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Joint Meeting of

Istanbul Spine Masters & ISMISS Turkey

February 24 - 26, 2022

Memorial Bahcelievler Hospital, Istanbul, Turkey

PROGRAM & ABSTRACT BOOK

www.istspine.org/2022

Joint Meeting of Istanbul Spine Masters & ISMISS Turkey

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Invitation

It is our pleasure to announce the “Joint Meeting of Istanbul Spine Masters & ISMISS Turkey 2022” which will be held at the Memorial Bahcelievler Hospital in Istanbul in February 24-26, 2022.

Like the previous four years, this year the 13th ISMISS Turkey and 6th Istanbul Spine Masters meetings will be organized jointly. By combing the two meetings, the organizing societies, the Middle East Spine Society and the ISMISS (International Society for Minimal Intervention in Spinal Surgery) Turkey Chapter aim to reach a greater audience, thus contribute to the spine education in our area more effectively. This year, the meeting precedes the 1st World Congress of Motion Preserving Spine Stabilization, which will be held at the same venue. Thus, the attendees would be able to take advantage of participating two meetings using single logictics arrangement, with a discounted price.

Traditionally, while ISMISS meetings include lectures and videos of the latest minimal invasive techniques and spinal endoscopy; the Istanbul Spine Masters meetings cover whole spectrum of spine surgery in an “advanced course” format and more interactive/didactic way. As always, the topics covered are extremely relevant to daily practice. The meeting program is just “intense”, and full of excellent lectures from prominent experts, results of implementation of new procedures, case discussions, debate sessions, live surgery, video demonstrations, and workshops from industry.

We look forward to seeing you in Istanbul in February 24-26, 2022.

Prof. Cumhur KILINÇER, MD, PhD
Co-Chairman

Prof. Mehmet ZİLELİ, MD
Co-Chairman

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Mehmet Zileli

Cumhur Kılınçer

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Sebastian Gitter

Atul Goel

Kemal Koç

Joachim Oertel

Tunç Öktenoğlu

Abolfazl Rahimizadeh

Onur Yaman

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Faculty

(In Alphabetical Order)

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Abolfazl Rahimizadeh
Iran

Ahmet Tulgar Başak
Turkey

Altay Sencer
Turkey

Benedikt Burkhardt
Switzerland

Cumhur Kilinçer
Turkey

Ehab Shiban
Germany

Hikmet Uluğ
Turkey

Joachim Oertel
Germany

Kemal Koç
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Kresimir Rotim
Croatia

Massimilliano Visocchi
Italy

Mehdi Sasani
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Mehmet Zileli
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Turkey

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Germany

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Turkey

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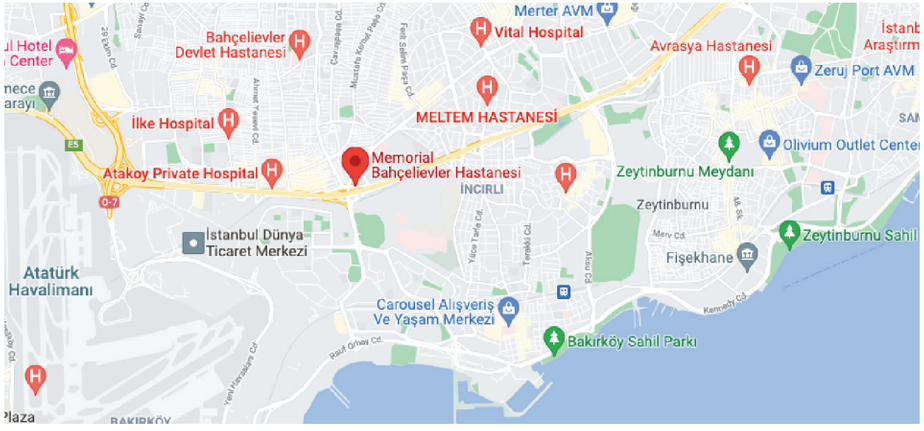

ORGANIZATION SECRETARIAT

PRIME
CONGRESS MANAGEMENT AND TOURISM

Op. Cemil Topuzlu Cad. TİBAŞ Dalyan Konutları F Blok K.4 D.8 Fenerbahçe 34726 İstanbul - Turkey
Phone: +90 216 357 23 23 • **Fax**: +90 216 357 23 33 • **Web:** www.primeqm.com

Contact Person
Naci Armağan / +90 532 176 22 46

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24 February, 2022 — ISMISS Turkey

SESSION 1
ENDOSCOPY: PRINCIPLES

Moderator: *Mehmet Zileli*

08.15-08.30	**Opening** *Joachim Oertel, Mehmet Zileli*
08.30-08.45	**Endoscopy in cervical degeneration** *Joachim Oertel*
08.45-09.00	**The history and evolution of endoscopic spine surgery** *Benedikt Burkhardt*
09.00-09.15	**Endoscopic posterior approach in thoracic spine** *Joachim Oertel*
09.15-09.30	**Anatomy of the Kambin triangle** *Tunç Öktenoğlu*
09.30-09.45	**Principles of transforaminal endoscopic lumbar discectomy under local anaesthesia and conscious sedation** *Yener Erken*
09.45-10.00	**Safety of irrigation in lumbar endoscopic discectomy** *Altay Sencer*
10.00-10.30	**Refreshment break**

SESSION 2
ENDOSCOPY: TECHNIQUES

Moderator: *Cumhur Kılınçer*

10.30-10.45	**Perfect timing for lumbar discectomy** *Serdar Kahraman*
10.45-11.00	**Preoperative planning & step by step technique of lumbar transforaminal approach** *Hikmet Uluğ*
11.00-11.15	**Preoperative planning & step by step technique of lumbar interlaminar approach** *Altay Sencer*
11.15-11.30	**Lumbar migrated herniations: Existing classifications and when TF when IL?** *Hikmet Uluğ*
11.30-11.45	**Technique of transforaminal percutaneous endoscopic lumbar discectomy for migrated disc herniations** *Yener Erken*
11.45-12.00	**Unilateral biportal endoscopy for stenosis** *Tarık Yazar*
12.00-12.15	**Endoscopic tubular procedure for cervical foraminal stenosis and for migrated lumbar disc herniation** *Benedikt Burkhardt*
12.15-12.30	**Discussion**
12.30-13.30	**Lunch**

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SESSION 3
CASE and VIDEOS

Moderator: *Sebastian Gitter*

13.30-13.45	**Spinal cord herniation: Case and video** *Serdar Kahraman*
13.45-14.00	**Endoscopy-assisted resection of calcified thoracic disc: Case** *Mehdi Sasani*
14.00-14.15	**Spinal endoscopy: Surgical videos** *Tarık Yazar*
14.15-14.30	**Case presentation: L4-5 cranially migrated herniation; TF, IL or microsurgery?** *Hikmet Uluğ*
14.30-14.45	**Lumbar endoscopy: Case and video** *Joachim Oertel*
14.45-15.00	**Extended indications for endoscopic spine surgery** *Altay Sencer*
15.00-15.30	**Refreshment break**

SESSION 4
DECOMPRESSION TECHNIQUES

Moderator: *Joachim Oertel*

15.30-15.45	**Decompression techniques in lumbar stenosis** *Tunç Öktenoglu*
15.45-16.00	**Hemilaminectomy and bilateral decompression for thoracic spinal stenosis** *Kemal Koç*
16.00-16.20	**Unilateral approach for intradural tumors** *Serdar Kahraman*
16.20-16.40	**Anterior cervical microforaminotomy (ACMF): Is it dynamic preservation?** *Abd-Elhafiz Shehab-Eldien*
16.40-16.55	**En bloc cervical laminoplasty with preserving posterior structure and arcocristectomy in cervical spondylotic myelopathy** *Kemal Koç*
16.55-17.15	**Case discussion: 75-year-old male with spinal stenosis, disc herniation and listhesis: How to treat?** *Sebastian Gitter*
12.00-12.15	**Case: Lumbar spinal stenosis MIS decompression or TLIF and fusion?** *Joachim Oertel*
	Closing

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25 February, 2022 — ISTANBUL SPINE MASTERS

SESSION 1
CERVICAL

Moderator: *Kemal Koç*

09.15-09.30	**Vertebral artery mobilization and cervical tumor resection** *Kemal Koç*
09.30-09.45	**Reduction of cervical spinal deformity with occipital condyle screw** *Özkan Ateş*
09.45-10.00	**Management of missed or neglected hangman's fractures: Report of 8 cases** *Abolfazl Rahimizadeh*
10.00-10.15	**Spinal navigation in FBSS** *Kresimir Rotim*
10.15-10.30	**Cervical spondylotic myelopathy: WFNS recommendations on surgical indications** *Mehmet Zileli*
10.30-11.00	**Refreshment break**

SESSION 2
CRANIO-CERVICAL JUNCTION and CERVICAL

Moderator: *Cumhur Kılınçer*

11.00-11.15	**Long term results of hybrid stabilization: Fusion plus artificial disc implantation in double level treatment in cervical spine** *Sebastian Gitter*
11.15-11.30	**Cervical hybrid implants in personal experience** *Massimiliano Visocchi*
11.30-11.45	**Anatomy and biomechanics of the craniocervical junction** *Özkan Ateş*
11.45-12.00	**Chiari malformation: Theories and surgical options** *Massimiliano Visocchi*
12.00-12.15	**Indications and methods of craniocervical fixation** *Mehmet Zileli*
12.15-12.30	**Discussion**
12.30-13.30	**Lunch**

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SESSION 3

FREE PAPERS

Moderator: *Abolfazl Rahimizadeh*

13.30-13:40 **OP-01: Radiological and clinic results of posterior dynamic (semirigid) stabilization in the cervical spinal stenosis**
Kemal Paksoy, Tansu Gürsoy, Salim Şentürk, Onur Yaman

13.40-13.50 **OP-02: Methylprednisolone, Betamethasone and Cryoablation Injection for Facet Joint Pain**
Ismail Bozkurt

13.50-14.00 **OP-03: Outcomes of chordomas of the sacrum and mobile spine: Clinica series with average 6 year follow up**
Habib Tadayyon Einaddin Karakoç, Mehmet Zileli

14.00-14.10 **OP-04: Sagittal balance radiological outcomes on patients submitted to C0-C1-C2 posterior fixations**
Vitor Pinto, Leopoldina Pereira, Djamel Kitumba, Rui Reinas, Oscar L Alves

14.10-14.20 **OP-05: Radiofrequency thermocoagulation of the ganglion impar for coccydynia management**
Emir Kaan Izci

14.20-15.00 **Discussion**

15.00-15.30 **Refreshment break**

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SESSION 4

CASE PRESENTATIONS

Moderator: *Özkan Ateş*

15.30-15.45 **Lumbar spine MISS: Institutional experience**
Tomislav Sajko

15.45-16.00 **Case: Delayed odontoid type II fracture with complete posterior ptosis of the odontoid**
Abolfazl Rahimizadeh

16.00-16.15 **Case: Management of C2 osteoblastoma**
Kemal Koç

16.15-16.30 **Case: Multiple level lumbar epidural hematoma evacuation with unilateral approach**
Özkan Ateş

16:30-16:45 **Case: Double level traumatic spondyloptosis of the thoracic spine with Brown-Séquard syndrome**
Abolfazl Rahimizadeh

16.45-17.00 **Case: Huge pelvic meningocele below S3-operative technique**
Massimiliano Visocchi

Closing

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SESSION 5

DYNAMIC STABILIZATION and NEW TECHNOLOGY

Moderator: *Tunç Öktenoglu*

09.15-09.30 **Compensation mechanisms in aging spine**
Tunç Öktenoglu

09.30-09.45 **Long term results of interlaminar dynamic stabilization in lumbar spinal stenosis**
Sebastian Gitter

09.45-10.00 **Dynamic stabilization in spinal disorders**
Mehdi Sasani

10.00-10.15 **Minimal invasive surgery of the cervical spine using navigation and robotics**
Ehab Shiban

