cement augmentation
Salem Bauones 1,2, Julien Garnon 2, Guillaume Koch 2, Nitin Ramamurthy 2, Jean Caudrelier 2, Georgia Tsoumakidou 2, Roberto Luigi Cazzato 2, Afshin Gangi 2.

1 Radiology Department, King Fahad Medical City, Riyadh-Saudi Arabia. 2 Interventional Radiology Department, Strasbourg University Hospitals, Strasbourg, France.

Introduction: Osteoporotic fractures of the sacrum usually involve the sacral ala and can be managed with percutaneous cementoplasty if conservative therapy failed to achieve bone consolidation. On the other hand, isolated transverse fractures of the lowest sacrum are more rare, with little literature focusing on their management in the osteoporotic population. If pseudoarthrosis occurs in this location, sacroplasty is not an optimal therapeutic option because of the poor biomechanical resistance of cement to multi-directional stresses.

Objectives: To report two cases of chronic unhealed transverse fractures of the lowest sacrum successfully managed with percutaneous image-guided screw fixation augmented with cement injection. To illustrate the technical feasibility, safety, and favourable short-term outcome of this novel procedure.

Methods: Two cases with symptomatic non-united lower sacral transverse fractures underwent percutaneous image-guided screws fixation with adjunctive PMMA cement injection. Mechanical properties of osteosynthesis were adjudged superior to standalone cementoplasty in each case. Cannulated screws were placed under combined CT and fluoroscopic guidance with complementary cementoplasty to secure screw fixation. Clinical outcome at 24h, 1- and 3-month follow-up was measured according to VAS scale.

Results: Our two cases illustrate the feasibility of cement-augmented PIGSF for isolated transverse lower sacral fractures. Using a caudo-cranial midline trans-sacral approach, it was possible to access the sacral column via the cortex of S5, avoiding the lateral nerve roots and the central dural sac that terminates at S2–S4. CBCT imaging guidance facilitated precise K-wire placement perpendicular to the fracture and exact measurement of screw length to ensure that screw-heads were flush with S5 cortex, and screw-tips were completely within cancellous bone to optimize fixation. Two screws were placed to theoretically maximize rotational stability, although it is unclear whether this is clinically relevant. After 24 h, VAS was 0/10. At 1- and 3-month follow-up, there was ongoing complete pain resolution and significant improvement in mobility.

Conclusion: Our cases illustrate good efficacy and safety of PIGSF for transverse lower sacral fractures, with immediate and durable pain relief, improvement in mobility, hardware stability, and no significant complications. Ongoing clinical and radiological monitoring is mandatory given the absence of long-term follow-up. Further prospective studies with larger populations, longer followup, and validated outcome measures are required to evaluate the role of this novel technique in the management of this rare, disabling, but treatable clinical entity.

Ethical Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical st
Acknowledgement: NONE
Funding: NONE

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Poster 11. Knowledge around back pain and spinal disorders among Saudi patients: a cross-sectional study  
Awwad WM 1, Alfayez SM 1, Bin Dous AN 1, Alrabiei QA 2, Altowim AA 3, Almutair AS 3, Arafah O 1

Introduction: Lower back pain is more common among elderly patients, affecting 25.1% of men and 35.1% of women aged sixty years and above. In the countries of the Gulf Cooperation Council (GCC), LBP is considered a major health problem with a prevalence ranging from 18.8-64.6%. It is essential to ensure that the patients have proper understanding of the condition they are suffering from. In this regard, several studies conducted in different countries have investigated the level of knowledge in patients with back problems. The majority of these studies revealed unawareness of patients about the spine and its disorders. For instance, Tavafian et al., who assessed the attitude and awareness of Iranian patients towards LBP, found that 74% of them had little knowledge about LBP and its risk factors. That being said, educational interventions to correct the misconceptions and unawareness have proven to be effective in managing the pain and disability, especially if combined with other treatment modalities like physiotherapy.

Objectives: To assess the knowledge of patients about low back pain and spinal disorders.

Methods: This cross-sectional study was conducted at King Saud University, Riyadh, Saudi Arabia, from December 2015 to February 2016, and comprised patients presenting with lower back pain. The low back pain knowledge questionnaire was translated to Arabic and distributed, after adding more questions, among patients. The scores were calculated as per the published guidelines. SPSS 21 was used for data analysis.

Results: There were 153 patients in the study. The reliability test revealed a Cronbach’s alpha score of 0.834 for all items. The overall mean age was 40.2±19.3 years (range: 15-76 years). Besides, 61 (39.9%) participants were males and 92 (60.1%) were females. The overall median score was 9 (interquartile range: 0-19) out of 24 points. Both educational level and monthly income were found to be dependent variables (p<0.001; p=0.007).

Conclusion: The majority of patients with lower back pain had limited knowledge about their condition and the related complications.

Ethical Approval: approved by ethical committee at King Saud University
Acknowledgement: None declared.
Funding: none

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Poster 12. Dysfunctional breathing symptoms among healthcare workers with chronic neck pain: an observational pilot study  
Ameerah S. Al-Harthi 1,2, Hana I. AlSobayel 2, Einas S. Al-Eisa 2.
1 Physical Therapy department, Prince Sultan Military Medical City, Riyadh, Saudi Arabia. 2 Physical Therapy Division, Department of Rehabilitation sciences, King Saud University, Saudi Arabia.

Introduction: Neck pain is one of the leading causes of disability globally. It is prevalent among healthcare workers of different specialties. Several local studies have shown high prevalence rates among dental professionals as well as eye care professionals in Saudi Arabia. Many factors can contribute to neck pain and various manifestations may be present including breathing dysfunction.

Objectives: This is a pilot study to explore the association between chronic neck pain and dysfunctional breathing symptoms among healthcare workers.

Methods: A cross-sectional study with a convenience sample of 31 healthcare workers with chronic neck pain was conducted at Prince Sultan Military Medical City (PSMMC), one of central hospitals in Riyadh. The participants completed the Neck Disability Index (NDI), Nijmegen Questionnaire (NQ) and Self-Evaluation of Breathing Questionnaire (SEBQ) to measure neck pain and disability and dysfunctional breathing symptoms respectively.

Results: The majority of the participants were females (87%) with a mean age of 33.8±6.4 years. 42% were nurses, 29% physiotherapists while the remaining participants were dental assistants, physicians and office workers. The results showed a
moderate to good positive correlation between NDI \((18.84\pm10.97)\) and NQ \((16.61\pm9.32)\) \(r = 0.65, n= 31, p< 0.01\). Fair positive relationship was also shown with SEBQ \((10.71\pm9.35, rs= 0.49, n=31, p<0.01)\). The two breathing questionnaires (NQ, SEBQ) showed moderate to good positive relationship \(rs= 0.62, n=31, p<0.01\).

**Conclusion:** Healthcare workers who complain from chronic neck pain may present with dysfunctional breathing symptoms. Implications: It should be considered for physiotherapists to screen dysfunctional breathing symptoms when treating chronic neck pain clients and if present, provide subsequent assessment and treatment if needed. Moreover, incorporating breathing awareness/retraining as part of occupational safety and work-related injury prevention schemes would be beneficial.

**Ethical Approval:** Approved by the Research Ethics Committee of Prince Sultan Military Medical City (PSMMC) in Riyadh, Kingdom of Saudi Arabia.

**Acknowledgement:** None declared.

**Funding:** None declared.

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**Poster 13. Effectiveness of combined facets radiofrequency (RF) plus transforaminal epidural therapy versus facets RF alone for spinal facets syndrome pain due to hypertrophied lumbosacral facets syndrome with limited foraminal impingement.**

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Pain & Headache Management Center, International Medical Center Jeddah, Saudi Arabia.

**Introduction:** In lumbar foraminal nerve root impingement; spinal nerve roots in the lower back are compressed, producing tingling, weakness or numbness that radiates from the low back, buttocks and legs, while lumbosacral facet syndrome is a type of degenerative arthritis that occurs between the lower back and pelvis, causing significant pain throughout the lower body.

**Objectives:** The aim is to evaluate the effectiveness of combined radiofrequency (RF) plus transforaminal epidural therapy versus facets RF alone for back pain due to hypertrophied lumbosacral facets syndrome, in addition to radicular pain.

