

Scottish Spine Surgeons Meeting
13th and 14th November 2015
Final Revised Programme with Abstracts

As surgeons based in the Scottish Health Service providing care for patients with conditions of the spine we want to share best practice. This forum and website (www.spinesurgeons.scot) are for healthcare professionals involved in spine surgery care at present, but who knows what the future will bring. Our annual informal and friendly gathering helps us to achieve our best clinical care for patients now and in the future.

The aim of the programme is to cover an aspect of spine surgery for everyone. All of us as consultants are aware of our responsibility to train the next generation. We wish to encourage the safe practice of surgery of the spine. This safe practice includes those who work with us but do not provide spine surgery.

The venue for our ~8th Scottish Spine Surgeons meeting is at the Royal College of Surgeons of Edinburgh - new Prince Philip events venue.

An award of 6 hours CPD for Friday and 3 hours CPD for Saturday have been approved by the Royal College of Surgeons of Edinburgh (Recognition number – RCSEd01621). Accommodation for the Friday evening will be at the College Hotel at 10 Hill Place Hotel and is included in registration thanks to our sponsors. The final programme is below (updated 12/11/2015).

Everyone should bring a mobile device with “Socrative Student” (www.socrative.com/apps) loaded onto it. Both Apple and Android versions are available. This will allow interaction throughout the meeting.



WiFi is available throughout.

Trainee Forum - Essential Inter collegiate Surgical Curriculum Programme (ISCP) topics. For the first time we are including this forum to cover some of the final year topics in both the Neurosurgical and Orthopaedic ISCP curriculum.

There will be an additional aspect to this year's meeting, a logo competition for this forum. There have been 6 entries to "reflect the provision of safe spine surgery care in Scotland". These are on the logo web page www.spinesurgeons.scot/our-next-meeting/logo-competition . The winner will be voted on by all of the group. A prize and permanent acknowledgement will be awarded.

To attend, thank you for filling the registration form. Any specific requests for the 2015 meeting can be placed in the message section at the end.

I wish you all a safe trip so that we can enjoy discussing the spine.

Kind regards,
Chris, organiser Scottish Spine Surgeons meeting 2015 - Edinburgh
E-mail: christopher.adams@nhs.net
Web page: www.spinesurgeons.scot

Scottish Spine Surgeons Meeting
13th and 14th November 2015
Final Revised Programme with Abstracts

Friday 13th November 2015.

Trainees educational morning(or CPD / refresher for the rest of us).

"The FRCS exit exams - ISCP spine essentials". Link to [ISCP](#)

0830hrs Coffee.

0900hrs. Cervical myelo radiculopathy and lumbar radiculopathy including cauda equina syndrome. By Jothy (Mr Kandasamy, Consultant Neurosurgeon, Edinburgh).

1000hrs. Principles of management of cervical trauma. By David (Mr Mowle, Consultant Neurosurgeon, Dundee).

1040hrs. Coffee.

1100hrs. Managing spinal infection - vertebral osteomyelitis / discitis and epidural abscess. By David (Mr Mowle, Consultant Neurosurgeon, Dundee).

1130hrs. Metastatic spinal cord compression. By Chris (Mr Adams, Consultant Orthopaedic Surgeon, Edinburgh). Changed from Andrew (Mr Frost, Consultant Orthopaedic Surgeon, Aberdeen) due to recent illness.

1215hrs. Treating thoraco-lumbar fractures. By Tony (Mr Reece, Consultant Orthopaedic Surgeon, Glasgow).

1300hrs. Lunch.

1330hrs. Invited lecture. "Tips and tricks in radiology of the spine - now and in the future". By Dr Simon McGurk, Consultant Radiologist, Edinburgh and the Borders.

1415hrs. Research and audit papers- part 1. **Full list below.**

1505hrs. Coffee.

1520hrs. Invited lecture. "Knowledge is power - where does our data fit in". By Dr Alex Stirling, Consultant in Public Health Medicine, Public Health and Intelligence (PHI), NHS National Services Scotland.