10.15-10.30 **Artificial intelligence: Applications and impact on spinal surgery**
Abd-El Hafiz Shehab Eldien

10.30-11.00 **Refreshment break**

SESSION 6

DEFORMITY

Moderator: *Abd-El Hafiz Shehab Eldien*

11.00-11.15 **Sagittal balance and pelvic parameters: Clinical implications**
Onur Yaman

11.15-11.30 **Surgical treatment of severe cervical kyphosis: Experience in 29 cases**
Abolfazl Rahimizadeh

11.30-11.45 **Adult degenerative scoliosis**
Onur Yaman

11.45-12.00 **Spondyloptosis: Single stage reduction and stabilization long-term outcome**
Abd-el Hafiz Shehab Eldien

12.00-12.15 **Case demonstrations: Surgical treatment of primary bone tumors, MIS treatment for spondylodicitis- How I do it?**
Ehab Shiban

12.15-13.30 **Lunch**

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SESSION 7

Panel: Treatment options for degenerative deformities

Moderator: *Mehdi Sasani*

13.30-13.45 **Emerging technologies for the surgical treatment of spinal tumors**
Ehab Shiban

13.45-14.00 **Ossification of the ligamentum flavum in Iranian nation: Report of 57 cases**
Abolfazl Rahimizadeh

14.00-14.15 **Orthrus™ dynamic implant system**
Ahmet Tulgar Başak

14.15-14.30 **Surgery for lumbar foraminal stenosis with pedicle resection and dynamic stabilization**
Mehdi Sasani

14.30-14.45 **Case presentation and video: Endoscopy for lumbar spinal stenosis**
Salim Şentürk

14.45-15.00 **Discussion**

15.00 **Closing of the meeting**

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February 24 - 26, 2022

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Invited Speaker Lectures

(According to the Chronological Order at the Scientific Program)

24 February, 2022 / 08.30 - 08.45

Endoscopy in cervical degeneration

Joachim Oertel, MD, Giovanni Miccoli, MD
Department of Neurosurgery, Saarland University Medical Center, Homburg, Saarland, Germany

Endoscopy represents a new technique for minimally invasive surgery in degenerative spine diseases. In the present abstract, a peculiar focus to the cervical spine is given.

The authors retrospectively reviewed all cases of posterior endoscopic cervical procedures performed at the Department of Neurosurgery, Saarland University Medical Center between 2011 and 2020. All patients >18 years at time point of surgery with complete medical data sets and available intraoperative video documentation of the entire surgical procedures were screened.

Endoscopic foraminotomy was performed using the Easy Go® Spine System (KARL STORZ GmbH & Co. KG, Tuttlingen, Germany), including a 30° Hopkins® Forward-Oblique telescope with 9.5 cm in length, a H3-Z Full HD Camera Head and a Xenon Nova® 300 cold light fountain. The image was intraoperatively transmitted on a 26" HD Flat Screen. All intraoperative data were recorded via AIDA® compact NEO data archiving system (KARL STORZ GmbH & Co. KG, Tuttlingen, Germany). A Zeiss Kinevo (Carl Zeiss AG, Oberkochen, Germany) was available at all time points of surgery for converting to microscopic visualization.

Easy Go® Spine System was used in all cases according to the previously published technique: The patient was prone positioned with the head fixed in a three-point Mayfield clamp with elevated and slightly inclined position, fixating the surgical field above the level of heart. Affected cervical levels were identified using intraoperative lateral fluoroscopy. In case of affected levels below C6, the shoulders of the patients were gently pulled down and fixed with tape for sufficient X-Ray imaging.

A total of 95 endoscopic foraminotomies were performed in 76 patients, who met the inclusion criteria and could be included for final analysis. Main indication for surgery was radiculopathy with or without neurological deficits. Fifty-one patients (67.1%) were male and twenty-five female (32.9%). Mean age at surgery was 55.6 years (29-82 years).

Thirty-four patients of the study population had previous cervical spine surgery 15 patients underwent previous anterior cervical discectomy and fusion (ACDF). Mean follow-up was 27.6 months.

Sixty-two patients had single-level surgery, thirteen had double-level surgery, only in one case a triple level surgery was done. Four patients underwent to a bilateral foraminotomy.

The endoscopic system was easily handled in all cases. Eleven patients were operated on with the 15 mm, sixty-five with the 19 mm O.D. working sheath. No case and/or intraoperative complication required to stop surgery switching to microscopic technique. There was only one case of intraoperative dural tear, anyway, easily managed with apposition of a bio-absorbable patch made of human plasma-derived fibrinogen and thrombin. One postoperative hematoma causing local pain was subsequently evacuated trough microsurgical access. The mean overall operating time was 77 minutes (range 22-272 minutes), lower if considering the time taken for a single foraminotomy: 68 minutes (range 19-140 minutes). Mean postoperative time between date of surgery and discharge was 4 days (±2; range 2 to 15 days).

Postoperatively 73 patients reported to be completely pain-free or with considerable diminished pain.

Thirty patients reported an improvement of their preoperative sensory deficit, in 12 it was unchanged postoperatively. One patient had a worsening of his preoperative sensory deficit; in one case was reported a new-onset sensory impairment.

Motor strength improved in 22 patients while it was unchanged in 12; two patients had a transient worsening of their motor impairment (in one case it only remined a mild deficit). In two cases a new onset motor deficit was reported.

Clinical success was documented for 69 patients (91%). The mean NDI was 18%.

Taken a part, patients with previous surgery had clinical success of 80% and 22% of NDI.

In all, endoscopy represent a successful option for the application o minimally invasive technique in cervical degeneration. Particularly its application in posterior approaches is well described.

24 February, 2022 / 08.45 - 09.00

Endoscopic Posterior Cervical Foraminotomy as a Treatment for Osseous Foraminal Stenosis

Benedikt Burkhardt

Background: Posterior cervical foraminotomy is a valuable treatment option for cervical radiculopathy. Here the authors present their technique and results in the treatment of a series of patients suffering from osseous foraminal stenosis.

Methods: Forty-three patients suffering from cervical osseous foraminal stenosis were operated on via a posterior approach with the EasyGO endoscopic system. Decompression was performed in 1 segment in 31 patients, in 2 segments in 11 patients, and in 3 segments in 1 patient. Bilateral decompression was performed in 4 cases. Twenty-four (55.8%) patients had been subjected to previous spine surgery. All procedures were video recorded and afterwards retrospectively analyzed. In addition, particular reference was given to previous cervical spine surgery, postoperative outcome, reoperation rate, and complications.

Results: The endoscopic system was easy to handle intraoperatively in all procedures. No emergency stopping was required. Forty-one patients reported improved and/or even no remaining pain postoperatively (95%). Thirty-five patients (81.4%) regained full motor strength. Clinical success rate with respect to Odom's criteria reached 39 patients (90.7%). One reoperation was needed due to postoperative hematoma (2.3%). One patient suffered from transient worsening of his preoperative paresis (2.3%). Neither dural tear nor nerve root injury was observed. Reoperation rate due to degenerative changes was 18.6% (8 of 43 patients).

Conclusions: This retrospective analysis shows that posterior endoscopic decompression is a successful option in the treatment of osseous cervical foraminal stenosis.

24 February, 2022 / 09.00 - 09.15

Endoscopic posterior approach in the thoracic spine

Joachim Oertel, MD, Giovanni Miccoli, MD
Department of Neurosurgery, Saarland University Medical Center, Homburg, Saarland, Germany

Endoscopy represents a new technique for minimally invasive surgery in degenerative spine diseases. In the present abstract, a peculiar focus to the posterior approach to the thoracic spine is given.

The authors retrospectively reviewed all cases of posterior endoscopic procedures performed to the thoracic spine at the Department of Neurosurgery, Saarland University Medical Center between 2011 and 2020. All patients >18 years at time point of surgery with complete medical data sets and available intraoperative video documentation of the entire surgical procedures were screened.

Endoscopic foraminotomy was performed using the Easy Go® Spine System (KARL STORZ GmbH & Co. KG, Tuttlingen, Germany), including a 30° Hopkins® Forward-Oblique telescope with 9.5 cm in length, a H3-Z Full HD Camera Head and a Xenon Nova® 300 cold light fountain. The image was intraoperatively transmitted on a 26" HD Flat Screen. All intraoperative data were recorded via AIDA® compact NEO data archiving system (KARL STORZ GmbH & Co. KG, Tuttlingen, Germany). A Zeiss Kinevo (Carl Zeiss AG, Oberkochen, Germany) was available at all time points of surgery for converting to microscopic visualization.

Easy Go® Spine System was used in all cases according to the previously published technique: The patient was prone positioned with the head fixed in a three-point Mayfield clamp with elevated and slightly inclined position, fixating the surgical field above the level of heart. Affected thoracic levels were identified using intraoperative lateral fluoroscopy.

A total of 16 endoscopic posterior approaches to the thoracic spine was identified in 16 patients, who met the inclusion criteria and could be included for final analysis. Main indication for surgery was myelopathy due to posterior ligament hypertrophy. Mean follow-up was 27.6 months.

Nine patients had single-level surgery, seven had double-level surgery. In the seven cases, cervical adjacent levels were involved.

The endoscopic system was easily handled in all cases. No case and/or intraoperative complication required to stop surgery switching to microscopic technique. There were no intraoperative complications. The mean overall operating time was 80 minutes.

Postoperatively, all patients improved from the myelopathy symptoms to a variable degree.

In all, endoscopy represent a successful option for the application of minimally invasive technique in thoracic pathology. Particularly its application in posterior approaches seems to be of value.

24 February, 2022 / 11.45 - 12.00

CAN WE PREDICT THE OUTCOME OF DECOMPRESSION SURGERY IN MULTILEVEL STENOSIS?

Tarık Yazar, Hayati Aygün **,Abdullah Merter**
Univ. of Ankara Orthopaedic Dept.

Background and purpose: 10 -25% of patients who undergo surgery for spinal stenosis, have residual symptoms from time to time low functioning and low health-related quality of life after the surgery.

When we realized that 15% postoperative cases are not happy after unilateral biportal endoscopic surgery(UBE), our aim is to find out a promising and objective predictor for the patients' post operative prognosis.

In this way, we could determine the number of decompression levels more objectively and more accurately in multilevel spinal stenosis.

Imaging findings and clinical complaints are not compatible in all cases.

This incompatibility makes it difficult to determine the correct indication.

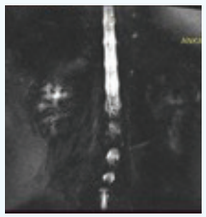
For example, as in the patient indicated below, the preoperative MRI sections and the patient's clinics are not fully compatible.

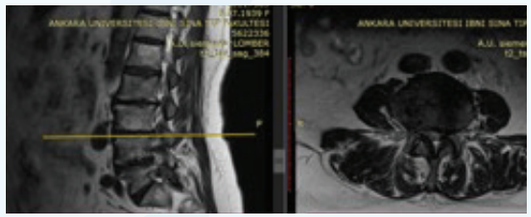
Case Presentation:

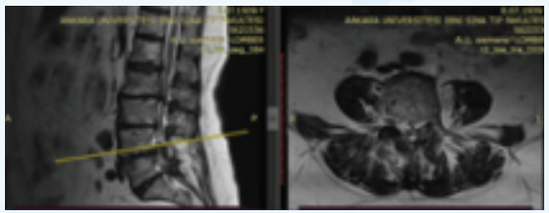
74 Y ♀

Complaints:

1. There is pain from the waist to the hips while walking.
2. Can't sleep because of pain.
3. The pain sometimes goes below the knee on both sides.
4. Feet are always cold.
5. There are tingling on both sides, it is relieved when the feet are raised high.
6. It shows L5 syndrome as a dermatome.
7. Lean forward and to the right when standing.
8. Walking on heels is worse than walking on toes (especially right).
9. Sitting laseque test worse on the right, pain in the right hip.







Neurologist, announced us magnetic stimulation SEP and MEP could determine the decompression level or levels.