**Methods:** Study involved 80 patients of Pain & Headache Management Center, International Medical Center, KSA. First group (N=42) underwent combined LS (RF) + transforaminal epidural, applied to the lumbosacral facets region, with the following settings: 80 degrees x 1 min and repeated x 3 with repositioning of the needle plus transforaminal epidural block with dexamethasone plus ozone, applied to nerve roots (affected). Second group (N=38) underwent lumbosacral RF alone. Patients were followed up to one year period. Inclusive criteria: 46 females, 34 males; ages between 40-70 years old, with mean of 38 years; and patients who already failed 9-12 sessions of High Intensity Laser Therapy (HILT) and/or ExtraCorporal ShockWave (ECSW) or Physical Therapy (PT). Exclusive criteria: patients older than age 80; with uncontrolled diabetes and blood pressure; taking anti-coagulant; other neurological deficits; pregnant women.

**Results:** Average improvement of 72% for the first group, according to the numeric pain scale, was seen in patients who were treated by combined therapy; 59% in second group.

**Conclusion:** Patients with low back pain who went through the combination therapy had more significant improvement than those who went through LS facets RF only, with benefits lasting for more than 6 months.

**Ethical Approval:** N/A

**Acknowledgement:** None declared.

**Funding:** NONE

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**Poster 14. The validity and reliability of the Arabic version of the Japanese Orthopedic Association Back Pain Evaluation Questionnaire: can we implement it in Saudi Arabia?**

Alfayez SM 1, Bin Dous AN 2, Altowim AA 3, Alrabiei QA 4, Alsubaie BO 5, Awwad WM 6.

**Introduction:** The Japanese Orthopedic Association designed their back pain evaluation questionnaire (JOABPEQ) which was proven to be feasible, reliable and valid. The questionnaire’s validity and reliability were confirmed when it was implemented in patients with different cultural background.
Since the JOABPEQ still has not been utilized in any of the Arabic countries, we present the Arabic version with its validity and reliability.

**Objectives:** To assess the visibility of using Japanese Orthopedic Association Back Pain Evaluation Questionnaire in our community.

**Methods:** After ensuring an optimal forward-backward translation of the JOABPEQ, the Arabic version was distributed among 151 patients visiting our clinics from December 2015 to February 2016. The reliability was tested using Cronbach’s alpha. The convergent validity was assessed through aggregating and correlating the questionnaire’s items with their previously designed and validated subscales described in the JOABPEQ validity study by Fukui et al. (four items for social function, seven for mental health, six for lumbar function, five for walking ability and four for low back pain); Spearman’s correlation matrix was used. The correlation coefficient had to be greater than 0.40 for each item with its corresponding subscale to be satisfactory. Scores underwent descriptive analysis, and Mann-Whitney u test was performed to compare between categorical subgroups.

**Results:** 151 spine patients completed the questionnaire. The mean age (range) was 34.9 (10-72) years. The male respondents were 61 (40.4%) and the females were 90 (59.6%). The result of Cronbach’s alpha for internal consistency (reliability) was 0.87 for the 25 items. The validity was confirmed since the correlation coefficient was greater than 0.4 for each item with its corresponding subscale to be satisfactory. Scores underwent descriptive analysis, and Mann-Whitney u test was performed to compare between categorical subgroups.

**Conclusion:** the Arabic version of the JOABPEQ is valid, reliable and feasible in assessing patients with spine disorders. We believe the JOABPEQ with its different versions are suitable questionnaires to be used across nations and can serve as a unified tool in conducting research and exchanging information in the future.

**Ethical Approval:** approved by ethical committee at King Saud University

**Acknowledgement:** None declared.

**Funding:** none

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**Poster 15. The Effect of an educational program on preventing low back pain and improving the level of awareness among nurses**

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**Introduction:** The worldwide prevalence of the musculoskeletal disorder among nurses was reported from 40 % to 90 In Saudi Arabia, studies have shown that low back pain was highly prevalent among nurses ranging from 48% to 61%. Educational programs to prevent low back pain showed significant results in improving nurses’ knowledge and behaviors. However, the effect of the educational program on preventing low back pain among nurses remains scarce.

**Objectives:** The aim of this study is to evaluate the effectiveness of an educational program in improving the level of awareness and in preventing low back pain among nurses working in King Fahad Medical City.

**Methods:** Two electronic self-administered questionnaires were sent to all nurses in King Fahad Medical City to compare the incidence of low back pain and the level of awareness between nurses who received education and nurses who did not. These questionnaires were modified Nordic Musculoskeletal Questionnaire and a previously validated questionnaire to screen the level of awareness.

**Results:** A total sample of 507 nursing staff recruited in the study. Whereas 29 (5.7%) male and 478 (94.3%) female nursing participated. A low number of nurses 185 (36.5%) were involved in the educational program on preventing low back pain and the level of awareness between nurses who received education and nurses who did not. These questionnaires were modified Nordic Musculoskeletal Questionnaire and a previously validated questionnaire to screen the level of awareness.

**Results:** A total sample of 507 nursing staff recruited in the study. Whereas 29 (5.7%) male and 478 (94.3%) female nursing participated. A low number of nurses 185 (36.5%) were involved in the educational program on preventing low back pain. Similarly, 167 (32.9%) nurses had low back trouble during the last 7 days. 339 (96.6%) females nurses and 12 (3.4%) male nurses had statistically significant (P < 0.001) association with low back pain and physical activities. Overall there was statistically significant (P < 0.001) association physical exposure and low back problem that mean the occurrence of low back pain was higher in those who handling the patients, moving patients from bed to wheel chair, and ambulating patients etc. Also, statistical significant (P < 0.001) association was found between nurses who had back problems and had taken educational program activities. Furthermore, statistical significant (P < 0.001) association was observed between nurses who had taken educational program and had awareness and knowledge.
Conclusion: The education program is improving the knowledge and awareness for nurses, although, low back pain persists in both groups. Future research is needed to study the effectiveness of the multidisciplinary approach in decrease low back pain among nurses.

Ethical Approval: The study was approved by the Institutional Review Board for Medical Research at King Fahad Medical City.

Acknowledgement: None declared.

Funding: none

Poster 16. Differential effects of cathodal and anodal transcutaneous spinal direct current stimulation paired with locomotor training in chronic spinal cord injury: a report of two cases
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Introduction: Transcutaneous spinal direct current stimulation (tsDCS) is a noninvasive technique that can be used for modulating spinal cord and cortical neuroplasticity in humans. tsDCS is a simple, painless tool, involving the application of low constant direct current (DC) over the spinal cord to induce changes in the excitability in a polarity-dependent fashion. While anodal stimulation has an excitatory effect on the neuronal tissues, cathodal stimulation has an inhibitory effect. Previous studies has shown that tsDCS improved motor and sensory functional outcomes following SCI. However, most of these studies were carried out using a single session of stimulation and single type of tsDCS.

Objectives: The purpose of this study is to investigate the differential effects of anodal, cathodal and sham type of tsDCS, using multiple sessions of stimulations, paired with locomotor training in inducing spinal neural plasticity and behavioral functional changes in patients with chronic incomplete SCI.

Methods: Participants. Two male patients were included in this study, subject A (24 year old) and subject B (27 year old) with incomplete spinal cord injury (SCI) ASIA-C following a road traffic accident. Subjects presented on a wheel chair with spasticity, muscle weakness and urinary incontinence. Methods. This double-blind, sham-controlled, crossover study combined tvDCS with locomotor training on a robot-assisted gait treadmill. tsDCS was administered to both subjects; subject (A) received sham and cathodal stimulation and subject (B) received sham and anodal stimulation with 6 weeks for each type of stimulation. A two weeks washout period was given between each type of stimulation. Functional gait training was given to both subjects using a Locomat. Functional outcome measures included 10 Meter Walk Test (10MWT), Modified Ashworth Scale (MAS), Berg Balance Scale (BBS), Manual Muscle Testing (MMT) and Spinal Cord Independence Measure – III (SCIM-III). Corticospinal excitability was evaluated by measuring bilateral soleus motor evoked potentials (MEP) elicited by transcranial magnetic stimulation (TMS). Moreover, spinal cord excitability was measured by bilateral soleus H-reflex/M-wave ratio.

Results: Cathodal tsDCS increased scores of 10MWT, SCIM-III, BBS and decreased the scores of MAS and MMT. 10MWT, SCIM-III, BBS and MMT measures increased following anodal stimulation. Anodal stimulation also increased spasticity by increasing the scores of MAS. Sham tsDCS improved measures of 10MWT, SCIM-III, BBS and MMT but left the measures of MAS unchanged.

Conclusion: Findings indicate that cathodal tsDCS improves functional gait measures and alters spasticity in patients with incomplete SCI. These results suggest that each type of tsDCS has different effects, combined with gait training, on functional outcomes and neurophysiological corticospinal measures.

Ethical Approval: The experimental protocol was approved by our local ethical committees (Imam Abdulrahman bin Faisal University, Institutional Review Board).