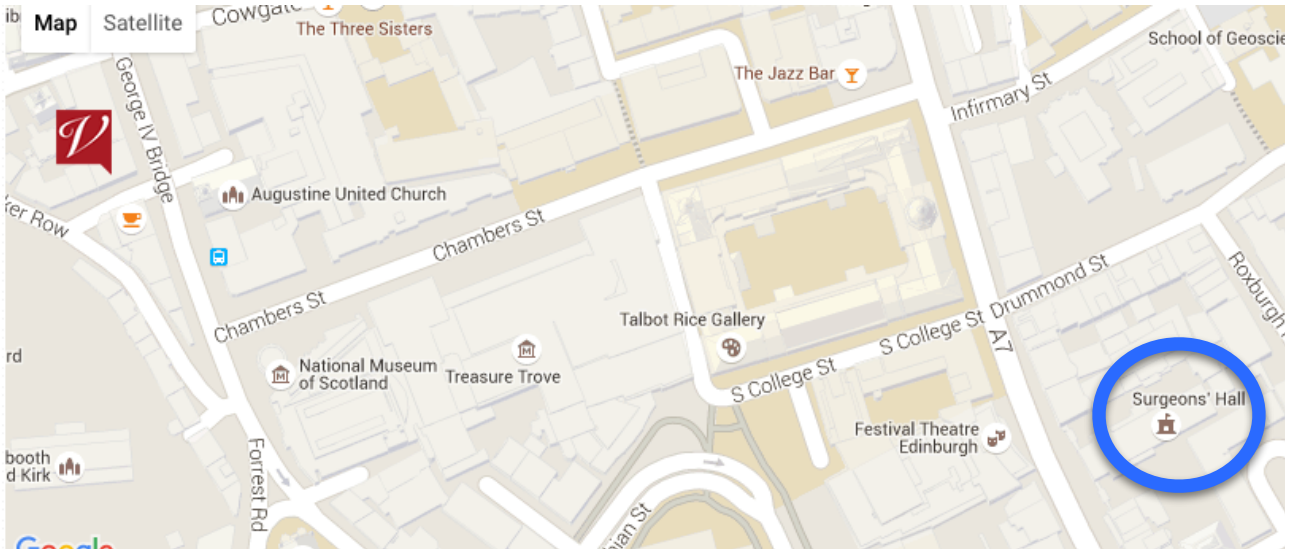
1610hrs. "Who is next to be accused of spinal negligence - an orthopaedic surgeon or a neurosurgeon? - 1. How to make it neither for a Scottish spine operation - 2. the cost of risk". By Dr Barry Parker, Medical Adviser, Medical and Dental Defence Union of Scotland.

1700hrs. Research and audit papers - part 2. **Full list below.**

1740hrs. Evaluation then Award of Trainee Paper Prizes.

1800hrs. Drinks then meal at 7pm. Vittoria on the Bridge, George the IV Bridge, EH1 1EN

**Scottish Spine Surgeons Meeting
13th and 14th November 2015
Final Revised Programme with Abstracts**



A map on the next page with the College / Hill Square in a blue circle and Vittoria logo on the left. Basically a short walk along Chambers Street past the Museums of Scotland. Vittoria's has a wine bar that we will start in.

Saturday 14th November 2015

0845hrs. Coffee.

0915hrs. Case reports. **Submitted list below.**

0945hrs. Invited lecture. "Unseen with my own eyes - endoscopic spine surgery". By Alastair (Mr Gibson, Consultant Orthopaedic Surgeon, Edinburgh).

1030hrs. What am I supposed to do with this patient? Part 1.

Please bring cases as a powerpoint presentation. If this is not possible bring patient name and CHI number as there will be PACS Global drive access available.

1100hrs. Coffee

1120hrs. Consultant papers. "5 Years of treating young people deformity in Scotland". By Enrique (Mr Garrido, Consultant Orthopaedic Surgeon, Edinburgh).

1140hrs. What am I supposed to do with this patient? Part 2.

Please bring cases as a powerpoint presentation. If this is not possible bring patient name and CHI number as there will be PACS Global drive access available.

1200hrs. "Members only". Where to now for the Scottish Spine Surgeons meeting? Evaluation.

1230hrs. Lunch.

1300hrs. Closing.

Most Voted Logo award and prize for best logo for the Scottish Spine Surgeons. Certificates.

Scottish Spine Surgeons Meeting
13th and 14th November 2015
Final Revised Programme with Abstracts

Papers for Presentation.

Any health care professional can submit an abstract for presentation. As in previous years the presentations have to be about spine surgery and include a minimum of three patients on a topic. Both research and audit presentations are equally welcome. Presentations are all podium for a maximum of 6 minutes with up to 4 minutes for questions.

The presenters of the trainee forum will decide on the papers to be presented and will award the prizes. There will be two presentation prizes, a **first and runner up this year**. To be eligible to enter you must be a trainee, medical student or other health care professional or trainee. To be awarded the eligible person must be the person presenting. The running order below is in date order of abstract submission.

Friday 13th, 1415hrs. Research and audit papers- part 1.

1. Title: Posterior spinal fusion for adolescent idiopathic thoracolumbar/lumbar scoliosis (Lenke 5C) using a unilateral convex segmental pedicle screw technique.

Presenter: Mr Simon Benedict Roberts. E-mail address: simonroberts100@hotmail.com

Authors: Roberts S.B., Tsirikos A.I., Subramanian A.S.

Institution: Scottish National Spine Deformity Service, Royal Hospital for Sick Children, Edinburgh.

Conflicts of Interest: None. Funding Source: None.