In the paper Multilevel myelopathy in Maroteaux-Lamy syndrome, Dr. Mut et all. (1) explained the importance of magnetic stimulation on SEP waves.

EMG, MEP, SEP and magnetic simulation studies were performed by the neurologist.

As a result: In addition to EMG, in this presented four levels compressions case, SEP and MEP examination graphics have shown us the necessity to decompress L3-S1 levels of this multi-level stenosis.

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ENMG FINDINGS: It indicates the presence of multiple root involvement, which concerns all L3-S1 roots, but most affected S1 roots.

In this case, the clinical picture was not very clear. We decided not only according to MR but also according to ENMG graphics. Post operatively, she is doing well. Patient's quality of life become good.

There will be more reliable results with more cases.

M Mut, A Cila, K Varlı, N Akalan, Multilevel myelopathy in Maroteaux-Lamy syndrome and review of the literature. Clinical Neurology and Neurosurgery 107 (2005) 230-235.

24 February, 2022 / 12.00 - 12.15

Endoscopic Intralaminar Approach for the Treatment of Lumbar Disc Herniation

Benedikt Burkhardt

Background: Almost every surgical approach carries the risk of causing some degree of spinal instability, especially in cases of excessive resection of the lamina and facet joint. This study describes the endoscopic intralaminar approach (ILA) for the treatment of cranially and caudally migrated lumbar disc herniation.

Methods: Thirty-one patients who underwent endoscopic ILA for 26 caudally and 5 cranially migrated lumbar disc herniations were identified from a prospectively database. At final follow-up, a personal examination and a standardized questionnaire evaluation were conducted, including the Oswestry Disability Index (ODI) and functional outcome according to modified MacNab criteria. In addition, particular reference was given to back pain, leg pain, and repeat procedures.

Results: The mean final follow-up was 37.0 months (range, 5-57 months) at which 29 patients attended (93.5%). No leg pain was noted in 95.0%, no back pain in 85.0%, full motor strength in 95.0%, and no sensory deficit in 95.0% of patients with ILA. Clinical success was reported by 95.0% of patients and the mean ODI was 9% in patients with ILA. Ten patients had an enlargement of ILA to conventional laminotomy (32.3%). By comparison of clinical outcome and repeat procedure rate in patients with ILA with patients with enlargement to laminotomy, no significant differences were identified except for higher ODI (i.e., 16%) in patients with enlargement of ILA.

Conclusions: Endoscopic ILA is a safe technique for the treatment of cranially and caudally migrated lumbar disc herniations. Careful procedural planning is recommended to protect soft tissue and osseous structures and to achieve excellent clinical outcome.

24 February, 2022 / 13.45 - 14.00

Endoscopy-assisted resection of calcified thoracic disc

Mehdi Sasani, MD, Professor of Neurosurgery
Koc University School of Medicine- American Hospital

Calcified midline thoracic disc herniation (CMTDH) surgery is still remaining controversy. Thoracic disc herniations (TDH) are relatively rare and less symptomatic patients account for 0,19 to 4% of all disc herniation that are going to surgical treatment. The entity of TDH is known so the assessment and diagnosis of thoracic disc herniation patients are well performed. Otherwise select of appropriate approach and effective surgical strategy has still challenged because of poor outcome after many surgical technique which have been defined up to now. In consequence choice of favorite surgical treatment for TDH is controversial due to the location and consistency of the TDH.

The main idea of presentation is to describe the surgical technique by endoscope to remove CMTDH via transthoracic discectomy (TD) and posterior trans-corporal of thoracic vertebra discectomy (PTTVD) approaches. The advantages and disadvantages of both approaches are discussed. The Oswestry Disability Index (ODI) and visual analog scale(VAS) were used to assess the patients. Subarachnoid space Index (SSI) was formulated as spinal cord diameter (SCD)/subarachnoid space diameter(SSD) at the level of thoracic disc herniation. This index gives an idea in the preoperative evaluation of how the spinal cord can be mobilized during surgery. Continuous somatosensory/ motor evoked potential monitoring were recorded simultaneously during surgery.

The complication was seen as pleurisy and lung contusion in two patients who underwent TD approach. One patient with SSI type II who underwent PTTVD surgery, was intraoperatively changed of an evoked response without neurological deficit after waking up. Significant improvement was observed in the ODI and VAS parameters.

TD clearly provides a minimally invasive and effective alternative to open thoracic surgery. A surgeon must be familiar with the surgical anatomy and the endoscopic techniques to ensure an optimal surgical outcome. Hence, that is one limitation in the practice of thoracoscopic discectomy. On the other hand, PTTVD provides a good anterior vision as an TD approach without the thoracic surgery side effects and avoids complications due to spinal cord encroachment for surgical manipulation in the posterolateral approach. SSI gives an idea in the preoperative evaluation of how the spinal cord can be mobilized due to manipulation of the spinal cord during surgery. This index has been edited only according to our limited experience. We think that further radiological examination is required to formalize it in the future.

Istanbul Spine Masters & ISMISS Turkey

Invited Speaker Lectures

24 February, 2022 / 15.30 - 15.45

Decompression Techniques in Lumbar Stenosis

Tunç Öktenoğlu M.D., Professor of Neurosurgery
Koc University School of Medicine Department of Neurosurgery

Lumbar stenosis is a well-known pathologic condition typically resulting from spondylosis. This pathology might occur throughout the spine but is more prevalent in the cervical and lumbar regions where relatively mobile segments combined with axial loading can lead to degenerative arthritic changes. A combination of hypertrophied facet joints and ligaments, disc herniation, spondylolisthesis, and osteophyte overgrowth can lead to lumbar stenosis and subsequent compressive neurologic symptoms

Surgical decompression of lumbar stenosis is one of the most common surgery for patients older than 65 years of age. Prospective randomized clinical trials have shown significantly better improvements in patient functional outcome and quality of life with surgical intervention compared to conservative treatment. The Maine Lumbar Stenosis Study and the Spine Patient Outcomes Research Trial (SPORT) have both shown statistically significant improvement in patient outcomes.

Traditionally, lumbar stenosis is treated with an open, decompressive laminectomy with or without facetectomies. This has been very effective for improvement of clinical symptoms but may inadvertently lead to cases of iatrogenic spinal instability, requiring additional surgical intervention for stabilization. Radiographic studies, cadaver models, and finite element studies have shown that open decompressive laminectomies are effective for lumbar stenosis but also disrupt the native anatomic support structures; supraspinous ligament, interspinous ligament, spinous process, lamina, facet joints, ligamentum flavum, and paraspinal musculature, leading to muscular atrophy and potential long-term spinal instability.

The efferct of spinal elements on spinal stability is found as; Facet joints 39%, Disc and annulus 29%, Supra/ Interspinous ligament 19% and Ligamentum flavum 13%.

Biomechanical cadaver stusies showed that range of motion increases by 32% following laminectomy and increases by 14,3% following bilateral hemilaminotomies.The development of instability following facet sparing laminectomy is found 8-31% in literatüre.

Subsequently, “minimally invasive spine surgery” (MISS) was developed focally address the diseased structures but minimize disruption of the surrounding normal anatomic structures. Muscle splitting serial tube dilators and retractors were designed to minimize disruption of the paraspinal musculature and provide direct and focal access to the diseased anatomy.

MISS tecniques offers similat satisfactory outcomes as traditional open tecniques and additionally they offer some important advanteges such as decreased blood loss, shorter operative time, shorter hospital duration, decreased postoperative narcotic requirement, decreased rate of infection and CSF leak, and a decrease in time required for return to work.

The effective treatment of lumbar stenosis is surgical decompression. There are several different techniques have been described;

1. Laminectomy (possibly with facetectomy)

   This technique carries high risk for development of spinal instability. Therefore a stabilization procedure is usually performed.

2. Minimally Invasive Techniques

   a. Unilateral approach bilateral decompression; Under surgical microscope the surgery is performeg by uni lateral approach and bilayeral decompression is achieved. The most important advantage of this method is the preservation of contralateral muscle and bony structures.Therefore the incidence of instability progression following surgery is less.

   b. Microendoscopic decompression; The decompression procedure is performed with endoscopy. Therefore the iatrogenic disrıption of the spinal musculature structures are minimal.

24 February, 2022 / 16.40 - 16.55

En bloc cervical laminoplasty with preserving posterior structure and arcocristectomy in cervical spondylotic myelopathy

Rahmi Kemal Koç

Erciyes University, Department of Neurosurgery Kayseri, Turkey

Laminoplasty for cervical spondylotic myelopathy was introduced alternatively to laminectomy in 1970 in Japan. There are some complication for cervical laminoplasty.

Complications of laminoplasty

Axial neck pain due to facet capsule distruption and wide muscle dissection. Axial neck pain rate were 29% in C3-7 laminoplasty and 5.4% in C3-6 laminoplasty.

Kyphotic deformity due to distruption of posterior tension band, resection of 50% of the facet joint and capsule and incorrect patient selection (a lordotic angle of <10°, a kyphotic angle during flexion that is larger than a lordotic angle during extension).

How can reduce the complications of laminoplasty ?

- Postoperative deformity and instability of the cervical spine must be avoided.
- All muscular attachments to the C2 spinous process must be preserved.
- Nuchal ligament attached C7 must be preserved. If there is C6-7 compression, C7 arcocristectomy may be performed.
- Posterior tension band must be preserved.

The open door laminoplasty technique is modified with the aim of preserving posterior structure. The posterior spinal elements such as spinous process, supraspinous and interspinous ligaments, muscles attached to spinous process of C2 and C7, and facet capsules are preserved. Laminae are stabilized by placing titanium miniplates and screws

Surgical technique

Upper and lower level of compression were included to laminoplasty.

The head was positioned prone and then immobilized by three-point head holder.

A midline incision was made to expose the spinous processes from C2 to C7 for a typical C3-C6 laminoplasty. The subperiosteal dissection of muscles from spinous processes to middle of lateral mass was performed. The junction of facet and lamina is identified. The “door” is opened on the more symptomatic side. On the hinged side, the junction of lamina and lateral mass was partly drilled to create a gutter. On the opened side, it was completely drilled. Keyhole foraminotomies are performed if necessary. Using angled curet, the open side is slowly lifted. Elevated lamina and lateral mass are stabilized by placing titanium miniplates and screws. Any sublaminar adhesions are dissected free. The posterior spinal elements such as spinous process, supraspinous and interspinous ligaments and muscles attached to spinous process of C2 and C7, facet capsules are preserved. If C6-7 levels affected, arcocristectomy was performed. C7 laminoplasty was’nt performed. Muscles attached to spinous processes of C2 and C7 were preserved.

Clinical series

A retrospective review of 81 patients with CSM who underwent an en bloc cervical laminoplasty with preserving posterior structure of the cervical spine during the period from 2007 to 2014 was performed. The mean modified JOA scale score was 11.4±2.4 preoperatively and 15.0±3.9 postoperatively. Neurological recovery rate was 68.6%. C7 arcocristectomy was performed in 19 patients. No axial pain was noted in the postoperative 2 months. Keyhole foraminotomies were performed in 11 patients and radicular pain completely resolved after surgery. Temporary 5th nerve root palsy was observed in 3 patients. Mean cervical spine lordosis was 10.6±10.5 preoperatively and 8.6±9.5 postoperatively. No postoperative spinal instability and kyphotic deformity were noted.

Conclusion

En bloc cervical laminoplasty with preserving posterior structure is useful in preventing postoperative spinal malalignment and axial pain. Arcocristectomy is an effective technique for prevention of postoperative axial pain in patients with C6-7 narrow spinal canal.

Istanbul Spine Masters & ISMISS Turkey

Invited Speaker Lectures

25 February, 2022 / 09.15 - 09.30

Vertebral artery mobilization and cervical tumor resection

Rahmi Kemal Koç

Erciyes University, Department of Neurosurgery Kayseri, Turkey

Both of primary and metastatic tumors of the cervical spine are likely to involve the vertebral artery (VA) on one or both sides.