Acknowledgement: We gratefully acknowledge the participation of our patients. Special thanks must go to Mr. Abdullah Alghazwani for his great effort.

Funding: This work was support partially by Imam Abdulrahman bin Faisal University.
**Poster 17. Low back pain among school teachers and its psychosocial effects: a cross-sectional study in Taif city**

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**Introduction:** Low back pain (LBP) is broadly recognized as critical problem which affect extensive section of the population. School teachers were at risk of LBP due to the nature of their works include many high risk postures.

**Objectives:** This study aim to identify the prevalence and severity of low back pain among teachers and its psychosocial influences.

**Methods:** A cross-sectional study in which Oswestry Low Back Disability Index (ODI) was used to assess LBP and patient health questionnaire (PHQ-9) was used to assess the psychological effects. Sampling technique was multistage clustering method and sample size was determined by Epi Info7 program.

**Results:** A total of 645 teachers from 41 schools was included with 52% of them were males. The means of age for males and females were 42.08± 6.82 and 39.46± 5.88, respectively. About 70% of teachers have experienced LBP in their lives and 61% of them had LBP last year. In addition, 54% of them had LBP last month and about 30% had LBP the same day. As a result of LBP, 32% had been prevented from doing normal activity and 27% had seen doctor. Also, 40% taking medication for LBP and about 19% had sick leave. Socially, 43% had difficulty in their social lives ranging from mild to severe. Females were more affected physically and psychologically with a significant statistical difference between them and males (P-value=0.002,0.001 for ODI and PHQ-9, respectively). There was a moderate significant correlation between PHQ-9 and ODI scores coefficients (r=0352, rho=0.403,p-value=0.0001). Smoking and prolonged sitting were significantly aggravating the depressive symptoms (P-value=0.026) and ability to do normal activity (p-value=0.002), respectively.

**Conclusion:** LBP prevalence is high among school teachers and it affects the psychosocial health significantly. Physical and psychological health of Teachers with LBP were significantly correlated.

**Ethical Approval:** Research proposal was reviewed and approved by institutional review board (IRB) of Taif university and ministry of education directory office at Taif city. No study activities were done before we got the approval.

**Acknowledgment:** This research was supported by the ministry of education directory office at Taif city. Also, We thank our colleagues from health services sector in that office who provided insight and expertise that greatly assisted this research.

**Funding:** None declared.

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**Poster 18. Does acetylcholine in dorsal horn of spinal cord come from pChAT positive DRG neurons?**

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**Introduction:** Acetylcholine (Ach) is a neurotransmitter synthesized from precursor acetyl-CoA (Ac-CoA) and choline via the enzyme choline acetyltransferase (ChAT). Several literatures have been put forward to investigate that pChAT, a splice variant of a peripheral type encoded alternatively by the gene for choline acetyltransferase of the common type (cChAT), was observed in dorsal root ganglia (DRG), along with ACh was visualized in situ on sections of mouse spinal cord using a new method called Tandem Imaging Mass Spectrometry (TIMS).

**Objectives:** Furthermore, the current study aimed to answer the question; does acetylcholine in dorsal horn of spinal cord come from pChAT positive DRG neurons? We designed our experiment focusing on the possible synthesis of Ach in rat spinal cord by pChAT.

**Methods:** We Perform dorsal root axotomy (DRx) in rat, and then correlate disappearance of pChAT by immunohistochemistry with succeeding disappearance of acetylcholine by TIMS.

**Results:** Our detailed analysis further showed that the layers (L1, L2, L3 and L4) of dorsal horn contained many pChAT positive axons, as well as the
dorsal column of spinal cord, whereas such positive nerves were found only occasionally in the contralateral side of DRx. On the other hand, the pChAT positive reaction disappeared in all layers of the dorsal horn and also not seen in sacral and lumbar projection of dorsal column in the ipsilateral side. **Conclusion:** Overall, the present investigation demonstrates ACh synthesized via pChAT in the dorsal horn of spinal cord, proposing an attractive role of ACh neurotransmission of the primary sensory afferents.

**Ethical Approval:** This research work was supported by MNRC, Shiga University of Medical Science, Seta Tsukinowa-cho, Otsu, Shiga, Japan

**Acknowledgement:**

**Funding:** This research work was supported by MNRC, Shiga University of Medical Science, Seta Tsukinowa-cho, Otsu, Shiga, Japan

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**Poster 19. Fabrication of Calcium Phosphate-Cel lulose nanocomposite scaffold for bone tissue engineering applications**

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**Introduction:** Bone is a natural nanocomposite that consists of hierarchically arranged collagen fibrils, proteoglycans, and hydroxyapatite (HA) crystals, all at nanometer scale. Osteoporosis is a common disease in skeleton of humans that characterized by low bone mineral density with structural weakness of bone tissue, leading to bone fractures of the hip, spine, and wrist [1-2]. Some of the epidemic studies indicated that 150 million peoples are suffering from osteoporosis in worldwide [3]. This degenerative bone disease primarily affects postmenopausal women, but also men may suffer from reduced bone mineral density. The prevalence of the disease will further increase as a result of the demographic development in many industrialized countries. The disease can be classified as either primary or secondary. Primary osteoporosis is often due to estrogen deficiency in women following menopause (postmenopausal osteoporosis), but may also develop at older age in men (senile osteoporosis, in both females and males) [4]. Secondary osteoporosis may occur as a result of hormonal disorders (e.g., hyperparathyroidism) or treatment of patients with glucocorticoids (steroid-induced osteoporosis) [5]. In addition, nutritional factors may be involved in the development of osteoporotic disorders [6]. In the Kingdom of Saudi Arabia (KSA), 34% of healthy Saudi women, and 30.7% of men, 50-79 years of age are osteoporotic. With a reported increased life expectancy in KSA increasing from 45-67 years in 1960 to 75.7 years in 2013, the prevalence of osteoporosis is expected to increase even further. Lifestyle factors play a significant role in the high prevalence of this disease, with low calcium intake, lack of physical activity, and a higher prevalence of vitamin D deficiency, being among the main culprits. In KSA, there is an approximately 8,768 femoral fractures each year costing billions, and being an endemic area for vitamin D deficiency, bone health is becoming a serious concern in the kingdom [7, 8]. Currently, nanotechnology has been cause the revolution in various sectors such as food, agricultural, electrical, information technology, pharmaceutical and biology. In biomedical sector nanotechnology based materials involved to detect and treat the diseases. Moreover, several kinds of nanostructure based scaffolds were exploited for bone tissue engineering applications. Thus, in this present investigation we prepared the calcium phosphate-cellulose nanocomposite and analyzed their biocompatibility on human mesenchymal stem cells

**Objectives:** Can the Fabrication of Calcium Phosphate-Cellulose Nanocomposite Scaffold apply for Bone Tissue Engineering?

**Methods:** Approximately 0.5 g of cellulose nanofibrils were immersed in 50 mL of distilled water under stirring. Then, 50 mL of a 0.01 M calcium chloride solution was added drop wise to cellulose nanofibrils under magnetic stirring at 70 °C. Afterwards, a 0.02 M disodium hydrogen phosphate solution (50 mL) was added dropwise to the mixture for 30 min with stirring. The mixture was centrifuged at 3,000 rpm for 10 min. The resulting pellet was collected and dried at 85 °C. The obtained powder was used for further studies. The crystalline nature and
morphological properties of fabricated nanocomposites were analyzed using X-ray diffraction and transmission electron microscope respectively. The biocompatibilities of the nanocomposites were assessed by MTT assay and AO/EB staining.

**Results:** The prepared nanocomposites crystalline nature was analyzed using X-ray diffractometer. The XRD patterns of the prepared nanocomposites are shown in Fig. 1. The XRD results of the synthesized calcium phosphate-cellulose nanocomposites (Fig. 1) exhibited a number of diffraction peaks that were attributed to the formation of hexagonal-phase hydroxyapatite on cellulose nanofibrils. The peaks corresponding to calcium phosphate in the XRD patterns are in good agreement with the peaks listed in the standard JCPDS database (No. 74-0566). Tissue engineering and regenerative medicine is an emerging field that aims to build biological substitutes to improve human health. Currently, upon the examination of nature, the use of nanotechnology for regenerative medicine is obvious. For example, bone and tooth are organic/inorganic hybrid composites. In particular, the bone matrix is composed of nanocrystalline calcium phosphate and collagen fibers. Biocompatibility is an essential requirement for biomedical applications of nanocomposites. The biocompatibility of the prepared silica nanocomposites were analyzed with hMSC cells by the MTT assay. The hMSC cell viability was analyzed after the cells were exposed to nanocomposites for 24 and 48 h. The effect of the silica nanocomposites on the viability of the hMSC cells is shown in Fig. 2. No significant reduction was observed in the viability of cells treated with the prepared nanocomposites. According to the results, nanocomposites exhibit cytocompatibility and can be used for bone tissue engineering applications.