Background context: Spinal fusion for Lenke 5C adolescent idiopathic scoliosis (AIS) can be limited to the thoracolumbar/lumbar (TL/L) region and is conventionally corrected using a bilateral segmental pedicle screw technique. Inadequate evidence exists to evaluate the efficacy of a unilateral segmental pedicle screw technique or to guide selection of the lowest instrumented vertebra.

Aim/Purpose: To investigate the efficacy of a unilateral convex segmental pedicle screw technique to correct TL/L AIS; and to identify pre-operative radiological parameters correlating with extension of the fusion beyond the caudal end vertebra of the curve.

Study Design/Setting: Retrospective cohort study.

Patient Sample: 72 patients with TL/L AIS who underwent correction using a unilateral convex segmental pedicle screw technique between 2006-2011.

Outcome Measures: Clinical, radiological and SRS-22 scores were collected pre-operatively and two-years' post-operatively.

Methods: Patients were divided into two groups: group 1 (n=53) patients underwent fusion between vertebrae at the limits of the curve; group 2 (n=19) patients underwent extension of the fusion distally beyond the caudal end vertebrae.

Results: Mean scoliosis correction of the whole cohort was 80%. Five pre-operative radiological parameters differed between groups and correlated with extension of the fusion distally. Regression analysis incorporated these parameters into an equation with 81% positive predictive value in determining if the lowest instrumented vertebra should be at the caudal end vertebra or 1-2 levels distally. SRS-22 scores were similar between the groups.

Conclusions: TL/L AIS is effectively treated by posterior spinal fusion using a unilateral pedicle screw technique. Five radiological parameters correlate with distal extension of the fusion, and reliably inform selection of the lowest instrumented vertebra.

Scottish Spine Surgeons Meeting
13th and 14th November 2015
Final Revised Programme with Abstracts

2. Title: The Surgical Management of Severe Scheuermann's Kyphosis.

Presenter: Mr Tom Carter. E-mail address: carter.tom@doctors.org.uk

Authors: TH. Carter, AI. Tsirikos

Institution: Scottish National Spine Deformity Service, Royal Hospital for Sick Children, Edinburgh.

Conflicts of interest: none declared. Funding source: none declared.

Background context: Severe Scheuermann's kyphosis, a structural deformity of the thoracic or thoracolumbar spine can result in disabling pain, neurological compromise and cosmetic dissatisfaction. Modern techniques have improved correction through a posterior-only or antero-posterior approach but can result in significant morbidity.

Purpose: 1). Present the surgical results of treatment of severe Scheuermann's kyphosis in regard to deformity correction, global coronal and sagittal balance and complication rate; 2). Evaluate functional outcomes using the Scoliosis Research Society (SRS-22) questionnaire.

Study design: Cohort study. Retrospective analysis of prospectively collected data from a single surgeon's series.

Patient sample: Fifty-two consecutive patients; 47 thoracic and 5 thoracolumbar kyphosis deformity.

Outcome measures: Clinical data combined with quality of life assessment questionnaires and radiographic parameters.

Methods: We reviewed 33 male and 19 female patients. Preoperative MRI excluded intraspinal anomalies. Fifty patients underwent posterior-only and 2 antero-posterior spinal arthrodesis. Mean age at surgery was 16.4 years. Mean follow-up was 4.5 years.

Results: Mean kyphosis corrected from 92.3° to 46.9° (p<0.001). Scoliosis was eliminated in all 29 affected patients. Coronal and sagittal balance was universally restored. Mean blood loss was 20% total blood volume. Mean operation time was 4.2 hours. Mean inpatient stay was 9.3 days. SRS-22 scores improved from 3.4 pre-operatively to 4.6 at 2 years, with high treatment satisfaction rates. Complications included one septicaemia episode, but no wound infections, no junctional deformity, no loss of significant correction and no re-operations.

Conclusions: Posterior-only spinal arthrodesis with hybrid instrumentation can safely achieve excellent correction of severe Scheuermann's kyphosis.

3. Title: Quality of life assessment using the Scoliosis Research Society (SRS)-22 questionnaire in children and adolescents undergoing surgical treatment for spinal deformity.

Presenter: Greg McKean. E-mail address: g.mckean@sms.ed.ac.uk

Authors: McKean GM, Tsirikos AI, Sharp H, Brady E

Institution: Scottish National Spine Deformity Service, Royal Hospital for Sick Children, Edinburgh.

Conflicts of Interest: Nil. Funding source: Nil

Background context/Purpose: The aim of our study was to evaluate the impact of surgical treatment on quality of life in patients with spinal deformities using the SRS-22 questionnaire.

Study design: SRS-22 questionnaires were collected prospectively at 4 stages of treatment: pre-operatively, 6-months, 12-months and 24-months post-operatively in all patients with spinal deformity from 2006-13.

Patient sample: 545 consecutive patients (425 females: 120 male).