The cervical tumors involving or surrounding the VA are great challenges for Neurosurgeons to carry out radical cervical tumor resection. In order to prevent inadvertent VA injury during the tumor resection and to achieve safe and maximum tumor resection and to minimize the tumor recurrence, VA releasing has a great importance.

For the management of such tumors, a standard anterior approach may be inadequate.

To evaluate the clinical therapeutic effect of vertebral artery releasing to maximum cervical tumor resection.

Surgical Technique

Anterior Approach. It is approached from the affected side. The natural space between the sternocleidomastoid (SCM) muscle and the internal jugular vein is widely dissected. The SCM muscle is retracted laterally, while the carotid artery, jugular vein, esophagus, and trachea were retracted medially. If the lesion is small, a routine anterior cervical opening may be done. The sympathetic chain is recognized under the prevertebral aponeurosis and then, the medial portion of the longus colli muscle is excised medial to the sympathetic chain. Dissection is started at the upper and lower parts of the lesion. The intertransverse ligament is resected and the anterior wall of the transverse foramen is removed subperiosteally using a Kerrison rongeur. The VV bleeding is controlled by a bipolar coagulator; however, a homeostatic agent may be used when the bleeding cannot be controlled. The VA is identified and then completely mobilized from the affected lateral walls to the anterior wall. The dissection then continues between the tumor and surrounded tissue, then the VA is retracted laterally or medially for the remainder of procedure. The tumor is totally removed.

Posterior Approach. In this case, it is approached from the midline incision. The paravertebral muscle is dissected to the affected side. After partial hemilaminectomy with the removal of the lateral mass, the nerve root, and VA was identified and the VA became free. In addition to tumor excision, instrumentation and autograft fusion were performed as needed.

Clinical series

From March 2001 to January 2019, 21 patients with cervical bone tumors (15 benign and 6 malignant tumors) underwent tumor resection with vertebral artery releasing in our clinic. There were 12 males and 9 females with ages ranging from 6 to 71(mean 30.4) years old. The medical records of these patients were reviewed retrospectively. All the patients were followed-up clinically and radiologically.

The average follow-up was 64 months. Histopathology revealed adenocarcinoma metastasis (4), osteoblastoma (4), eosinophilic granuloma (2), giant cell tumor (2), aneurysmal bone cyst (2), schwannoma (3), cavernous hemangioma (1), mesenchymal tumor (1), langerhans cell histiocytosis (1) and primitive neuroectodermal tumor (1). All the patients received gross total tumor resection and made a good neurological recovery. No such complications as spinal cord or vertebral artery injury, postoperative radiculopathy or instrumentation failure were observed. Local recurrence was observed only in two patients with lung adenocarcinoma metastasis.

Conclusion

Causing no significant morbidity, the cervical bone tumors surrounding VA can be radically resected after VA releasing.

25 February, 2022 / 15.30 - 15.45

Minimal invasive lumbar spine surgery: institutional experience

Sajko T [1,2,3,4], Rotim K [1,2,3,4], Jurilj M [1,2], Rotim C [5]

[1]Department of Neurosurgery, Sestre milosrdnice UHC, Zagreb, Croatia

[2]Department of Anatomy and Physiology, University of Applied Health Sciences, Zagreb, Croatia

[3]Department of Neurology and Neurosurgery, Medical School, J J Strossmayer University of Osijek, Osijek, Croatia

[4]NeuroSpine Special Hospital for Neurosurgery, Zagreb, Croatia

[5]Policlinic Rotim, Zagreb, Croatia

Lumbar discectomy is still considered the gold standard in surgical management for symptomatic disc herniation after conservative treatment has failed. Considering conventional surgical techniques, in the last more than 20 years, different methods with minimal damage to neuromuscular spine structures are being developed and introduced, all having the purpose to reduce the postoperative back-pain.

The advantages of the minimally invasive spine surgery include: possibility of performing procedures under local anaesthesia, reduced hospital stay, limited blood loss with consecutively reduced fibrous tissue development, quicker return to work and everyday activities. From the economical point of view, this kind of treatment is considered to be a cost-effective intervention.

PLDD (percutaneous laser disc decompression), tubular retractor system and SED (selective endoscopic discectomy) are minimally invasive methods in treatment of lumbar disc hernia that have been used in Croatia from 2008 in the Department of neurosurgery Sestre milosrdnice University Hospital Center.

PLDD is based on a laser beam causing reduction of the intradisc mass and therefore intradisc pressure.

The tubular retractor system combines reliability of conventional microsurgical methods with advantages of minimally invasive techniques and is based on preventing detachment of paraspinous muscles and consequently preserving spine stability.

SED includes specially designed endoscopes that provide excellent visualisation and enable pain cause removal with preserving the healthy part of the disc.

Although all these listed methods are used in the everyday practice, there is still lack of controlled prospective studies for evidence-based conclusions on benefits of minimally invasive spine surgery for lumbar disc hernia treatment.

Istanbul Spine Masters & ISMISS Turkey

Invited Speaker Lectures

25 February, 2022 / 16.00 - 16.15

Case: Management of C2 osteoblastoma

Rahmi Kemal Koç

Erciyes University, Department of Neurosurgery Kayseri, Turkey

Osteoblastomas constitute less than 1% of all bone tumors and generally develop from the long bones and posterior vertebral elements. Unlike those in other regions, cervical osteoblastomas often occur in the vertebral body. Osteoblastoma of the cervical region is uncommon, and there are few reports of its treatment. The most common symptom is pain. However, they can cause neurological deficits and deformities depending on the location in the spine.

Purpose

The purpose of this study was to evaluate the surgical management of an osteoblastoma involving the entire C2 vertebra

Materials Methods

A 14-year-old girl presented with unbearable neck pain. Her medical history was unremarkable. Computed tomography (CT) and magnetic resonance imaging (MRI) revealed lytic and osteoblastic bone lesions involving the entire C2 vertebra. The tumor was resected in two stages with vertebral artery mobilization.

Surgical Technique

Surgery was planned in two stages. First, laminectomy of C2 with removal of intervertebral joints was performed, and the posterior portion of the mass to the vertebral artery was excised totally with a posterior approach, and the vertebral arteries were freed. After stabilizing the spine with screws in the occiput and lateral mass of C3–C4, posterior fusion was performed using two autologous rib grafts. The posterior grafts were fixed to the occiput by insert under the occipital plate, atlas by connecting rope and C3–C4 laminae by compressing under rods.

Before performing the anterior resection, we waited for 1.5 months to allow better integration of the bone screws and posterior grafts. Some relief of the neck pain in the period between the two stages was observed. Then, the odontoid and the mass located anterior to the vertebral artery were excised totally via the anterolateral/retropharyngeal approach to the high cervical spine. An autologous rib graft was placed between C1 anterior arch and C3 corpus under compression. The graft attached to C1 anterior arch with fish-mouth shaped and stabilized to C3 body with miniplates after decortications of C1 anterior arch and C3 corpus.

Excessive bleeding was not observed in both approaches. The patient had no postoperative problems. Histological examination confirmed the diagnosis of osteoblastoma. The pain resolved postoperatively, and the patient had no further complaints. No adjuvant therapy was applied postoperatively. A cervical collar with chin support was recommended for 3 months.

At the 4-year follow-up, the patient had no additional complaints, and fusion was detected in the cervical spine radiographs. No recurrence was observed on cervical MRI.

Conclusion

Marginal resection remains the best treatment for osteoblastoma of the spine. If tumor tissue surrounds the vertebral artery, the vertebral artery should be mobilized and the surrounding tumor mass excised.

25 February, 2022 / 16.00 - 16.15

Dynamic stabilization in spinal disorders

Mehdi Sasani, MD, Professor of Neurosurgery
Koc University School of Medicine - American Hospital

Dynamic stabilization is a new procedure to treat degenerative spine surgery. If there is chronic instability such as “glacial instability” or “segmental motion dysfunction”, the patient is able to do daily activities. In this patients groups there is no risk of sudden neurologic deficit however, the pain is the most prominent finding. The major problem in these patients is the slow break down of anatomic integrity. Slow developing anatomical damage causes the progressive diminish of the spine resistance to the daily activities. Dynamic systems are appropriate for this kind of instabilities.

Dynamic stabilization is a strong alternative to fusion in chronic instability or minor instability cases. It is used in spine stabilization for a long time in spine surgery practice. This technology needs improvement both as a surgical technique and hardware technology. When we look at the literature which system is used, there is no problem with single level stabilization. The problem in dynamic stabilization can be summarized as the loosening of the screw in the S1 vertebra as the level increases and the inability to effectively protect the physiological vertebral column movement. First of all there is a hardware problem in multilevel stabilization such as screw loosening and breakage and the second as the level increases system becomes more rigid. In dynamic rod rigid screw systems tension on the rod cause a rigid spine then normal spine. The goal of the dynamic system is to achieve a system that provides stabilization at more levels and at more physiological limits.

In this presentation how the above-mentioned problems can be solved and new surgical methods and screw designs for this purpose will be presented.

Joint Meeting of

Istanbul Spine Masters & ISMISS Turkey

February 24 - 26, 2022

Memorial Bahcelievler Hospital, Istanbul, Turkey

Oral Presentations

OP-01

Radiological and clinic results of posterior dynamic(semirigid) stabilization in the cervical spinal stenosis

Kemal Paksoy[1], Tansu Gürsoy[2], Salim Şentürk[2], Onur Yaman[1]
[1]İstanbul Bahçelievler Memorial Hospital Spine Center
[2]İstanbul Memorial Hizmet Hospital

Purpose: Surgical methods in patients with cervical spinal stenosis (CSS), in cases where cervical alignment is neutral or lordotic, posterior intervention, and anterior surgery are preferred in kyphotic patients. Neighboring segment disease and pseudoarthrosis are the main problems that arise in fusion surgery. In this study, we publish short-term results of 11 patients with whom we performed posterior decompression and semirigitis fixation, which are not in the literature, in patients with CSS whose cervical alignment is neutral or kyphotic.

Materials-Methods: Eleven patients with cervical spinal stenosis were included in the study. Of these patients, 7 were male and 4 were female. The mean age of these patients was 64.6. The clinical status of the patients were compared using the Visual Analog Scale (VAS), Oswestry Disability Index (ODI) and the Japanese Orthopedic Association (JOA) scale on the 1st, 6th and 12th months preoperatively. Radiologically, preoperative-postoperative cervical sagittal vertical axis (cSVA), cervical lordosis (C0-2) (C2-7), thoracic inlet, T1 slop measurements were performed.

Finding: The results of preoperative and postoperative VAS, JOI and ODI scales of patients who underwent decompression and posterior dynamic stabilization (PDS) due to CSS were found to change positively in the Wilcoxon Rank statistical test. Control scoliosis radiographs of the patients were performed on the 1st day, 6th month and 12th months. In this process, it was observed that the sagittal vertical axis did not change, cervical lordosis was preserved, and ROM was preserved before and after surgery. Spinal stabilization was observed on functional radiographs of the patients. In clinical and radiological follow-up of the patients, it was observed that neighboring segment disease and pseudoarthrosis did not develop.

Result: Posterior dynamic stabilization with laminectomy due to CSS is a new technique used in the literature. Posterior dynamic stabilization is a new method in which radiological and clinical results that can be used in the cervical spinal stenosis are well effective. Although the patients have short-term follow-up for 1 year, the absence of neighboring segment disease and pseudoarthrosis, preservation of cervical sagittal alignment, lordosis, and ROM preservation are the main advantages of the new method.

OP-02

Methylprednisolone, Betamethasone and Cryoablation Injection for Facet Joint Pain

Ismail Bozkurt
Department of Neurosurgery, Çankırı State Hospital, Çankırı, Turkey

Introduction: With its rich vascular and neural network the facet joints have been identified as a possible pain source. Lumbar facet syndrome is low back pain due to asymmetry, stenosis, sclerosis, erosion, arthrosis and hypertrophy of these joints. Intra-articular and medial branch injections have aimed to provide temporary pain relief. Different modalities have been evaluated to provide faster and longer relief of pain. In this study, the results of intra-articular Methylprednisolone and Betamethasone injection and medial branch block via cryoablation have been evaluated.