**Conclusion:** Overall study results indicate that nanocomposite based scaffold can be applicable for bone tissue engineering.

**Ethical Approval:** not applicable.

**Acknowledgement:** None declared.

**Funding:** none

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**Poster 20. Understanding the interactions with image-guidance system in spine navigated surgery**

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**Introduction:** The technology used to acquire imaging for intra operative surgical navigation, has evolved from the discovery of X-rays in the late 19th century to the highly sophisticated intra operative Computed Tomography (CT) based navigation tools used today. Navigation has emerged as one of the most reliable representative of technology; as it continues to transform surgical interventions into safer and less invasive procedures.

**Objectives:** Image-guided technology has transformed spinal surgical interventions, in this review article the author attempts to understand the interactions with the most commonly used 3D system with the intraoperative cone beam CT, and develop a smooth workflow surgical plan.

**Methods:** The introduction of cone-beam CT enabled multiple fluoroscopic image acquisition by a device that rotated isocentrically around the patient. The images are reconstructed into a cone-beam CT scan that can be used for navigation once it is transferred to an image-guided system. As the reference arc is tracked with the patient imaging, the computer-generated 3D image of the patient’s operative field is already registered and ready for use with navigation.

**Results:** The users of navigation cited increasing accuracy, facilitating complex surgery, minimizing radiation exposure, performing a high volume of surgeries, and its use for minimally invasive surgeries as advantages.

**Conclusion:** With an increasing number of intraoperative imaging and navigation options being made available to surgeons, integrating effective training and shortening the learning curve are essential to making this technique cost-effective and safe. However, if the surgical team is aware and takes into account the above interactions, image-guided systems enable safe and accurate placement of spinal instrumentation in both routine and challenging situations.

**Ethical Approval:** No need for an ethical approval for a review study

**Acknowledgement:** AlHabib Medical Group
Funding: None declared.

Poster 21. Benefit of intraoperative neurophysiological monitoring in a pediatric patient with spinal dysmorphism, split cord malformation and scoliosis
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Introduction: Split Cord Malformation (SCM) is a rare, uncommon congenital anomaly, where a segment of the spinal cord is subdivided longitudinally into two hemicords, and the two segments reunite again below the split (1). It has been described as the milder and most common form of spinal dysraphism, with reported incidence rate of 3.8-5% of all spinal cord anomalies. It’s mainly a condition of children, as it been well documented, symptoms and accompanied neurological deficits related to congenital anomalies may not appear at birth, but they start to appear with the child’s growth as a result of spinal cord continuous tethering with the growth. these symptoms can be categorized into three main categories: neurological, cutaneous, and orthopedic manifestations.

Objectives: To demonstrate the role of multimodality Intraoperative Neurophysiological Monitoring (IONM) in preventing intraoperative neurologic insult and minimizing any post-operative neurologic deficits in a patient with spinal dysmorphism (tethered cord), split cord malformation (Diastematomyelia) and scoliosis.

Methods: A retrospective analysis was performed on one pediatric patient who underwent twelve operations for the correction of scoliosis, split cord and untethering of the spinal cord. A multimodality IONM protocol including Somatosensory Evoked Potentials (SSEP), Transcranial electrical Motor Evoked Potentials (tCEMEP) and Electromyography (EMG) was utilized during the last six procedures.

Results: The patient underwent six neurosurgical and orthopedic procedures from age 3 to 6 years. This included release of tethered cord, resection of filum terminale, removal of bony spur at T11-T12 level and release of adhesions at L3 level. This was followed by a repair of subcutaneous meningocele, correction of scoliosis with VEPTR (Vertical Expandable Prosthetic Titanium Rod) technique, and expansion of VEPTR every six months. All these procedures were done without Intraoperative Neurophysiological Monitoring (IONM) and without any post-operative neurological deficits. At age six (procedure #7) a VEPTR expansion with multimodality IONM was performed. During VEPTR release, first left lower and later right lower MEPs were lost. Surgeon slightly expanded VEPTR and cancelled spinal correction resulting in reappearance of tCEMEP responses before closing. Patient moved all extremities post-operatively. The post-operative MRI showed partial split cord malformation with re-tethering of spinal cord. The patient underwent surgery for the repair of split cord malformation and release of tethered spinal cord with IONM. After laminectomy an intracanal bone spur was found. The dura was exposed, a cartilage like band attached to the cord was identified extending from the dura to the dorsal surface of the cord. Careful dissection with microsurgical technique was made. The cartilage band was completely removed. The cord was spitted. All arachnoid and adhesions in between the cord and the dura were removed. Then filum terminale was isolated utilizing 1.0-2.0 mA triggered EMG (t-EMG). The last five (5) procedures done with IONM were without any intraoperative changes.

Conclusion: IONM is a technique which has been proven to be mechanically feasible even in younger age. A multimodality IONM can be confidently used to identify any underlying neurophysiological changes during complex surgical procedures. This reduces the risks of post-operative neurological deficits due to surgical damage and incomplete untethering of the spinal cord. We strongly recommend to utilize IONM during high risk surgical procedures to avoid any post-operative neurological...
Poster 22. The impact of sleep deprivation on the performance of surgical and medical residents in the Eastern Province of the Kingdom of Saudi Arabia

Imam Abdulrahman Bin Faisal University, Saudi Arabia

Introduction: Residency training is known to be a stressful and demanding period due to the long working hours and overnight calls. Therefore, residents are more susceptible than others to sleep deprivation, which in turn could affect their performance. However, residents of different specialties are subjected to variable workloads, which could be affected by sleep deprivation differently.

Objectives: The aim of our study is to assess the variability in the impact of sleep deprivation on the performance of surgical and medical residents. This, according to our knowledge, has not been done in Saudi Arabia to date.

Methods: A Questionnaire was distributed in person to general surgery and internal medicine residents of all levels in Saudi Commission of Health Subspecialties accredited training centers in the Eastern Province of Saudi Arabia. It focused on working hours, post-call daily functioning, and sleep requirements. It included a modified Sleep Deprivation Index (SDI) scale, composed of 12 items, which allowed assessment of the effects of sleep deprivation on individual performance.

Results: A response rate of 47% (56/119) for general surgery and 50.4% (71/141) for internal medicine residents was obtained. Overall, surgery residents reported longer post-call working hours (averaging 6.7 versus 5.7 hours) and a nearly equivalent number of sleeping hours on a regular on-call night compared to medicine residents (1.08 versus 1.00 hours). Surgery and medicine residents had very similar scores in the SDI scale (27.99 versus 28.35) signifying no difference in impact of sleep deprivation on performance among the two groups.

Conclusion: The study demonstrates that despite working longer hours, surgery residents do not display increased impact of sleep deprivation on their performance compared to medicine residents. This could be attributed to true resilience to sleep deprivation among surgery residents or to the primary culture within the surgical field in which individuals are less accepting of natural limits of personal performance. Future researches may compare impact of sleep deprivation on the performance of female and male residents.

Ethical Approval: Ethical approval was taken from the Institutional Review Board (IRB) committee in Imam Abdulrahman Bin Faisal University.
Acknowledgement: None declared.
Funding: None declared.

Poster 23. Use of steroid in spinal cord injury: myth or fact

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Abstract

Introduction: Spinal cord injury (SCI) is common cause of morbidity and mortality in this country and around the world. A lot of research were done to find definite treatment but none of them reached good clinical trial except methylprednisolone.

Objectives: But it was challenged by many spine expert to have insufficient evidence for routine clini-
ical use, especially its side effects was documented in most of clinical trial, while its benefit was limited to few studies related to same author.

**Methods:** It’s clinical benefit was difficult to reproduced, hence most spine surgeon stopped its use in SCI. We review the latest studies with the original NASCIS studies trying to come up with the right conclusion

**Results:** Most studies does not support the use of steroids in SCI, but the few one that support it, caution the treating surgeon about the consistent side effect compared to the inconsistent benefits of neurological recovery

**Conclusion:** Treating the patient with SCI should be standerized with clinical pathway. Steroid should not be one of them, instead it should be the discretion of the surgeon having in mind the side effects. The future hold more studies on novel substances that showed good result in animal studies

**Ethical Approval:** None declared.

**Acknowledgement:** None declared.

**Funding:** None declared.

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**Poster 24. Prevalence of low back pain among health science students**

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1. Medical Intern, King Saud University. 2. Orthopedics Department, KKHU, Riyadh, Saudi Arabia.