Outcome measures: SRS-22 rated qualitatively by patients and ranked quantitatively.

Scottish Spine Surgeons Meeting
13th and 14th November 2015
Final Revised Programme with Abstracts

Methods: Each questionnaire was recorded and analysed with respective SRS-22 themes: function; pain; self-image; mental; satisfaction. Other variables including demographics were analysed.

Results: Mean pre-operative SRS-22 scores for the whole group were: function 3.77 ± 0.75 ; pain 3.7 ± 0.97 ; self-image 3.14 ± 0.66 ; mental health 3.86 ± 0.77 ; total 3.62 ± 0.66 . Mean 2-year post-operative scores were: function 4.39 ± 0.42 ; pain 4.59 ± 0.56 ; self-image 4.39 ± 0.51 ; mental 4.43 ± 0.56 ; satisfaction 4.81 ± 0.40 ; total 4.52 ± 0.37 ($p<0.0001$). Males performed better at 2-years compared to females (4.49 ± 0.39), ($p=0.004$). Spondylolisthesis patients performed worse preoperatively (2.93 ± 0.26) compared to other diagnoses ($p<0.0001$). This did not impact 2-year post-operative outcomes. There were no significant changes regarding age or year of surgery; type of operation.

Conclusions: All individual domains and total SRS-22 scores improved significantly after surgical correction of spinal deformity in our young patients with incremental change between pre-operative, 6-month, 12-month and 24-month post-operative. Reported patient satisfaction at follow-up was very high for all individual diagnosis. 2-year post-operative outcomes compare favourably to reported SRS-22 scores in healthy adolescents (function: 4.31 ± 0.54 ; pain: 4.44 ± 0.67 ; image: 4.41 ± 0.64 ; mental health: 3.96 ± 0.81 ; total 4.26 ± 0.54).

4. Title: Decompression with or without fusion for lumbar foraminal stenosis and single level disc disease: a randomised controlled trial with 12 to 18 years follow up.

Presenter: Nick Clement. E-mail address: nickclement@doctors.org.uk

Authors: ND Clement, SS Muschik, JNA Gibson

Institution: Royal Infirmary of Edinburgh

Conflicts of Interest: Nil. Funding source: Supported by a grant from DePuy Ltd., U.K.

Background context: Initial trial results revealed limited evidence supporting instrumented fusion as an adjunct to decompression.

Aim / Purpose: To compare long-term outcomes following decompression (Group 1) with those following decompression and instrumented posterolateral fusion (Group 2) and decompression and instrumented posterolateral fusion plus transforaminal interbody fusion (Group 3).

Study design / Setting: Prospective randomized controlled trial.

Patient Sample: The current study with 10 patients per group was 80% powered (beta) to demonstrate a 22 point difference in the Dallas pain questionnaire (DPQ) between groups with an alpha of 0.005 (adjusted for multiple testing).

Outcome Measures: DPQ, Roland Morris (RM), SF-36 and EQ-5D questionnaires and Low Back Outcome Scores (LBOS).

Methods: Forty-four patients with single-level disc disease were randomly assigned to 1 of the 3 surgical groups.

Results: At mean 15 years follow up 33 patients were available for assessment. Group 1 demonstrated significantly better functional outcomes according to their DPQ, RM, LBOS, and EQ-5D (3L and VAS) scores when compared to the other two groups ($p<0.01$). The SF-36 score demonstrated that group 1 had significantly better generic health compared to groups 2 and 3. Regression analysis was used to adjust for differences in general health between the groups and demonstrated no significant difference between the groups in the spine specific scores: Dallas ($p>0.15$), Roland Morris ($p>0.37$), or the LBOS ($p>0.32$).

Conclusions: Fusion in combination with decompression for the treatment of foraminal stenosis and single level degenerative disc disease offers no long term functional benefit over decompression in isolation.

Scottish Spine Surgeons Meeting
13th and 14th November 2015
Final Revised Programme with Abstracts

5. Title: Intra-canal rib-head dislocation in dystrophic neurofibromatosis-Type 1 kyphoscoliosis: Current concepts and considerations on surgical management.

Presenter: George Mataliotakis. E-mail address: mataliotakis.george@gmail.com

Authors: George I. Mataliotakis, Enrique Garrido, Christopher Adams

Institution: Scottish National Spine Deformity Centre, Royal Hospital for Sick Children, Edinburgh.

Conflicts of interest: No. Funding source: No.

Background: Intra-canal rib head (RH) dislocation is a cause of additional cord injury in patients Neurofibromatosis type I dystrophic curves. Controversy still exists regarding RH resection, as recent evidence show RH retraction away from the cord along with curve correction.

Purpose: To define when the excision of the RH is indicated and in what sequence.

Study design / Setting: Case reports and literature review.