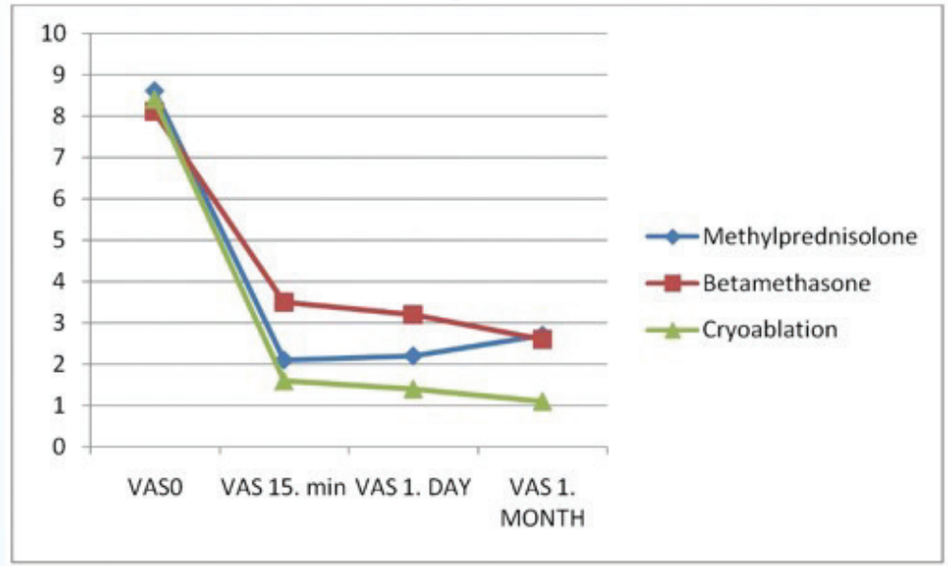
Materials and Methods: 80 patients with no history of lumbar surgery with low back pain resistant to conservative treatment were reviewed retrospectively. All interventions were performed in the operating room under fluoroscopic guidance. Patients in group A(n=30) received 20mg/1ml methylprednisolone (DepoMedrol) + prilocaine(1cc) + bupivacaine(1cc) per facet joint. Group B(n=30) received 5mg/ml Betamethason(Diprospan) + prilocaine(1cc) + bupivacaine(1cc). Group C(n=20) received prilocaine(1cc) per facet joint. A nerve probe was used with 0.5V stimulus to confirm absence of motor response. Metrum Cryflex device was used to pass nitrous oxide through the cannula at -65–80 °C to create cryoablation of an area approximately 5x10mm in diameter.

Results: A total of 80 patients underwent facet joint injection. Demographic information, Visual Analogue Scale (VAS) scores before the procedure, 15th minute, 1st day and 1st month are given in Table 1. In Table 2, the age distribution according to the treatment groups and the mean VAS scores and their standard deviations are given. Although there was a decrease in the mean VAS scores after the procedure, a minimal increase in the methylprednisolone group at the first month control was observed(Graph 1).

Discussion: The main target of facet injection in patients with lower back pain is to reduce pain by decreasing inflammatory process of the joint or by blocking the medial branch innervated by dorsal root. Prednisolone injection has been found to be beneficial with its anti-inflammatory activity. Overall, steroid injection into the facet joint has

been found to have moderate evidence in the management of low back pain in the short and long term. In this study, 3 groups of patients benefited from facet steroid injection and cryoablation in the short and medium term. The VAS score decreased more rapidly with cryoablation and this decrease was maintained more in the medium term follow up. Facet joint injection and medial branch block are still effective treatment options in the treatment of low back pain.

Graph 1



Mean VAS Scores of Treatment Groups

Table 1

Gender	Age	Injection Level	Group	Localization	Pain Duration	VAS (pre-op)	VAS (PO 15.min)	VAS (PO 1. day)	VAS (PO 1. month)
F	59	LEFT L4-5	A	LOWER BACK AND LEFT LEG	5 YEAR	10	9	9	7
M	34	BILATERAL L5-S1	A	LOWER BACK PAIN	1 MONTH	6	1	0	3
M	38	LEFT L4-5, L5-S1	A	LOWER BACK AND LEFT LEG	3 YEAR	8	1	0	3
M	44	RIGHT L3-4	A	LOWER BACK AND RIGHT LEG	8 YEAR	8	1	1	3
F	37	BILATERAL L3-4,L4-5,L5-S1	A	LOWER BACK PAIN	2 YEAR	9	1	0	2
F	40	RIGHT L2-3,3-4,4-5	A	LOWER BACK PAIN	7 YEAR	10	0	0	2
M	27	RIGHT L3-4,L4-5	A	LOWER BACK PAIN	1 YEAR	7	0	6	5
F	47	LEFT L4-5,L5-S1	A	LOWER BACK PAIN	2 MONTHS	10	3	0	0
F	56	LEFT L3-4	A	LOWER BACK PAIN	3 WEEKS	10	5	5	3
M	37	LEFT L5-S1	A	LOWER BACK PAIN	3 YEAR	10	2	2	2
F	45	RIGHT L4-5	A	LOWER BACK AND RIGHT LEG	2 AY	8	7	7	6
F	28	RIGHT L4-5	A	LOWER BACK AND LEFT LEG	1 YEAR	5	0	0	2
F	30	BILATERAL L4-5,L5-S1	A	LOWER BACK AND RIGHT LEG	8 YEAR	10	2	3	0
M	44	RIGHT L3-4,L4-5,L5-S1	A	LOWER BACK AND RIGHT LEG	4 YEAR	10	5	5	2
F	39	BILATERAL L4-5, L5-S1	A	LOWER BACK PAIN	3 YEAR	7	0	2	4
F	58	LEFT L4-5,L5-S1	A	LOWER BACK AND LEFT LEG	2 YEAR	10	2	0	2
F	71	LEFT L4-5, L5-S1	A	LOWER BACK PAIN	7 YEAR	10	1	2	0
M	46	BILATERAL L4-5	A	LOWER BACK PAIN	16 YEAR	10	0	1	1
M	52	LEFT L5-S1	A	LOWER BACK PAIN	14 YEAR	10	0	7	5
F	52	BİLAT. L2-3,L3-4,L4-5	A	LOWER BACK AND BOTH LEG	15 YEAR	10	3	1	5
M	41	RIGHT L4-5,L5-S1	A	LOWER BACK PAIN	2 YEAR	10	0	0	1
F	39	BİLL2-3,3-4,4-5 LEFT L5-S1	A	LOWER BACK PAIN	8 YEAR	8	6	1	0
F	48	LEFT L4-5,L5-S1	A	LOWER BACK AND LEFT LEG	4 YEAR	8	3	3	2
F	57	BILATERAL L3-4,L4-5,L5-S1	A	LOWER BACK AND BOTH LEG	10 YEAR	9	0	0	6
M	47	LEFT L4-5	A	LOWER BACK AND LEFT LEG	15 YEAR	5	0	0	0
M	25	LEFT L4-5, BİLAT L5-S1	A	LOWER BACK PAIN	8 YEAR	5	0	0	0
M	49	LEFT L2-3,L3-4 BİL L4-5	A	LOWER BACK AND LEFT LEG	10 YEAR	10	0	0	2
F	51	BİL L3-4,L4-5,L5-S1	A	LOWER BACK AND LEFT LEG	1 YEAR	6	0	0	3
F	65	BİL L4-5,L5-S1	A	LOWER BACK AND BOTH LEG	1 YEAR	9	1	1	1
F	59	RIGHT L4-5	A	LOWER BACK AND RIGHT LEG	3 YEAR	10	9	9	10
F	40	LEFT L3-4,L4-5	B	LOWER BACK AND LEFT LEG	2 YEAR	7	7	5	3
F	42	RIGHT L3-4, BİL L4-5 L5-S1	B	LOWER BACK PAIN	3 YEAR	8	5	3	2
M	38	BILATERAL L3-4,L4-5,L5-S1	B	LOWER BACK AND LEFT LEG	1 YEAR	10	7	7	5
M	73	RIGHT L5-S1	B	LOWER BACK AND RIGHT LEG	10YEAR	10	6	7	5
F	59	BİL L3-4,L4-5,L5-S1	B	LOWER BACK AND LEFT LEG	1 YEAR	8	2	2	1
F	44	LEFT L3-4,L4-5,L5-S1, R. L4-5	B	LOWER BACK PAIN	4 YEAR	9	4	3	1
M	54	LEFT L3-4,L4-5,L5-S1	B	LOWER BACK AND LEFT LEG	15 YEAR	6	2	2	1
F	42	LEFT L4-5,LEFT L5-S1	B	LOWER BACK AND LEFT LEG	2 YEAR	9	3	2	0
F	48	RIGHT L4-5,L5-S1	B	LOWER BACK AND RIGHT LEG	2 YEAR	8	2	2	0
M	48	LEFT L4-5,L5-S1	B	LOWER BACK AND LEFT LEG	1 YEAR	7	3	3	4
F	48	BILATERAL L4-5 L5-S1	B	LOWER BACK AND BOTH LEG	7 MONTHS	6	0	2	5
M	37	BILATERAL L5-S1	B	LOWER BACK PAIN	1 YEAR	9	0	0	2
F	55	RIGHT L2-3,L5-S1	B	LOWER BACK AND RIGHT LEG	6 MONTHS	10	4	4	2
F	37	LEFT L4-5 BİL L5-S1	B	LOWER BACK PAIN	11 YEAR	10	3	3	3
F	73	LEFT L4-5 L5-S1	B	LOWER BACK PAIN	2 YEAR	8	4	4	5
F	59	LEFT L4-5,L5-S1	B	LOWER BACK PAIN	2 MONTHS	7	5	3	2
M	24	BILATERAL L3-4,L4-5	B	LOWER BACK AND LEFT LEG	2 YEAR	3	0	3	3
F	44	BILATERAL L4-5,L4-5,L5-S1	B	LOWER BACK AND BOTH LEG	11 YEAR	9	4	4	2
M	40	LEFT L3-4,L4-5,L5-S1	B	LOWER BACK PAIN	3 MONTHS	9	4	4	1
F	62	LEFT L4-5, BILATERAL L5-S1	B	LOWER BACK AND LEFT LEG	5 YEAR	10	4	3	2
F	50	BILATERAL L5-S1	B	LOWER BACK AND RIGHT LEG	10 YEAR	8	5	6	8
M	59	BILATERAL L4-5,L5-S1	B	LOWER BACK AND LEFT LEG	1 YEAR	7	3	2	0
F	67	RIGHT L5-S1	B	LOWER BACK AND RIGHT	4 YEAR	8	3	3	5
F	49	LEFT L4-5	B	LOWER BACK PAIN	5 YEAR	8	8	4	1
F	42	BILATERAL L5-S1 RIGHT L4-5	B	LOWER BACK AND RIGHT LEG	3 YEAR	8	2	1	3
M	55	BILATERAL L5-S1	B	LOWER BACK BOTH LEG	2 YEAR	7	5	5	2
F	56	BILATERAL L3-4, L4-5	B	LOWER BACK PAIN	5 YEAR	6	5	5	4
M	66	LEFT L3-4, L4-5	B	LOWER BACK AND LEFT LEG	3 YEAR	9	2	2	1
M	69	RIGHT L4-5, L5-S1	B	LOWER BACK AND RIGHT LEG	7 YEAR	10	2	1	3
F	52	BILATERAL L3-4	B	LOWER BACK PAIN	3 YEAR	10	2	1	1
F	78	BILATERAL L4-5	C	LOWER BACK PAIN	3 YEAR	9	1	0	0
F	66	RIGHT L4-5	C	LOWER BACK AND RIGHT LEG	2 YEAR	8	2	2	2
F	63	BILATERAL L3-4	C	LOWER BACK PAIN	3 YEAR	10	0	0	1
M	63	BILATERAL L5-S1	C	LOWER BACK BOTH LEG	2 YEAR	10	2	2	1
M	72	BILATERAL L4-5 RIGHT L5-S1	C	LOWER BACK AND RIGHT LEG	4 YEAR	8	4	2	0
F	46	LEFT L3-4 BILATERAL L4-5	C	LOWER BACK AND LEFT LEG	1 YEAR	7	3	1	1
M	80	BILATERAL L4-5	C	LOWER BACK PAIN	5 YEAR	6	0	0	0
F	59	LEFT L3-4 L4-5	C	LOWER BACK PAIN	4 YEAR	9	1	1	0
F	51	RIGHT L5-S1	C	LOWER BACK AND RIGHT LEG	7 YEAR	10	2	2	0
F	71	BILATERAL L5-S1	C	LOWER BACK PAIN	6 YEAR	9	6	6	7
F	46	RIGHT L4-5 LEFT L5-S1	C	LOWER BACK AND BOTH LEG	2 YEAR	8	3	2	1
M	60	RIGHT L3-4 L4-5	C	LOWER BACK PAIN	3 YEAR	10	1	1	0
F	63	BILATERAL L3-4	C	LOWER BACK PAIN	2 YEAR	9	0	0	0
F	50	RIGHT L4-5	C	LOWER BACK AND RIGHT LEG	1 YEAR	6	1	1	0
M	48	BILATERAL L4-5	C	LOWER BACK PAIN	3 YEAR	7	2	2	2
M	75	LEFT L3-4 RIGHT L4-5	C	LOWER BACK LEFT LEG	2 YEAR	8	1	0	0
F	62	LEFT L3-4 L4-5 L5-S1	C	LOWER BACK PAIN	2 YEAR	7	0	2	2
F	81	BILATERAL L5-S1	C	LOWER BACK PAIN	1 YEAR	8	1	3	4
M	72	RIGHT L4-5	C	LOWER BACK RIGHT LEG	1 YEAR	9	0	0	1
M	77	BILATERAL L4-5	C	LOWER BACK PAIN	3 YEAR	10	2	2	0