**Introduction:** Health science students are vulnerable to studying problems, stress and prolonged time of studying and training which will lead to sedentary lifestyle, making them predisposed to having LBP.

**Objectives:** To determine the prevalence of low back pain (LBP) among health sciences students and to identify the associated factors.

**Methods:** Cross-sectional study was conducted among 1053 students from 5 health sciences colleges during the academic year 2016-2017. Self-administered questionnaire was conducted and included 4 sections: demographic characteristics, risk factors, Nordic Musculoskeletal questionnaire and Oswestry disability questionnaire. Data were analyzed using SPSS.

**Results:** Mean Age was 20.7 ± 1.6 years. 70.9% of students were female. Lifetime prevalence of LBP was 56.9% and 12-months 48.8%. Dentistry students reported highest lifetime prevalence of LBP (67.6%) with significant p-value (<0.001). Being male is associated with LBP (OR 1.65; 95% CI 1.25-2.17; p= <0.001). Students that were over age of 23 years had an association with LBP (OR 2.23; CI 95% 1.5-3.32; p= <0.001). Physically active students were associated with LBP (OR 1.30; 95% CI 1.01-1.67; p= 0.044). Spending more than 10 hours on computer or tablet was significantly associated with LBP (OR 2.19; 95% CI 1.30-3.70; p= 0.003). Feeling discomfort on bed was associated with LBP (OR 1.81; 95% CI 1.38-2.38; p= <0.001). Uncomfortable college furniture was associated with LBP (OR 1.40; 95% CI 1.09-1.79; p= 0.008). According to Oswestry disability scale, majority of students whom having LBP (90.3%) are having minimal disability due to LBP.

**Conclusion:** This study have shown high prevalence of LBP among future health care provider. These risk factors should be well established to minimize the prevalence of LBP among future health sciences students.

**Ethical Approval:** Research was approved through IRB Committee in College of medicine, KSU.

**Acknowledgement:** None declared.

**Funding:** None declared.

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**Poster 25. Self-reported outcome measures for LBP adapted to arabic in KSA**

**Sofiane Mokhtar Ghorbal 1, Mohamed Abdelhamid Guermazi 2, Mourad Ben Smail 3, Riadh Mohamed Rebai 3.**

1. Rabigh General Hospital. 2. King Abdulaziz Hospital, Jeddah. 3. King Fahd Hospital, Jeddah.

**Introduction:** Patient reported outcomes are frequently used in clinical practice, epidemiologic studies and researches. Cross-cultural adaptation of existing questionnaires to arabic is important for a number of reasons as exploring the impact and prevalence of low back pain in Arabic societies.

**Objectives:** To identify the available cross cultural adaptations to Arabic of questionnaires for low back pain in KSA and describe the psychometric properties of these adapted questionnaires.
Methods: A search on Medline and Google scholar for the terms back pain and lowback pain combined with the terms questionnaire, index, scale and outcome measures and Arabic. The data of the psychometric properties was extracted.

Results: Four questionnaires adapted to Arabic were identified: the Oswestry Disability Index (ODI), the Roland Morris Disability Questionnaire (RMDQ), the Fear Avoidance Beliefs Questionnaire (FABQ), and the Back Beliefs Questionnaire (BBQ). The crosscultural adaptations were performed using the “forward/backward” translation method. All the adaptation have been evaluated for the test-retest reliability, internal consistency and construct validity with adequate acceptance. The sensitivity to change was performed only for the FABQ.

Conclusion: The Arabic version of these questionnaires are reliable tools that enables clinicians and researchers to assess and compare consequences, functional disabilities, and clinical outcomes of different interventions for LBP in KSA.

Ethical Approval: None declared.

Acknowledgement: None declared.

Funding: None declared.

Poster 26. Giant cell tumor of the upper thoracic spine: report of a case and review of literature
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Imam Abdulrahman bin Faisal University, Saudi Arabia

Introduction: Giant cell tumor (GCT) is a benign neoplasm that typically classified as a locally aggressive tumor with malignant behavior and potential metastasis to the lung, typically develops after maturity. Most GCTs of bone occur in the epiphysis or meta-epiphysis of long bones and are rarely found in the spine. When involving the spine, the tumors occur predominantly in the sacrum. GCTs have a female predominance of 70.8% and present primarily during the third or fourth decades of life. GCTs in the spine (excluding the sacrum) constitute less than 2% of all vertebral tumors and less than 1% of all GCTs.

Objectives: The purpose of this study was to demonstrate a case of giant cell tumor in the upper thoracic spine of a single center experience with reviewing the literature and to demonstrate the medical as well as the surgical options and other possible adjuvant options and to show how these adjuvant therapies have contributed to the treatment of a such spinal pathological entity.

Methods: we retrospectively reviewed all of our case records, clinic, radiological, pathological, operative & post-op, and follow-up documents were reviewed thoroughly. Among the studies, we have reviewed 21 cases identified (including ours) of GCTs involving the thoracic spine. All data were analyzed by SPSS Statistics.

Results: The Statistical analysis of our study cases revealed, Means ± Standard deviations (means ± SDs) of the age between 16 to 64 years with mean of 33.95 and (± SD of 13.23) years, which was consistent with the findings of a previous study that demonstrated that GCTs present primarily during the fourth decade of life. For these 21 cases ratio of men to women was approximately 1:1.5 which was consistent with the results of previous studies. Through all GCTs cases reviewed here, we found that 50% of cases were in the T1-T7 region and the other 50% were in T8-T12 region of the thoracic spine. the most frequent complaint was pain which was consistent with the previous studies.

Conclusion: The management of patients with giant cell tumors of the spine represents a challenge, and since there is no specific treatment algorithm of this aggressive tumor, treatment option is tailored to the individual case, a biopsy is a gold standard method to diagnose spinal GCTs and en block total resection remains the treatment of choice. However surgical resection is not always applicable to all cases of spinal GCTs especially those in the cervical and upper thoracic regions due to the anatomical complexity of the region, and hence Obstacles in GCTS surgery have brought about novel ideas of non-surgical procedures (selective arterial embolization, radiotherapy, bisphosphonate therapy, denosumab therapy). So the Challenging matter is which one of these options is more convenient according to the specific case and the situation, since every supportive adjuvant therapy has its own advantages and drawbacks, and up to now there is no single best treatment when the surgical resection is not an option. So wide randomized control trial is needed.

Ethical Approval: None declared.
Acknowledgement: Special thanks to Dr. Wisam Al-Issawi for his precious support and monitoring.
Funding: None

Poster 27. Double hinged arms spinal retractor with distal articulation: a new idea
Mohammad Yasser Ghoneim
King Abdullah Medical City, Holy Capital, Saudi Arabia

Introduction: I am going to present my patented new idea of Double Hinged Arms Spinal Retractor with Distal Articulation

Objectives: Easy and fast handling single instrument retractor, provides effective retraction with smaller incisions, and clear better view, secured fit, reduces operative trauma to muscle tissues and post-operative pain.

Methods: modifying the single arm retractors by adding a second hinge at arm-prongs connection.

Results: It carries the advantages of avoiding having a full retractor sets, e.g. Caspar, McCulloch, etc., with its drawbacks having to have the full set with its cost, needs of more space in instruments table, training and orientation of nursing staff, and many trials until get proper size. It also provides over the single instrument retractors with or without single hinge, as in cerebellar and Beckman types, the advantages of easy application, proper muscle retraction with prongs appropriately running perpendicular to muscle fibers reducing traumatic application, provides clear and adequate surgical field view, could be adjusted properly regardless wound depth with no upward projection of arms or shafts, easy to shift handles from one wound end to the other without removal and re-application and could be used in smaller incisions, as in limited approaches, comparing to other types.

Conclusion: In brief it is a single surgical instrument retractor with easy and fast handling, provides effective retraction and clear better view, secured fit, using smaller incisions, reduces operative trauma to muscle tissues and post-operative pain.