Patient Sample, Outcome measures and Materials: All studies providing information were included. The data were recorded and processed with descriptive statistics. The cases presented herein provide additional information and contribute to the treatment sequence.

Results: The herein selected cases represent different stages of the natural history of cord compromise in dystrophic curves. The first is an asymptomatic case, the second presents “unstable” neurology and the cord “at risk” on the third case led to intraoperative loss of monitoring signals. A total of 49 patients are presented in the literature having intra-canal RH dislocation. 50% had secondary preoperative neurology. It was “unstable” in 33% of them, due to intermittent cord impingement by the RH. Following RH resection, 78% of the symptomatic cases showed complete recovery and 22% improvement with residual hyperreflexia and clonus.

Conclusion: The asymptomatic cases with minimal dislocation may be treated without RH resection. All symptomatic - including “unstable” neurology cases, require RH resection. In asymptomatic RH contact with the cord, the excision depends on surgeons planned correction. No flail RH should be left and its excision should precede an anterior release or posterior correction.

**Scottish Spine Surgeons Meeting
13th and 14th November 2015**

Final Revised Programme with Abstracts

6. Title: Safety and accuracy of pedicle screw placement in thoracolumbar unstable fractures after trauma: Experience from a National Spinal Injuries Unit.

Presenter: Muhammad Dherijha. E-mail address: muhammad.dherijha@gmail.com

Authors: M.Dherijha¹, C.Mathieson (1,2), C.Barrett (1,2)

Institutions: 1) Department of Neurosurgery, Southern General Hospital, Glasgow and 2) Queen Elizabeth National Spinal Injuries Unit, Glasgow.

Aim: To evaluate the accuracy and safety of pedicle screw placement in spinal fixation for trauma using the Zdichavsky scoring system.

Method: Retrospective analysis of all unstable thoracolumbar fractures treated at national spinal unit from May 2014- January 2015. Two fully qualified spinal surgeons performed all procedures jointly. Routine postoperative computed tomography scans were obtained using 3-mm axial cuts with multiplanar reconstructions. All cases were analysed independently using the Zdichavsky pedicle screw scoring system. Independent peri- and postoperative surveillance for local and general complications was performed to assess safety.

Results: A total 165 pedicle screws were inserted in 24 patients with median age of 31. All cases had unstable thoracolumbar fractures after trauma. Our study showed that 147(89%) screws were classified as optimally placed (Zdichavsky 1a) while a further 7(4.2%) were classified 1b. 3 screws(1.8%) were 2a and 8 (4.8%) screws were 2b. No screws were classified as 3a (gross lateral breach) or 3b (gross medial breach). There were no adverse neurological, vascular, or visceral injuries detected intraoperatively or postoperatively.

Conclusion: Our experience suggests that the provision of thoracolumbar trauma surgery by two fully qualified spinal surgeons is safe and effective with a high degree of pedicle screw accuracy. In particular, no screws were dangerously placed. We recommend this model of joint experienced operators where possible.

Friday 13th, 1700hrs. Research and audit papers - part 2.

7. Title: Posterior spinal fusion for adolescent idiopathic scoliosis (AIS) using a convex-convex unilateral pedicle screw correction technique: a novel concept of deformity correction.

Presenter: George Mataliotakis. E-mail address: mataliotakis.george@gmail.com

Authors: George I. Mataliotakis, Nikolaos Bounakis, Athanasios Tsirikos

Institution: Scottish National Spine Deformity Centre, Royal Hospital for Sick Children, Edinburgh.

Conflicts of interest: No. Funding source: No.

Background: Several techniques have been developed in order to achieve best scoliosis correction results.

Purpose: Presentation of a novel convex/convex unilateral segmental screw correction technique for double or triple AIS curves.

Study design / Setting: retrospective analysis of single surgeons' prospectively collected data.

Patient Sample: 138 consecutive patients (109 females/29 males)

Outcome measures: Corrections of thoracic kyphosis, lumbar lordosis, Sagittal and coronal balance. Quality of Life improvement. Minimum 2-year follow-up

Materials: Radiographic measurement of pre- and postoperative spinal parameters. Calculation of flexibility and correction indices. Preoperative and 6-,12- and 24-month postoperative SRS-22

Scottish Spine Surgeons Meeting
13th and 14th November 2015
Final Revised Programme with Abstracts

questionnaires. Statistical analysis. Surgical technique. Unilateral screws placed only across the convexity of each individual curve. 'Corrective rod' was the one attached to the convexity of each curve. Bilateral screws across the fixation ends for construct stability.

Results. Mean age at surgery was 15 years. There were 101 double and 37 triple curves. The Upper-Thoracic, Main-Thoracic and Thoraco-Lumbar curves corrected by 63.1%, 69.4% and 67.3% respectively. No loss of correction >2o at last follow-up. The Thoracic Kyphosis improved by 13.1o, reaching a mean of 45.1o. Global balance restored to normal limits. No intra- or postoperative complications apart from 2 SMA's, which resolved uneventfully. The SRS22 improved by 1.0, reaching a mean of 4.6 at last follow up. All results were statistically significant (p<0.001).