Table 1. Facet Joint Injection Sites and Demographic Values VAS: Visual Analogue Scale, A: Methylprednisolone, B: Betamethasone, C: Cryoablation

Table 2. Treatment group mean VAS values

Group	Age	VAS (pre-op)	VAS (PO 15.min)	VAS (PO 1. day)	VAS (PO 1. month)	VAS (pre-op vs. 1. month)
A	46±11	8.6±1.7	8.4±1.3	2.2±2.9	2.7±2.4	-5.9
B	51±11	8.1±1.6	3.5±2.0	3.2±1.7	2.6±1.9	-4.5
C	64±11	8.4±1.3	1.6±1.5	1.4±1.4	1.1±1.7	-7.3

*VAS: Visual Analogue Scale, A: Methylprednisolone, B: Betamethasone, C: Cryoablation, *mean±standard deviation*

OP-03

Outcomes of chordomas of the sacrum and mobile spine: Clinical series with average 6year followup

Habib Tadayyon Einaddin Karakoç, Mehmet Zileli
Department of Neurosurgery, Ege University, Izmir, Turkey

The primary spinal chordoma treatment is mainly considered radical surgery, although recurrence rates are pretty high. Radical surgery with extra marginal resection is possible with significant neurologic deficits and very high complication rates.This study reviews 48 spinal chordoma patients (sacrum 28, mobile spine 20) surgically treated between 1995 and 2019. Follow-up times ranged between 12 months and 238 months (average 6.16 years). Six patients were lost to follow-up after at least 1 year of control; three died 30 days after surgery.Surgery for sacrum tumors was an extra marginal resection (sacrectomy) in 19 patients, while nine patients had intralesional surgery. There were 13 cervical chordomas and seven thoracolumbar chordomas. Although we tried marginal resections for cervical chordomas, all had positive margins, and we accepted them as intralesional. Surgery for thoracolumbar chordomas was total spondylectomy in four cases and intralesional excision in three patients. Because of recurrences, the average surgery per patient was 3.45. It was more common in mobile spine chordomas (average 4.2) than sacral chordomas (average 2.92). Surgical complications of mobile spine chordomas (15/20; 75%) were also more than sacral chordomas (16/28; 57%). Chordomas of the mobile spine had no metastasis, while sacral chordomas had a 21% (6/28) metastasis rate. The recurrence rates of sacral chordomas (16/21; 76%) were not significantly different from the mobile spine (15/18; 83%). Among sacral chordomas, in all five cases who had no recurrence, the level of sacrectomy was S2 and below.Recurrence and survival rates of mobile spine and sacral chordomas are not different. Sacral chordomas tend to metastasize. Sacrectomy is successful for sacral chordomas at S2 and below.

OP-04

Sagittal balance radiological outcomes on patients submitted to C0-C1-C2 posterior fixations

Vitor Pinto[1], Leopoldina Pereira[1], Djamel Kitumba[3], Rui Reinas[1], Oscar L Alves[2]
[1]Serviço de Neurocirurgia, Centro Hospitalar Vila Nova de Gaia/Espinho, Vila Nova de Gaia, Portugal
[2]Neurocirurgia, Hospital Lusiadas Porto, Portugal
[3]Faculdade de Medicina da Universidade Agostinho Neto, Luanda, Angola

Introduction: Few studies evaluate the impact of fixations surgery around C0-C1-C2 on overall cervical alignment.

Objective: To analyse the influence that C0-C1-C2 fixations has on segmental (C0-C1-C2) and global cervical (C2-C7) alignment.

Methods: We retrospectively evaluated patients with high cervical spine instability that underwent C0-C2 or C1-C2 posterior fixations. Data were collected from pre and postoperatively plane radiographic exams on neutral position at last follow-up. The primary radiological outcomes were: C0-C1 angle, C1-C2 angle, C0-C2 angle, C2-C7 angle, cervical sagittal vertical alignment (cSVA) and T1 slope.

Results: Sixteen (16) consecutive patients were included with a mean age of 61,3 years (range 24 – 80 years), 11 females and 5 males. All patients were affected by atlanto-axial instability principally due to congenital malformation (62,6%) or degenerative disease (24,8%). Ten patients (62,5%) underwent C0-C2 fixation and six (32,5%) C1-2 fixation. C1-C2 fixations resulted on a increase of C1-C2 angle (mean increase 10,3°; range -13° to 24,2°) and a slight decrease of the C0-C1 angle (mean -4,5°; ranging from -24,5° to 17,3°). In contrast, C0-C2 fixation caused minimal impact on both C0-C1 angle (mean -0,33°; range -8,80° to 16,40°) and C1-C2 angle (mean -0,30°; range -9,60° to 7,10°). Focusing on subaxial sagittal alignment, C1-C2 and C0-C2 fixations showed no difference on C2-C7 angle (mean -4,08° versus -5,29°, respectively) and on T1-Slope (mean -4,03 versus mean -2,44), while affecting differently cSVA (means 11,01mm versus - 2,15mm).

Conclusions: Regarding the functional unit C0-C2, only C1-2 fixation impacts on segmental C0-C2 angle due almost exclusively to a lordotic change in C1-2 angle. As for C2-7 both induce slight compensatory kyphotic curvature. The most distinctive feature between the two types of operation is a change in the cSVA: C0-C2 tends to increase it whereas C1-C2 fixation has only a minimal effect. Pre-operative cSVA should be taken into account when choosing the most appropriate fixation option.

OP-05

Radiofrequency thermocoagulation of the ganglion impar for coccydynia management

Emir Kaan Izci
Konya City Hospital, Konya, Turkey

The term coccydynia (coccygodynia, coxalgia or coccygeal pain) refers to pain in the coccyx region. This pain can be seen in individuals of all ages and both sexes. However, it was determined that the mean age of onset was 40 and the prevalence was five times higher in women than in men.The first treatment recommended for coccydynia is conservative treatment. Non-steroidal anti-inflammatory agents (NSAIDs) and other analgesics, reduced sitting, use of pillows, other postural adjustments and non-surgical strategies such as physical therapy appear to be the gold standard treatment for coccydynia.However, more aggressive treatments may be indicated for a few cases that do not respond to conservative treatments. Today, local injections, ganglion impar injections, ganglion impar ablation techniques such as radiofrequency thermocoagulation, cryoablation, chemoneurolysis and surgical excision are other treatment methods.In this study, radiofrequency thermocoagulation impar ganglion blockade treatment applied in cases whose coccydynia complaints did not disappear with conservative treatment was evaluated.17 patients who were treated for chronic coccidinia in our hospital between 2019-2021 were evaluated retrospectively in the study. Of 16 patients, 11 were female (64.7%) and 6 were male (35.3%),mean age was 39,64±12,48. Patients with traumatic or non-traumatic coccidynia, pain despite the use of sitting pillows, chronic (more than 6 months) coccidynia even after physical therapy and who did not respond to conservative treatments such as nonsteroidal anti-inflammatory agents (NSAIDs) were included in our study. Radiofrequency thermocoagulation (RFT) was applied to patients with diagnostic ganglion impar blockade and at least 80% temporary pain relief. Pain intensity was evaluated with the Visual Analogue Scale (VAS). Patients were asked to rate their pain between 0-10 based on the VAS (0 lowest, no pain, and 10 highest, worst pain ever experienced).Treatment success was defined as a 50% or more reduction in post-procedural pain. All VAS scores were noted before, after, and throughout the procedures. After conducting descriptive statistics,paired samples t test was been used for hypothesis testing. Accordingly it was found that there was statistically significant difference between VAS Baseline and VAS 1th Month measurement scores ($p<0,05$). The mean difference was 7,82±1,18.It was found that there was statistically significant difference between VAS Baseline and VAS 3rd Month measurement scores ($p<0,05$).The mean difference is 7,70±1,10.In our study, it was determined that RFT to the impar ganglion had effective results in patients with chronic coccidynia. Accordingly,it was concluded that patients who respond to RFT had significantly lower pain scores after RFT.

Table 1

	N	Min	Max	Mean	Std. Deviation
Age	17	22,00	64,00	39,6471	12,48970
VAS Baseline	17	9,00	10,00	9,7647	,43724
VAS 1th Month	17	,00	4,00	1,9412	1,14404
VAS 3rd Month	17	,00	3,00	2,0588	1,02899

The mean age of the participants is 39,64±12,48. It was found that VAS Baseline mean score is 9,76±0,43, VAS 1th month mean score was 1,94±1,14 and VAS 3rd month mean score was 2,05±1,02.

Joint Meeting of

Istanbul Spine Masters & ISMISS Turkey

February 24 - 26, 2022

Memorial Bahcelievler Hospital, Istanbul, Turkey

Poster Presentations

PP-01

Transpedicular Fixation of Spine and Complications in Afghanistan

Ahmad Fawad Pirzad, Hashmatullah Mawlana Rahimi, Ahmad Fausal Pirzad, Mohamad Musa Sultani
Kabul University of Medical Sciences(KUMS)

Objective: Transpedicular fixation operation and its complications for Spine trauma in Afghanistan

Methods and Material: we design Retrograde case series study, Our materials are patient files from Archives and medical records,operation notes, literature review, Background and history of Transpedicular fixation operation and its complications for Spine trauma in all over the world and in Afghanistan. Clinical and imaging study (Radiography, CT scan and MRI), epidemiological evaluation of patients (female and male) undergoing spinal trauma (With and without Spinal Cord Injury). Operation and Stabilization (instrumentation), early and late complications,also complications due to Rods and Screws and wrong instruments application.