Ethical Approval: Published in PCT, PATENT COOPERATION TREATY Publication number WO2010020257 A1 Publication date Feb 25, 2010

Acknowledgement: Prototype is currently in use with spinal surgeons in Saudi Arabia, Egypt and U.K, the evaluation and suggestions of sizes and dimensions is under process of manufacturing, and also thinking about modification of blades for possibility of use in anterior
Funding: None “Self funded”

Poster 28. Use of stem cell in spine surgery
Abdulwahed Barnawi
Prince Sultan Military Medical City, Riyadh, Saudi Arabia

Introduction: Stem cell therapy is becoming a hot topic in many speciality and have many contributions in managing our patients according to their use and location of usage. In this paper we are reviewing the data published before and highlight the usage of stem cell in spine disease patients and how that going to help them today or in future

Objectives: To get idea and update our knowledge about the latest usage of stem cell in spine disease and how that going to help our patients

Methods: We reviewed articles from pub med searching for stem cell in spine, regeneration in spine, and stem cell. We did not determine period for the articles publication. And then all article received been analyses and their results been written

Results: We find the use of stem cell in spine it can be a future solutions for many problems we encountered during our management to our patients

Conclusion: Science is revolving and many years ago we considered a patient with chest infection is dead patients until proven other wise till the modern Medicine and the start of antibiotics era, I think this is very much applicable to many thing now we can not find right answers for it. But all this articles we think they contribute to our future understanding and may they give us the keys to solve most of the disease in spine we consider it now far from our hand.

Ethical Approval: Was not need approval from the ethical committee
Acknowledgement: My resident and fellow
Funding: Nothing to disclose
Poster 29. What are the barriers to developing disaster nursing core competencies?
Abdulellah Al Thobaity
Nursing Department, College of Applied Medical Science, Taif University, Saudi Arabia

Introduction: All nurses must have core competencies in preparing for, responding to and recovering from a disaster. In the Kingdom of Saudi Arabia (KSA), as in many other countries, disaster nursing is not fully understood and lack reliable, validated tools.

Objectives: This study aimed to explore barriers of disaster nursing in KSA.

Methods: This research was based on a pragmatic paradigm that permitted the use of the sequential methods approach that was selected for the study design. The settings of this study included 14 hospitals operated by different ministries in KSA. Study design had two phases. First, the quantitative phase involved three stages: pre-pilot, pilot, and national. In the second phase, the meanings of the most important findings from the national study were elaborated upon to develop better understanding of them.

Results: The main barriers to developing disaster management in Saudi Arabia were found to be research, education, qualification, and resources.

Conclusion: This study has implications for developing and improving disaster planning. Recommendations included the following: 1) emphasising the identified core competencies in all disaster planning; 2) instituting drill plans; 3) recognising the importance of the purpose and content of disaster plans; 4) addressing the identified communication, ethical, and cultural issues in all disaster planning; 5) involving emergency nurses in disaster planning; 6) planning for decontamination; and 7) improving disaster planning, since it was found to be a barrier to developing disaster nursing in Saudi Arabia.

Ethical Approval: King Abdullah Medical City: Institutional Review Board: Version No. 05-35-B IRB number 13-083, Sponsor: MOH
Acknowledgement: None declared.
Funding: Taif University- Saudi Arabia

Poster 30. Recurrent chest infection
Hadi Alaskar, Yasser Al-Jehani
Surgery Department, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia

Introduction: Esophageal perforation is a known complication of anterior cervical spine surgery, however it is a rare complication. It has an incidence of 0.25% and occurs hours, months or even years following surgery. A systemic review of 153 patients who underwent anterior spinal surgery and sustained esophageal perforation from 1980 to 2015, had a mean age of 44.7 years. The commonest symptoms at time of presentation were dysphagia, fever, neck swelling, and wound leakage. Etiology of perforation was found to be mostly due to hardware erosion or migration. Perforation may be identified by; modified contrast dye swallow studies, CT, endoscopy, plain radiography, and MRI. Some cases may be complicated with pneumonia, mediastinitis, osteomyelitis, sepsis, acute respiratory distress syndrome, and recurrent laryngeal nerve damage. The mortality rate in one review was 3.92%.

Objectives: A rare case of late esophageal perforation as a complication of Anterior cervical fixation That presented with Recurrent chest infections.

Methods: Case Report

Results: In conclusion, if perforation is suspected, imaging such as contrast studies, CT-scan or MRI should be employed to aid in diagnosis. Removal of hardware has an important role in the ultimate repair. Primary repair with a sternocleidomastoid flap is one of the most effective methods of achieving definitive esophageal repair.

Conclusion: In conclusion, if perforation is suspected, imaging such as contrast studies, CT-scan or MRI should be employed to aid in diagnosis. Removal of hardware has an important role in the ultimate repair. Primary repair with a sternocleidomastoid flap is one of the most effective methods of achieving definitive esophageal repair.

Ethical Approval: Case Report
Acknowledgement: None declared.
Funding: None declared.
**Poster 31. Spontaneous spinal epidural hematoma in pregnancy: case-report**

*Ali Malik Alahmed, Faisal Alabbas*  
King Fahad hospital, University of Dammam, Saudi Arabia

**Introduction:** We report an unusual clinical association with Spontaneous spinal epidural hematoma which is the pregnancy, we want to highlight that the most broadly accepted hypothesis cause of SSEH is a venous bleeding. The best diagnostic modality for it is spinal MRI and The best treatment choice for the majority of patients is an immediate surgical decompression of the neural structure.

**Objectives:** to emphasize that the immediate surgical intervention is mandatory to prevent the permanent neurological defect.

**Methods:** case-report

**Results:** we want to highlight that the most broadly accepted hypothesis cause of SSEH is a venous bleeding. The best diagnostic modality for it is spinal MRI and The best treatment choice for the majority of patients is an immediate surgical decompression of the neural structure.

**Conclusion:** We report an unusual clinical association with Spontaneous spinal epidural hematoma which is the pregnancy, we want to highlight that the most broadly accepted hypothesis cause of SSEH is a venous bleeding. The best diagnostic modality for it is spinal MRI and The best treatment choice for the majority of patients is an immediate surgical decompression of the neural structure.

**Ethical Approval:** IRB is under studying from king Fahad hospital in Khobar

**Acknowledgement:** None declared.

**Funding:** none

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**Poster 32. A Cervical nerve root Ewing Sarcoma resembling a Schwannoma: case report.**

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1 Division of Neurosurgery, Department of Surgery, College of Medicine, King Saud University, Riyadh, Saudi Arabia. 2 Department of Pathology, College of Medicine, King Saud University, Riyadh, Saudi Arabia.

**Introduction:** Ewing’s sarcoma (ES) is a malignant primitive neuroectodermal tumor (PNET) thought to arise from neural crest cells. It is the second most common malignant bone tumor after osteosarcoma, with a peak incidence in the second decade of life. 234 Overall, it is rare, making up about 10% to 15% of all primary bone tumors and 6% of all malignant bone tumors. 5 Between 1973 and 2004, the incidence of ES in the United States of America (USA) was 2-93 per 1,000,000 individuals. 1 Almost 85% of those cases present primarily with skeletal ES, while the rest have extraskeletal disease in the region of the head and neck, buttocks, lower extremities, chest wall, and retroperitoneal space. 4567 ES is reported to affect the pelvic bone and femur, but rarely the cervical spine. 138 The incidence of primary vertebral Ewing’s sarcoma is 3.5%. 138

**Objectives:** The occurrence of primary ES in the spine is unusual. The current case presents a unique case of an extraskeletal ES arising within a cervical nerve root and resembling a schwannoma. It adds to the understanding of ES location and significance of carefully following the final pathology report of the resected lesion.

**Methods:** Clinical assessment  
A 31-year-old Indian woman presented with progressive left upper limb C7 radiculopathy for the 6 months. The patient had total thyroidectomy 4 years prior to the current presentation followed by high dose of Radioactive iodine (131I) for thyroid papillary cancer. Her current pain was reaching to the left middle finger. It was electric and burning in nature and was more severe at night. She also experienced neck stiffness and left upper limb numbness. She had no other significant symptom. Physical examination revealed left upper limb muscle wasting, decreased sensation to pain, weakness of left elbow extension, and absent left triceps jerk. Cervical magnetic resonance imaging (MRI) showed a 1 x 2 cm well-defined T2 hyperintense mass lesion with heterogeneous enhancement in a mildly expanded left C6-C7 neural foramen. Imaging features were suggestive of a nerve sheath tumor-like schwannoma (figure 1-A). Operation technique and post-operative course  
Under general anesthesia, the patient was positioned prone. A left paramedian incision was done corresponding to C 6-7 level. Sequential muscle dilators were introduced and the left C 6-7 facet joint was identified. Left C6-7 facetectomy was performed and the
nerve was identified. The nerve sheath was opened and the tumor was found to be soft, grey, and separable from the surrounding nerve roots. It was removed in piecemeal achieving a gross total tumor removal. The patient experienced an uneventful post-operative recovery with marked improvement in the radiculopathy and power. Post-operative cervical spine MRI did not show any tumor residual (figure 1-B). Systemic imaging did not show any tumor elsewhere. Histopathology and Immunohistochemistry Histopathology showed an undifferentiated densely cellular tumor that consisted of small round to oval cells with scanty cytoplasm (figure 2). The stroma was minimal and the tumor cells exhibited predilection to cluster around the blood vessels. The tumor cells were strongly and diffusely positive for CD99 and focally for CD56, S100 and synaptophysin. They were negative for LMWCK, CD3, CD20 and CD45. Ki-67 proliferative index was high (about 40%, figure 2). The overall findings were compatible with Primitive Neuroectodermal Tumor (PNET)/Ewing's Sarcoma. Chemotherapy-radiotherapy treatments and follow-up The patient received adjuvant therapy including combined chemotherapy regimen of Etoposide (VP-16, a topoisomerase inhibitor) and Ifosfamide (nitrogen mustards alkylating agents) with Mesna (2-mercaptoethane sulfonate Na). On follow-up at one year, the patient had no active complaints. She was independent and back to work as a health care worker.