Conclusion: This technique uses overall less pedicle screws, achieving satisfactory scoliosis correction and restoration of global balance. It improves kyphosis, preserves lordosis and provides less risk of cord injury. Excellent patient satisfaction and function.

8. Title: A Peg Fracture is not the NOF of Neurosurgery.

Presenter: Maya Kommer. E-mail address: maya.kommer@gmail.com

Authors: M.Kommer, C.Mathieson, M.Purcell, C.Barrett

Institution: Institute of Neurological Sciences and Queen Elizabeth National Spinal Injuries Unit, Glasgow

Conflicts of Interest: None. Funding source: none declared.

Background context: C2 fractures in the elderly are thought to carry a poor prognosis

Aim / Purpose: Assess the outcomes of elderly patients with C2 fractures

Study design / Setting: Retrospective analysis

Patient Sample: Patients referred with C2 fractures between January 2005 and December 2014

Outcome Measures: Mortality

Methods: Patients were identified from referrals sheets and database. Notes of admissions were reviewed

Results: 290 patients were referred; 28 were admitted. Of the non-admissions 214(82 percent) were over 65. At review 99 patients were alive at an average of 38.3 months from injury(range 3.4- 117.5 months), 85 patients were deceased with an average survival of 11.8 months (range zero days to 117.5 months), survival was unknown for 27 patients. 57.6 percent of over 65s were alive at one year. 28 patients were admitted with C2 fractures; average length of stay was 14.7 days(range one-88 days). 23 patients were managed with a halo, two with fixation, two with traction and one in a Miami J collar. Of those admitted 13 were over 65; seven were alive at an average of 38 months from injury(range 3.7-116.8 months), five deceased with an average survival of 45.5 months(range 17.9-95.7 months) and one unknown. One patient managed in a halo subsequently required surgical fixation.

Conclusions: Despite our study population having a lower life expectancy than many parts of the UK, patients over 65 with C2 fractures had good outcomes. Halo fixation and Miami J collars were well tolerated with low rates of conversion to surgical intervention.

Scottish Spine Surgeons Meeting
13th and 14th November 2015
Final Revised Programme with Abstracts

9. Title: Berry's Ligament and the Inferior thyroid artery as reliable anatomical landmarks for the recurrent laryngeal nerve (RLN) - a fresh cadaveric study.

Presenter: Ali Rajabian. E-mail address: a.rajabian@hotmail.co.uk

Authors: Ali Rajabian, Michael Walsh, Nasir A Quraishi

Institution: Queen Elizabeth University Hospital, Glasgow.

Conflicts of Interest: None declared. Funding source: none declared.

Introduction/Aim: Whilst most cadaveric studies of the Recurrent Laryngeal Nerve (RLN) have focused on course variations as a suitable guide for Right versus Left RLN, they have mostly been done on preserved (fixed) cadavers which renders the RLN immobile. Our aim was to perform anterior cervical exposures from C2 to T2/3 with particular attention to the course of the RLN on right and left sided exposures in fresh cadaveric specimens. In addition, we aimed to expose the entire course of the RLN. Finally, we wanted to show the position of the RLN in relation to the trachea-oesophageal groove, inferior thyroid artery and Berry's ligament.

Materials and Methods: Eight fresh cadavers had extensive layer by layer dissections performed by 2 surgeons. The RLNs were exposed in their entire length and relationship to different landmarks recorded. Photographs were taken at each stage of the exposure.

Results: In all specimens, we were able to demonstrate the entire course of both RLNs from origin to insertion. The RLNs were consistently associated with the inferior thyroid artery and Berry's ligament bilaterally with the RLNs passing at almost perpendicular to these structures.

Discussion: The near horizontal direction of the Berry's Ligament in the cervical tissue planes exposed during anterior cervical exposures enables the surgeon to reliably identify the expected position of RLN at its medial end and hence avoid it prior to visual observation of the nerve on either side.

Conclusion: We found that the most reliable anatomical landmark bilaterally for the RLN was the inferior thyroid artery and Berry's ligament both of which would be encountered in anterior surgical exposure prior to the nerve itself. We believe that this will help spinal surgeons refine their surgical technique to identify this nerve where necessary and thus reduce the incidence of iatrogenic injury.

10. Title: The O-arm in surgery for rheumatoid neck.

Presenter: Sharif Al-Qadhi. e-mail: ns.sharif@yahoo.com

Authors: Sharif Al-Qadhi and Peter Bodkin.

Institution: Aberdeen Royal Infirmary.

Conflicts of Interest: None. Funding source: none declared.