Results: Transpedicular fixation operation is an advance technique for spine trauma stability and is young in Afghanistan and like other procedures it has its complications for Spine trauma in Afghanistan. In this study we discuss about History and background (Transpedicular fixation operation is introduced for the first time in the history of Neurosurgery in Afghanistan by French Neurosurgeons as an advance and new method for spine fixation, they brought Spinal fixation set and instruments and donated for Afghanistan People and doctors they trained Afghan Neurosurgeons.), Clinical and imaging (Radiography, CT scan and MRI), epidemiological evaluation of patients sex (female and male), residents, Age, Neurological deficits(with or without Neurological deficits) undergoing spinal operations and instrumentation, Anesthesia, early and late complications,also complications due to Rods and Screws and wrong instruments application. Misplaced transpedicular screws, Infection, rejection of instruments. Broken screws, the complications are preventable and more than half complications are belong to instruments (bad quality)

Conclusion: Fortunately it is good news that spine fixation as advance technique for Spine trauma is available in Afghanistan;s Hospitals(applied by Neurosurgeons and the complications are preventable and more than half complications are belong to instruments (bad quality) and neuro- rehabilitation is very important which is poor in Afghanistan hospitals.

Broken Instruments

PP-02

Occipitocervical fixation in traumatic patients – safe and reliable

Deyan Dimitrov Handzhiev, Edvin Ismail Vasvi, Giorgius Androniku, Soner Oktaev Terziev
Department of Neurosurgery, Univercity Hospital "St. Anna", Varna, Bulgaria

Introduction: Occipito-cervical fusion may is indicated for instability of the occipitocervical junction, secondary to a wide spectrum of pathology. The aim of this retrospective study was to evaluate the results of occipitocervical fixation in traumatic patients at our institution.

Materials and Methods: Indication for occipitocervical fixation in this selected group is only trauma. Between 2016 and 2019, a total of 28 patients underwent occipitocervical fixation. There where 18 male patients and 10 female patients from: 17 to 80 years with an mean average of 53. In twenty patients there were C2 fracture, four were with C1 and C2 and four were with fractures of one or both occipital condyles. We use polyaxial screws–rod–plate system according Magerl method. The mean follow-up period was 30days.

All patients were examined by computer tomography (CT) of the cervical spine.

Results: One patient died postoperatively in Intensive Care Unit due to primary brain stem contusion. No surviving patient had neurological deterioration postoperatively. There were no infections, instrumentation failure or revision required. Average operative time app 120min. Average blood loss 200-300ml. The patients were followed prospectively clinically and radiographically to a minimum of 30days

Conclusions: Occipitocervical fixation is safe and reliable surgical technique for cranio-spinal instability due to traumatic injuries. Although the indication of occipito-cervical fusion decreased since the C1–C2 posterior fixation techniques were described, it remains a valid and reliable option to be applied even in emergency especially in the elderly.

PP-03

Primary extranodal natural killer/T-cell lymphoma of lumbar spine: A case report

Fatih Keskin[1], Mehmet Fatih Erdi[1], Densel Araç[1], Hasan Esen[2]
[1]Department of Neurosurgery, Necmettin Erbakan University, Konya, Turkey
[2]Department of Pathology, Necmettin Erbakan University, Konya, Turkey

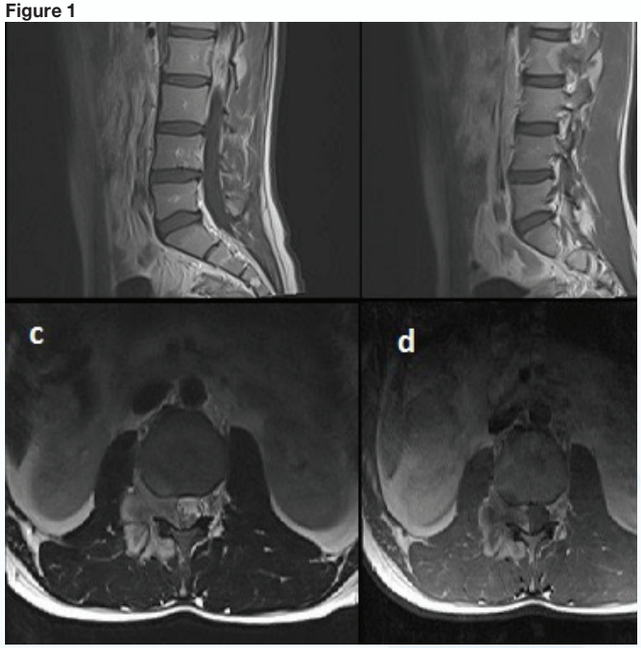
Introduction: Extranodal lymphomas constitute 10-20% of all lymphomas and spinal lymphoma is a relatively uncommon spinal tumor and accounts for 1-2% of lymphomas extranodal occurrence and usually arises spinal epidural space or intramedullary. Lymphomas have been described mostly fifth to sixth decades of life but seen in all of age groups.

Case: A 23-year-old male patient was admitted to our clinic with a complaint of low back and right hip pain that had been ongoing for one month. On physical examination he had no palpable cervical or axillary lymph nodes and neurologic examination was normal. It was seen a malignant lesion that infiltrated L2 pedicle, foramen and surrounding soft tissues on the MRI. Cord compression was pronounced at level of L2. The patient underwent operation with transforaminal approach resection of the epidural spinal cord tumors and foraminal tumors. Analysis of the pathological sections showed a diffuse infiltrate of lymphoid cells and most cells were positive for the T cell antigens with CD-30 and granzim B expression; also positive for the NK antigens with CD-56 (+). The pathological report resulted as aggressive cytotoksic NK/T cell lymphoma.

Discussion: Non-Hodgkin's lymphoma (NHL) accounts for 85% of spinal lymphoma cases, with the majority being diffuse large B cell lymphomas. These primary tumors are most commonly located in the thoracic spine, followed by the cervical spine and less commonly in the lumbar spine.Hodgkin's lymphoma, T cell lymphoma, plasmablastic lymphoma and NK cell lymphoma have also been described in the spine. In the literature, our case is rarely seen due to young age, lumbar region, and NK / T cell lymphoma. The treatment method is primarily indicated as surgical excision, then radiotherapy and chemotherapy according to tumor sensitivity. Primary spinal lymphoma seems to have an unfavorable prognosis. The survival estimates that we found varied. The median survival according to the literature is 6 - 9 months.

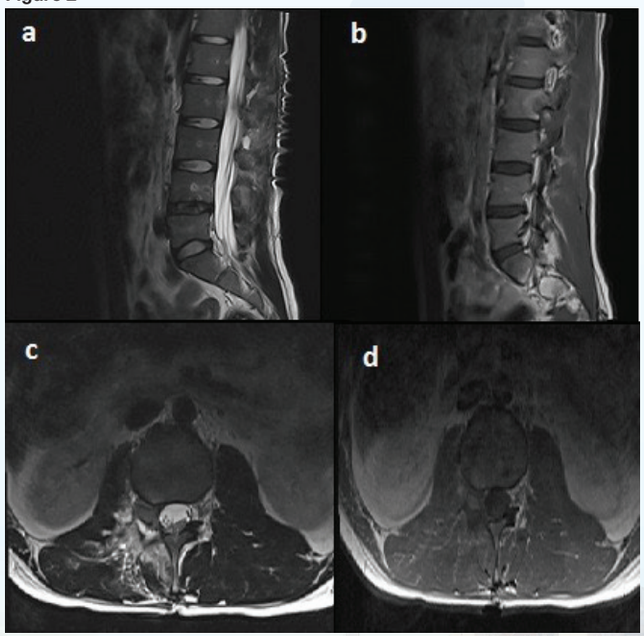
Conclusion: In primary spinal lymphomas, there is only a lesion in the vertebra and no involvement in the lymph nodes. Vertebral lesion surgery should be performed as soon as the course of this disease progresses very quickly, and patients should be transferred to the hematology-oncology department quickly following the pathological diagnosis.

Figure 1



Preoperative MRI shows L2 right pedicle and foraminal lesion on sagittal and axial planes with T2 images (b,c) and contrast enhanced images (a,d)

Figure 2



Postoperative MRI shows post-op images on sagittal and axial planes with T2 images (a,c) and contrast enhanced images (b,d)

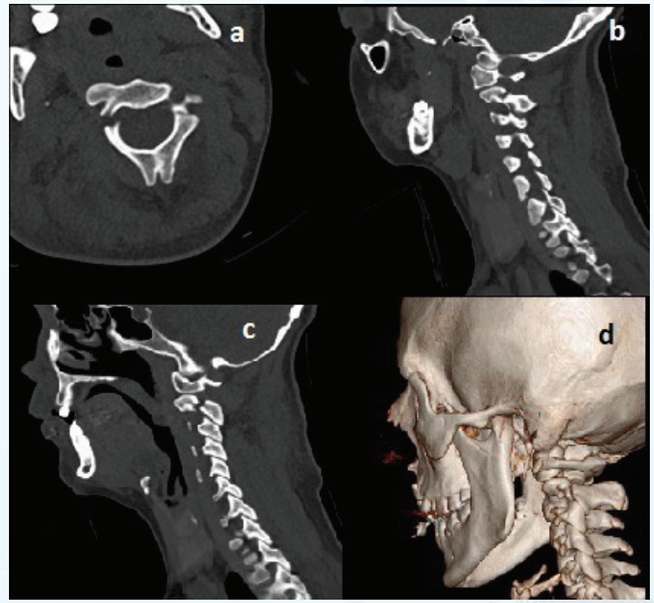
PP-04

Management of hangman's fracture with transpedicular lag screw fixation

Fatih Keskin[1], Mehmet Fatih Erdi[1], Densel Araç[1], Emir Kaan Izci[2]
[1]Department of Neurosurgery, Necmettin Erbakan University, Konya, Turkey
[2]Department of Neurosurgery, Education Research Hospital, Konya, Turkey

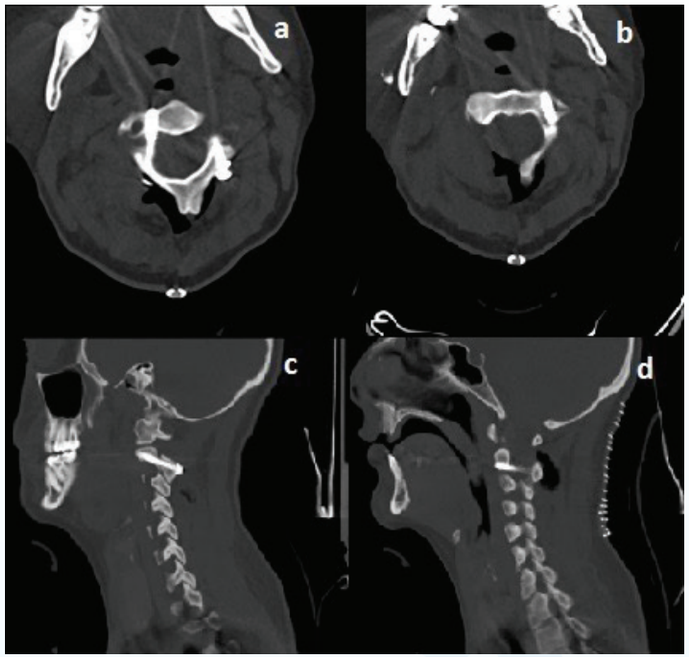
Hangman's fracture is fracture of the ring of the axis. Injury mechanism is axial compression and hyperextension traumas. The surgical decision depends on the type and extent of the discoligamentous injury between the axis and C2-3. In our case we were operated patient who had hangman's fracture type 2 according to Levine –Edwards. The lag screw osteosynthesis through the pars interarticularis represents a direct repair of the fracture and thereby restores physiological conditions without segmental fusion and preserve normal mobility.23 year old female patient admitted to our hospital because of traffic accident. She was neurologically in normal limits. On MRI and CT scans, bilateral C2 pedincules fractures and mandibular fracture were seen diagnosed on CT scans and MRI. Hangman's fracture was classified as Levine-Edwards type 2 and patient was decided to operate.Patients was intubated by videolaryngoscopy and carefully placed in a prone position. C1-C3 cervical median skin incision was made and paravertebral muscles were dissected laterally. The entry points were defined and cannulated instrument was carefully placed to the entry point under fluoroscopic control. K-wire was drilled through the fracture site into the corpus of the axis via the cannulated instrument. On the other side the same procedure was followed. The lag screws were introduced over the inserted wire and advanced to achieve uniform fracture compression and to avoid deviations of the fragments and screws. Intraoperatively cervical flexion-extension maneuvier was made and motion of spine without dislocation was seen. Lag screw osteosynthesis was performed successfully. Correct placement could be verified with CT scan postoperatively and nonunion was not observed. In patient with a complete follow-up, a bony fusion, an intact vertebral alignment, and no deformity could be detected on CT scans obtained after 3 months. The pars interarticularis lag screw osteosynthesis is a minimally invasive and mobility preserving surgical technique. Its advantages are minimal invasiveness, a shortened treatment time, and high fusion rates. The benefits are offset by the risk of injury to the vertebral arteries. The lag screw osteosynthesis is only possible with Levine-Edwards Type II fractures, because the intervertebral joints to C2-3 are functionally preserved. A further development and evaluation of the operative technique as well as comparison with conservative and alternative surgical treatment options are deemed necessary.