Results: Discussion The current case demonstrated a rare occurrence of spinal ES resembling a nerve sheath tumor. ES is a member of the Ewing's Sarcoma Family Tumors (ESFTs), which includes osseous Ewing's sarcoma, extraskeletal Ewing sarcoma (EES), Peripheral Primitive Neuroectodermal Tumors (pPNET), and Askin's tumor. 248 Most ES tumors occur in the long bones, pelvis, or ribs, but rarely may have an extraskeletal origin, hence the name extraskeletal Ewing sarcoma (EES); which has similar histology to skeletal ES and commonly affects the epidural spaces and paravertebral regions. 59 The differential diagnosis of small round cell tumors includes neuroblastoma, primitive neuroectodermal tumors of bone (PNET), malignant lymphoma, rhabdomyosarcoma, and ES. 356 MRI is the method of choice for assessing the full extent of ES tumor and their relationships to neurovascular structures. 5710 MRI characteristics of Primary Spinal Extrudural Ewing's Sarcoma (PSEES) are not specific and indistinguishable from other tumors. 7 It is low to intermediate signal on T1, heterogeneous but prominent enhancement on T1 with contrast and heterogeneously high signal on T2 with hair on end low signal striations. 11 On the other hand, radiographs usually show a lytic lesion or less commonly sclerotic changes. 3 However, these findings appear late on X-ray when neurological signs have become obvious. 35 Based on imaging, similar to the current case, ES tumors are often misdiagnosed as neurogenic tumors (schwannoma, neurofibromatosis) or giant cell tumors. 1 ES/PNET may be considered when a focal circumscribed spinal lesion is found in a young individual. 4 Rarely, ES may appear as a spinal dumbbell tumor with an incidence 17.5% of ES in the spine present as dumbbell shape tumors. 1 The relation of the current tumor to the patient's previous radioactive treatment is uncertain. Radioactive iodine (131I) has been used to diagnose and to treat hyperthyroidism and thyroid carcinoma patients. 12 However, ionizing radiation is itself a known carcinogen and there is a risk of developing sarcomas in the irradiated bone or soft tissues. 13 The risk to develop secondary primary malignancies (SPMs) linked to radioiodine (131I) was not increased in adult patients in which radioiodine (131I) was used for hyperthyroidism due to the relatively low dose of radiation. 13 However, in case of treating thyroid cancer, it carries a significant radiation exposure with a potential risk of radiation-induced sarcoma (RIS) because of a cumulative radioiodine (131I) dose ≥ 37.0 GBq. 1213 The risk of RIS was about 0.06% at an averaged latency of 15 years (3-64 years) after radiation therapy and influenced by factors such as dose, age at initial exposure, exposure to chemotherapeutic agents, the environment and genetic susceptibility. 1415 The most common histologic types of RIS were osteosarcoma, chondrosarcoma, malignant fibrous histiocytoma/sarcoma, nitric oxide synthase, and fibrosarcoma. 13 To differentiate RIS from the sporadic type, the sarcoma should arise within the irradiated field; which is the situation in the current case, histologically distinct from the index lesion and there must be a latency of several years after the exposure. 15 The clinical presentation of spinal ESS includes compression of the spinal cord, nerve roots or cauda equina syndrome. 4 The patient could present with axial spine pain with or without radicular pain, limb paresis, or sphincter dysfunction. 45 Some patients may expe-
rience systemic manifestations like fever, anemia, leukocytosis, and increased erythrocyte sedimentation rate at admission. The age of presentation ranges from 12 to 24 years (median 21 years) with a distinct predilection for males. The diagnosis of ES relies on histopathology and immunohistochemistry. 34 The p30/32MIC-2 gene product, CD99, is a cell-surface glycoprotein expressed in Ewing's sarcomas and primitive neuroectodermal tumors. 3568 Strong membrane staining for CD99 is consistently seen in Ewing's sarcoma with monoclonal antibodies 12E7, HBA-71, and O13. 5 Cyto genetic and molecular genetic studies can also be useful adjunctive tools in diagnosing Ewing's sarcoma. The t(11; 22) (q24; q12) chromosomal translocation can be identified in most Ewing's sarcomas and primitive neuroectodermal tumors. In our case, the diagnosis of Ewing's Sarcoma was confirmed by histopathology and immunohistochemistry. Ewing sarcoma is an aggressive tumor, which has a high incidence of recurrence and metastasis. Delay in diagnosis and treatment may lead to early metastasis, which remains the most important prognostic factor affecting outcome along with extraskeletal involvement at presentation. About 25% of ES patients will present with metastatic disease and the most common sites for metastases are the lung (50%), bone (25%) and bone marrow (20%). The definitive treatment of ES consists of wide surgical resection within safe limits, followed by chemotherapy and local irradiation, which may lead to 40% improvement in the prognosis. Ideally, the treatment should begin with 2-3 cycles of neoadjuvant chemotherapy; aiming to shrink the tumor and achieve marginal resection. 1513 ES tumors have variable sensitivity to radiation and chemotherapy due to biological heterogeneity. The classical chemotherapy regimen followed in ES consists of VACA (vincristine sulfate, dactinomycin, cyclophosphamide, and doxorubicinhydrochloride). Recently, insulin-like growth factor 1 receptor (IGF1R)-targeted therapies have resulted in responses in a small number of patients with advanced metastatic Ewing's sarcoma. 1

**Conclusion:** This case adds to the understanding of ES location and significance of carefully following the final pathology report of the resected lesion.

**Funding:** None declared.

**Poster 33. Assessment of cognitive performance in Saudi children with learning disabilities using Cambridge Neuropsychological Automated Battery**

Nouf Al Backer 1, Shahid Bashir 2, Koloud Al Harbi 2, Abdulrahman Alfatihadi 2, Syed S Habib 2

1 Department of Pediatric, Faculty of Medicine, King Saud University, Riyadh, Saudi Arabia. 2 Department of Physiology, Faculty of Medicine, King Saud University, Riyadh, Saudi Arabia.

**Introduction:** One of the most consistently replicated cognitive deficits in individuals diagnosed with learning disability (LD) is executive dysfunction associated with focal frontal lobe involvement. Executive functions are thought to be driven by prefrontal cortex, including response inhibition, set-shifting, working memory, and planning. They have been found to be impaired in children with ADHD and LD.

**Objectives:** The purpose of the present study was to compare Motor Screening Task (MOT), Intradimensional/Extradimensional Shift Subtest (IED Shift) and Simple Reaction Time (SRT) using The Cambridge Neuropsychological Test Automated Battery (CANTAB) between age matched LD and healthy children. We hypothesized that LD group would have more severe cognitive dysfunctions than healthy controls in the selected tasks.

**Methods:** This study was conducted in the department of Physiology and Pediatrics. A total of 160 participants participated in the study, 92 (57.5%) for the case group and 68 (42.5%) in the control group. The mean age for all participants was 9.1 ± 2.1 years, with a range from 6 to 15 years old. The two groups were age matched. The test battery used was Cambridge Neuropsychological Automated Battery (CANTAB).