Background context: Involvement of the cervical spine is common in rheumatoid arthritis. Clinical presentation can be variable, and symptoms may be due to neck pain or compressive myeloradiculopathy. Atlantoaxial instability is the most common form of cervical involvement and may occur either independently or concomitantly with cranial settling and subaxial instability.

Study design / Setting: retrospective.

Patient Sample: 4 cases.

Outcome Measures: Renawat Scale pre & post op comparison. Instrumentation revision.

Methods: A retrospective study of the Rheumatoid cases of the neck managed by surgical fixation using the O-Arm for the past one year.

Results: 3 of the 4 cases operated had an improved Renawat score. However, no complications were recorded that are related to the O-Arm use.

Conclusions: The O-Arm is showing to be a promising equipment in surgeries that require instrumentation of difficult spine pathologies. With regard to Rheumatoid neck, a further study comparing the use of O-Arm against the more traditional C-Arm will be useful.

Scottish Spine Surgeons Meeting
13th and 14th November 2015
Final Revised Programme with Abstracts

11. Title: Right versus left sided exposures of the recurrent laryngeal nerve (RLN) and it's branches - a fresh cadaveric study.

Presenter: Ali Rajabian. E-mail address: a.rajabian@hotmail.co.uk

Authors: Ali Rajabian, Michael Walsh, Nasir A Quraishi

Institution: Queen Elizabeth University Hospital, Glasgow.

Conflicts of Interest: None declared. Funding source: none declared.

Introduction/ Aim: The higher vulnerability of RLN in anterior approach to the cervical spine on the right versus left sides is the subject of ongoing debate. Whilst most cadaveric studies have focused on in situ variations in course and local structural relations of the RLN as a suitable guide, they have mostly been done in preserved (fixed) cadavers or without relevance to the needs of spinal exposure. Our aim was to perform surgically relevant exposures of the anterior cervical spine with particular attention to observing the potential vulnerabilities of the RLN on right and left side in fresh cadaveric specimens. In addition, we aimed to explore its branches.

Materials and Methods: 12 cadavers had extensive layer by layer dissections by 2 surgeons. The RLNs and its branches were exposed in their entire length and explored for vulnerability. Each stage was photographed.

Results: In all specimens, we demonstrated that right sided approach clearly causes undue stretch of the nerve and its branches particularly below C5 (photographed). The left side provided a good exposure without undue traction on the nerve. However, the terminal oesophageal branches of the nerve were especially vulnerable to this stretch or direct pressure on the left side.

Discussion: Traction neuropraxia of the upper oesophageal branches of the RLN nerve may provide an alternative explanation for the transient post-op dysphagia (up to 60%). The laryngeal supply of the RLN benefits from Galen's anastomotic nerve supply of SLN (Ansa of Galen) and hence the neuropraxia of the nerve is less frequently symptomatic.

Conclusion: Below C5, the left sided anterior cervical approach permits a wider access to the entire anterior cervical spine with less risk to the RLN. Neuropraxia induced on the oesophageal branches directly by retractors or indirectly by traction could provide a possible explanation for transient post-op dysphagia. We believe that this will help spinal surgeons to refine their surgical technique and thus reduce the incidence of iatrogenic injury.

**Scottish Spine Surgeons Meeting
13th and 14th November 2015
Final Revised Programme with Abstracts**

12. Title: Natural history of Untreated Scheuermann's kyphosis, 44 patients at 20 years follow up

Presenter: Joseph Fournier. E-mail address: Joseph.fournier.france@gmail.com

Authors: J Fournier, N Clement, A Duckworth, E Garrido

Institution: NHS Lothian, Scottish National Spine Deformities Service

Conflicts of Interest: no. Funding source: none

Background context: Scheuermann's Kyphosis treatment is debated, and no evidence based Guidelines exist on the management of the condition.

Aim / Purpose: To assess the health status of patient presenting Scheuermann's Kyphosis untreated surgically with a long follow up to better advice today's patients.

Study design / Setting: Retrospective single centre study

Patient Sample: 44 patients diagnosed from 1980 to 1995 were reviewed.

Outcome Measures: ODI and Sf-36 Scores compared to age and gender match population scores.

Methods: A cohort of 115 patient diagnosed with Scheuermann's kyphosis on basis of X-ray and Clinical examination was identified using the service database. At that time no patient was offered surgical treatment unless neurological symptoms were present. 44 Patients from that initial cohort were available for review.

Results: SF-36 and ODI scores were not significantly different from the age and gender matched population scores ($p>0.1$). There was no significant correlation between the severity of the kyphosis at last visit and the components of the SF36 ($p>0.15$) or the ODI ($p=0.95$). Age however, was a significant predictor of the ODI, with increasing age being associated with a worsening ODI score ($r=0.41$, $p=0.003$). Regression analysis ($R^2 0.2$) was used to adjust for confounding variables and age ($p=0.005$) remained the only significant predictor of ODI.