**Results:** We observed significant differences were in performance on all CANTAB subtests, with the learning disability (LD) group compared to control group, indicating deficits in the motor screening task, the IED shift task and a longer simple reaction time. The IED and MOT were significantly greater / longer among patients with learning disabili-
ties compared to the normal group (P values were <0.001 and <0.001, respectively). Patients with learning disabilities (cases) had a longer SRT time than normal controls (cases: 1050.4 ± 626.5 versus controls: 815.5 ± 133.9, p=0.003). Those with learning disabilities (cases) were able to complete a mean of 8.4 IED stages, p<0.001). The maximum time to react (SRT-Maximum) was significantly longer in the case group (965.9 ± 716.4) compared to the normal controls (747.7 ± 120.7, p=0.014). Patients with learning difficulties had significantly more errors in the motor screening tasks (MOT-Error) compared to the normal control group (case: 12.4 ± 2.7, p<0.001). MOT-MED was significantly larger among the case group than the control group (p<0.001). SRT-Per was significantly lesser among the cases than the control group (p<0.001).

**Conclusion:** Patients with learning disabilities have significant decline in visuospatial motor screening, flexibility of attention and motor speed performance suggested by MOT, IED and SRT respectively compared to age matched healthy subjects. We recommend that these tests should be added for assessing the severity and prognosis in LD cases.

**Ethical Approval:** by IRB of College of medicine King Saud University
Acknowledgement: None declared.
**Funding:** Work on this study was supported by Deanship of Scientific Research and international research group (IRG14-26) from King Saud University, Saudi Arabia.

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**Poster 34. Self-diagnosis and self-management of pain among residents of Riyadh**

Monirah Bin Saleem, Alanoud Alhumaid, Haya Bin Hassan, Lamia Aljeraisy, Nofal Alabdulwahed, Reem Bin Saleem, Sara Almadani, Waad Alzaher, We’aam Alhameidi
Princess Nourah Bint Abdul Rahman University

**Introduction:** The way people approach and manage a health related condition has changed immensely with the accessibility of information from the internet, medical TV shows and magazines. And despite the prevalence of self-diagnosis, few comprehensive studies were conducted in Saudi Arabia to assess this practice.

**Objectives:** The main purpose was to identify the prevalence of self-diagnosis and self-management of pain, the reasons for self-diagnosis and the sources of preference for information collection.

**Methods:** A descriptive cross-sectional study was conducted at Princess Nourah University, Prince Mohammed bin Abdulaziz Hospital and malls in Riyadh city, Saudi Arabia. and was approved by the Research and Ethical Committee at Princess Nourah University. A total of 632 participants ages of 18 years and above were included. A self-administered close ended questionnaire consisting of 34 questions and an online survey were designed based on literature review, and there main purpose was to identify the prevalence of self-diagnosis and self-management of pain, the reasons for self-diagnosis and the sources of preference for information collection. The data were compiled, checked for completeness, and analyzed using the Statistical Package for Social Sciences (SPSS).

**Results:** Women were more likely than men to self diagnose online[78.3% vs 60.6%]. The likelihood of self-diagnosis was more common among those with monthly income less than 5,000, and those with a college degree [ 47.0% and 52.4%]. Health care providers were the main source for a diagnosis for those with a monthly income more than 10,000 compared to the those with less income [54.7% vs 38.6%]. When asked about the reasons of self-diagnosis both gender agreed on the answer “it’s easier than going to the doctor “. Furthermore, there was strong association between the higher education levels, and how participants decided the medication dosage [p value 0.002]. Collage graduates had the highest percentage in choosing doctor consultation for medication dosage [29.0%].

**Conclusion:** Based on the findings of the study, the following conclusions were made: Prevalence of self-diagnosis seems to be elevated in the Saudi population. There is a shift in the ways in which people seek health and medical information, with more patients looking for different resources for information rather than seeking the advice of their physician. The decision of disease management is also influenced by the economic status.

**Ethical Approval:** approved by the Research and Ethical Committee at Princess Nourah University.
**Acknowledgement:** None declared.

**Funding:** None declared.

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**Poster 35. Effectiveness of visual illusion for the management of neuropathic pain after spinal cord injury: a systematic review**


Parkwood Institute, London Ontario Canada

**Introduction:** Pain is a significant complication after SCI with a prevalence of 70%. Management of pain after SCI is challenging due to the inadequate evidence for most treatment options. There is ongoing research regarding novel treatments for SCI-related neuropathic pain which are based on the theory that afferent sensory input can modulate cortical activity. Consequently, correct the mismatch between the motor output and sensory feedback and modify or reverse the cortical reorganization. Approaches which show great promise in managing NP after SCI include motor imagery, mirror therapy and sensory illusions whether tactile, auditory or visual

**Objectives:** To conduct a systematic review to examine the effect of visual imagery on reducing neuropathic pain intensity in individuals with spinal cord injury (SCI).

**Methods:** Medline, CINAHL, EMBASE and PsycINFO databases were searched for all relevant articles published from 1980 to January 2017. Study quality was assessed using the Physiotherapy Evidence Database (PEDro) assessment scale for randomized controlled trials (RCTs)

**Results:** There is level 2 and 4 evidence that virtual walking or virtual wheeling may reduce post SCI neuropathic pain

**Conclusion:** The results of the systematic review provide support for the use of visual imagery interventions in improving neuropathic pain post SCI.

**Ethical Approval:** Approvrd

**Acknowledgement:** None declared.

**Funding:** None

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**Poster 37. Effect of obesity on the duration of surgery, post-operative complications, need of blood transfusion and total length of stay in the hospital in patients with grade II and III spondylolisthesis.**

Waleed Mohammad Awwad, Khalid Abdullah Binown, Abdulrahman Ahmed Alkadhaib, Nawaf Hussien Modah, Saud Mohammed Alfayez, Omar Abdullah Alsultan

**Introduction:** The effect of obesity in patients with grade II and III spondylolisthesis in regards of post-operative complications, need of blood transfusion and total length of stay in the hospital.

**Objectives:** Objectives: to assess the differences between obese and non-obese patients in terms of the duration of surgery, need of blood transfusion, post-operative complications and length of hospital stay.

**Methods:** the charts of patients with spondylolisthesis who underwent transforaminal lumbar interbody fusion (TLIF) at our academic tertiary hospital from January 2013 to July 2016 were reviewed retrospectively. The inclusion criteria involved patients with grade II & III degenerative spondylolisthesis who were admitted electively for TLIF. Patients who underwent previous spine surgery, had relatively decreased hemoglobin level or managed surgically by different spine surgeons were excluded. Univariate and multivariate logistic regression analyses were conducted to evaluate the impact of obesity, among other risk factors, on the duration of surgery, post-operative complications, need of blood transfusion and total length of stay in the hospital. P-values less than 0.05 were considered significant.

**Results:** Sixty seven patients were included of whom 55.1% were obese. The encountered complications were wound infection and deep venous thrombosis in 10.1% and 4.3%, respectively. Approximately 14.5% of the patients had suboptimal wound healing. None of the patients developed pulmonary embolism or deep infection. There were no significant differences between obese and non-obese patients. The duration of surgery was the only dependent variable that showed significant increase in the odds ratio among obese patients; however, upon multivariate logistic regression, the increase in odds ratio was not significant.

**Conclusion:** Conclusion: Obesity is not associated with higher rates of post-operative complications
or higher hospital length of stay; however, the duration of surgery is significantly longer when operating on obese patients based on the results of the univariate logistic regression analysis.

**Ethical Approval:** None declared.
**Acknowledgement:** None declared.
**Funding:** None declared.

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**Poster 38. Factors affecting patient’s acceptance of spine surgery in King Saud university hospital in KSA**

_Waleed Mohammad Awwad, Omar Alsultan, Saud Mohammed Alfayez, Abdullah Nasser bin Dous_

**Introduction:** Spine surgeries are common; however, misconceptions about potential complications have been reported leading patients to refuse them for no scientific reason. Our aim in this study to evaluate the patients attitude regarding spine surgeries and to understand the factors that could affect their choice.

**Objectives:** Spine surgeries are common; however, misconceptions about potential complications have been reported leading patients to refuse them for no scientific reason. Our aim in this study to evaluate the patients attitude regarding spine surgeries and to understand the factors that could affect their choice.

**Methods:** This cross-sectional study involved seventy-six patients who visited King Saud university hospital out-patient orthopedic spine clinic between May to October 2016 all of which needed surgical intervention for their spine pathology. A general demographic questionnaire was used to assess patient response toward the surgery and to identify the factors that might influence their decision. SPSS was used for statistical analysis.

**Results:** A total of 76 patients were included in this study. Forty-three were females and 33 were males. 46 (60.5%) patients agreed to surgery. The remaining 30 (39.5%) refused surgery for various reasons. There was no statistically significant difference in the demographic data between the 2 groups.

**Conclusion:** The refusal rate for spine surgeries is high and underreported. We believe the misconceptions could be a reason. Thus, educational campaigns should be initiated.
NOTES