Conclusions: The overall general health of patients with Scheuermann's disease is not significantly different for the general population and the effect of lower back pain upon their quality of life is minimal.

13. Title: Spinal Instrumentation using Medtronic O-arm Navigation: Aberdeen Experience

Presenter: Maz Iqbal

E-mail address: mazhar.iqbal1@nhs.net

Authors: Mr M Iqbal, Mr P M Bhatt, Mr P Bodkin, Mr J Walkden, Ms S Ross, Mr M H Kamel

Institution: Aberdeen Neurosurgery Department, ARI

Conflicts of Interest: None. Funding source: Nil.

Background context: O arm navigation for instrumentation of spine

Aim / Purpose: To evaluate our accuracy for screw placement

Study design / Setting: Retrospective analysis

Patient Sample: All spinal instrumentations using O-arm navigation

Outcome Measures: Inaccurate placements requiring replacement or removal of screws

Methods: Review of PACS, Opnotes and case notes

Results: 27 patients operated on over the last 1 year had 145 screws inserted using O-arm. 6 screws were malpositioned, 4 required removal & 2 required re-insertion. Only 1 patient had pressure sores related to position on the table. No neurological compromise noted in data so far.

Conclusions: O-arm assistance is very helpful in accurate screw placement with little complication rates.

C1. Title: Non-operative and operative management options for Grisel Syndrome – a case report

Presenter: Odhran Murray. E-mail address: omurray32@gmail.com

Authors: Andraay Leung, Odhran Murray, Simon Thomson

Institution: Leeds General Infirmary

Conflicts of Interest: No conflict of interest. Funding Sources: No funding obtained

Background Context: Grisel Syndrome is a rare paediatric condition in which involves atraumatic subluxation of the atlanto-axial joint due to transverse ligament inflammation, commonly as a result of ear, nose or throat infection.

Purpose -

Study Design/Setting: We present a case involving a 12 year old girl with Grisel Syndrome, in which the patient had the full range of appropriate treatment modalities for this condition. High quality images were recorded throughout the patient's treatment journey.

Patient Sample -

Outcome Measures -

Methods: The patient presented to our institution, a regional university teaching hospital, having developed torticollis for six weeks after an upper respiratory traction infection. On admission, a CT scan was performed which confirmed rotatory subluxation of the atlanto-axial joint, with C2 aligned fully with the vertebrae below.

Results: Historic evidence suggests paediatric rotatory atlanto-axial subluxation responds to non-operative measures of immobilization with or without traction, and therefore the patient was firstly treated in a cervical collar. Unfortunately, after five months in a cervical collar, no improvement in position was noted on repeat imaging. The patient was then treated in traction for ten days. Marked improvement was noted in the first ten days in traction, and the patient was subsequently placed in a halo vest. However, the reduction was not maintained and after two weeks in the halo vest, malalignment between C1 and C2 was seen on both plain radiographs and CT scan.

Having failed non-operative treatment, the patient underwent Harms arthrodesis as the definitive treatment, which took place without perioperative complications.

Conclusions –

C2. Title: Revision Surgery for Cage Misalignment with PEEK Cage, Pelvic Bone Graft and Additional Pedicle Screws for L4 Vertebral Chordoma: A Case Report.

Presenter: Ignatius Liew

E-mail address: ignatiusliew@gmail.com

Authors: Ignatius Liew, Odhran Murray, J Timothy, C Durham

Conflict of Interest: No conflict of interest. Funding Source: No funding obtained.

Background Context: Chordomas represent 1% to 4% of all primary bone tumours, with approximately 15% involving the mobile spine and 40% involving the lumbar spine region.

Aim/Purpose: -

Study Design/Setting: A previously fit and well 43-year-old male presented with a 1-year history of progressive low back pain and subsequently lower limb radiculopathic pain.

Patient Sample: Case report

Outcome Measures: Case report

Scottish Spine Surgeons Meeting
13th and 14th November 2015
Final Revised Programme with Abstracts

Methods: MR of lumbar spine showed an expansile lesion with an associated pathological fracture of the posterior half of the L4 body causing cauda equina compression. CT showed no extra spinal lesion or metastasis.

Results: He was subsequently treated as aneurysmal bone cyst with surgical resection (L4 vertebrectomy, anterior stabilisation with an expandable PEEK cage, bone graft and posterior stabilisation with 4 pedicle screws and 2 rods. Final histological report concluded that the lesion was a chordoma. 4-weeks postoperatively, a sudden atraumatic painful episode occurred and radiographs demonstrated parallelogramming of the posterior construct with cage subsidence and movement anteriorly. Revision L1-S2AI posterior instrumented fusion with cross-linking corrected and stabilised the deformity.

Conclusions: Following en-bloc resection of primary spinal tumours, we suggest multilevel fixation and the use of a cross-link for stabilisation.