Figure 1



Shows fracture of C2 pedincules on axial (a), sagittal (b,c) and 3D CT images of the patient preoperatively

Figure 2



Shows lag screws extending from C2 pedincules to C2 corpus on axial (a,b) and sagittal (c,d) CT images of the patient postoperatively

PP-05

The Effect of Prebending Rod Use on Sagittal Parameters in Lumbar Degenerative Scoliosis

Kemal Paksoy[1], Tansu Gürsoy[2], Salim Şentürk[2], Onur Yaman[1]
[1]İstanbul Bahçelievler Memorial Hospital Spine Center
[2]İstanbul Memorial Hizmet Hospital

Purpose: Sagittal alignment is changing patient's quality of life standards. Patients with a compatible spinopelvic sequence can be provided with pre-surgical planning. In this study, we compared the efficacy of the rods specially prepared for the patient in the surgery that was operated for lumbar degenerative scoliosis (LDS) in pre-surgical planning and postoperative alignment.

Material and Method: Patients who were operated on for LDS had standing scoliosis radiographs before and after surgery. Spinopelvic parameters were calculated on the scoliosis radiographs of the patients using the Surgimap program before surgery; pelvic incidence (PI), lumbar lordosis (LL), pelvic tilt (PT), sagittal vertical axis (SVA). With the Surgimap program, a 3D technical drawing of the rod was obtained and a sample rod was obtained with a 3D printer. The previously bent rod was used during surgery. On postoperative scoliosis radiographs, spinal parameters were measured and statistically compared with Wilcoxon Rank test.

Findings: The ages of the patients who underwent surgery for LDS were 45-77 (average age 61). Of these patients, 4 were male and 7 were female (57.5 and 64 in the mean age order of male and female). It was observed that the LL, PI-LL and SVA values of the patients planned before surgery were provided statistically with the Wilcoxon Rank test. In some cases after surgery, the pelvic tilt (PT) value has not been sufficiently reduced due to the inability to provide enough retroversion of the pelvis(due to insufficient deflection of the surgical table). It was observed that PT values did not provide the values calculated before surgery.

Result: Obtaining compatible spinopelvic parameters after surgery will increase quality of life standards as well as reduce proximal component kyphosis and failure that may occur after surgery. With prebending rod, LL, PI-LL and SVA values can be achieved in a statistically significant way as calculated before surgery. In this way, the values after surgery can be calculated with precise measurements.

Rod

prebending rod

PP-06

Minimal invasive technique and spinal stability

Jalal Najjar
Bab alHawa Hospital, North of Syria

Minimal invasive technique and spine stability

All Neurosurgical techniques that preserve the posterior ligamentous complex, supra spinous, intra spinous ligaments and ligament flavum, intact, protect the spinal contents and support the spinal stability. The wide laminectomies that dissect the bilateral spinal musculs, and resct all ligaments as, in spinal tumour surgey, intra and extra dural, or in decompression for spinal instability and fixation, make the spinal cord unprotected for large scars and adhesions which may affect nerve roots and spinal cord later, also the very important role of the posterior ligamentous complex in the stability of the spine make the minimal invasive technique as unilateral microsurgical approach for bilateral spinal decompression, or unilateral microsurgical approach for spinal lesions, is very important technique, also preserving these ligaments in treating spinal instability, play a very important factor for decreasing adujsent level disease and reduce fixation failure and screws problems

PP-07

The Effect of Halo-gravity Traction on Lung Functions in Rigid Kyphoscoliotic Patients

Kemal Paksoy[1], Tansu Gürsoy[2], Salim Şentürk[2], Onur Yaman[1]
[1]İstanbul Bahçelievler Memorial Hospital Spine Center
[2]İstanbul Memorial Hizmet Hospital

Introduction: Hard and severe kyphoscoliosis patients before surgery in a specific time weights and the appropriate halo-gravity traction (HT) to provide some flexibility depending on the curvature that improves over gradually increasing traction with weight, depending on the preoperative neurological complications that can occur during surgery on the cord and provides a reduction in significant improvement in respiratory function was observed.

Material and Method: Eleven patients with rigid kyphoscoliosis were included in the study. The mean age was 13 ± 4 years. Eight of the patients were female and 3 were male. Before surgery, after the halo was inserted under local anesthesia in operating room conditions, traction was performed by hanging approximately 20-40% of the patient's weight with traction devices specially prepared for each patient. Traction was provided for approximately 6 ± 2 hours during the day. The traction period was 30±2 days. The effect of HT on pulmonary function tests (PFT) was performed multidisciplinary in a single spinal center.

Findings: PFT was used to assess the predicted forced vital capacity (FVC%). The apexes of the curvatures were mainly in the thoracic spine. HT was used in all patients before surgery. The mean scoliosis cobb angle before surgery was 106.1 ° ± 34.5 ° and the mean kyphosis angle was 90.7 ° ± 29.7 °. All PFT data were obtained before surgery and 24 patients were assessed during HT. The difference between the first and last PFTs during HT was 15.0 ± 8.2% on average (p <.005 and statistically significant result). Regarding the evolution of respiratory functions, the mean preoperative FVC in patients was 40.2 ± 18% and FVC 54.5% at follow-up. Preoperative% FVC,% FVC follow-up and response during HT were predicted as high improvement.

Results: The main goals in the treatment of rigid kyphoscoliosis are to improve sagittal and coronal balance, as well as to improve respiratory functions. In literature studies, HT has been shown to be a useful tool for selected patients. The data presented in this study can be used in future studies to compare the surgical and pulmonary results of severe and rigid deformities.

PP-08

Clinical and Radiological Comparison of Surgical Treatment Methods in Patients with Cervical Spinal Stenosis

Hümeyra Kullukçu Albayrak
Department of Neurosurgery, Ankara City Hospital, Ankara, Turkey

Aim: The aim of this study is the comparison of patients who underwent different surgical procedures for cervical spinal stenosis (CSS) in clinical and radiological terms with various factors.

Study Design: 62 patients who were operated for CSS, were divided into groups depending on the method of operation as anterior corpectomy+fusion with cage/bone graft (Group 1), posterior decompression with laminectomy+fusion with lateral mass screw (Group 2) and open-door laminoplasty (Group 3).

Methods: The data in patient files were examined retrospectively in terms of demographic data (gender, age, presence of diabetes),clinical data (neck pain, neurological improvement) and radiological data (number of segments compressed,cord diameter,sagittal alignment,presence of myelomalacia).The patients were evaluated considering their neurological examinations,Japanese Orthopetic Association (JOA) scores and radiological findings preoperatively and postoperatively.

Results: 52 male(83.9%) and 10 female(16.1%) patients participated in the study whose mean age was 56.6±8.3(43-76).The follow-up period of the patients was 6-40 months (mean 12.7 ± 9.2).The mean recovery rate was 63.2±3.7%. The Pre-op/Post-op JOA scores of the patients were found to be 15.7±1.6/16.1±1.6 in Group 1, 13.9±3.4/13.3±3.42 in Group 2 and, and 14,1±3.7/15.4±3.0 in Group 3. Interms of JOA scores the increase of the pre-op and post-op changes only in Group 3 was found to be statistically significant. Statistically significant results were obtained in Group 1 in terms of post-op JOA scores of the patients under the age of 60; whose sagittal cord diameter was measured as 6mm or less in the pre-op cervical computed tomography (CT), with lordotic alignment of the pre-op cervical axis and who did not have T2 signal intensity increase in the pre-op magnetic resonance imaging (MRI). While evaluating Group 2, no statistically significant results were obtained in any of the parameters. In Group 3, it was seen that the factors including male gender, age below 60 years, sagittal cord diameter being 6mm or less in pre-op cervical CT measurement, lordotic alignment of the pre-op cervical axis and no increase in T2 signal intensity in pre-op cervical MRI were seen to be statistically significant indicators for the result.

Conclusion: Early results show that better outcomes can be obtained when anterior corpectomy and fusion and

open-door laminoplasty is performed in patients with under the age of 60, have pre-op a sagittal cord diameter of 6mm or less and lordotic alignment and no myelomalacia on MRI. It has been observed that better clinical and radiologic recovery can be expected in selected patients.

Tablo 1

	Group 1 n: 24	Group 2 n: 16	Group 3 n: 22	p
Age	60,3±8,3	59,1±8,4	60,4±10,5	0,896
Pre-op JOA	15,7±1,6	13,9±3,4	14,1±3,7	0,250
Post-op JOA	16,1±1,6	13,3±3,4	15,4±3,0	0,020*
Pre-op cord diameter	5,7±1,3	5,5±1,0	4,4±1,2	0,001*

Comparison of surgical methods in terms of pre-op prognostic factors (age, pre-op and post-op JOA, pre-op cord AP diameter).

Tablo 2

	n	Pre-op JOA	Post-op JOA	p
Group 1	24	15,7±1,6	16,1±1,6	0,092
Group 2	16	13,9±3,4	13,3±3,4	0,720
Group 3	22	14,1±3,7	15,4±3,0	0,001*

Comparison of surgical methods to one another basing on the pre-op and post-op JOA and the improvement ratios.

PP-09

Incidental L2-L3 Congenital Block Vertebra in Adult Patient

Mehmet Arıcan, Zafer Orhan
Department of Orthopedic and Traumatology, Duzce University School of Medicine, Duzce, Turkey

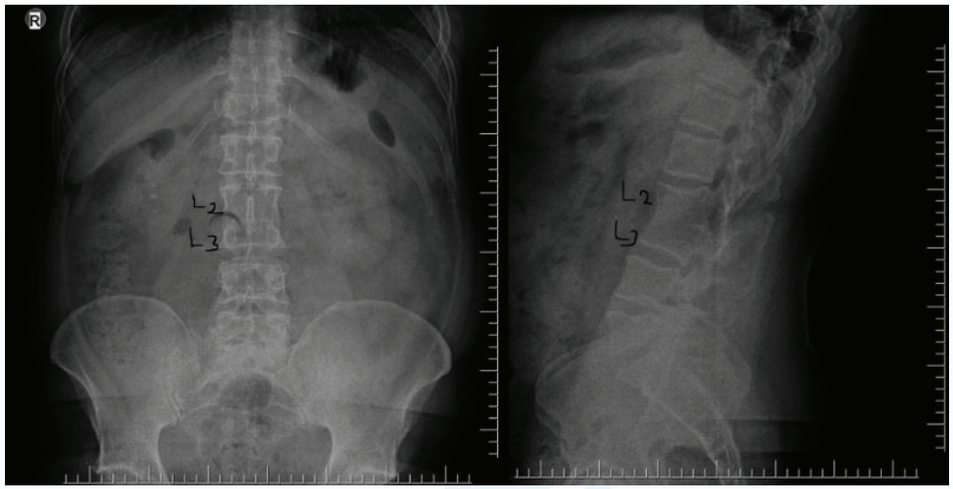
Background: A variety of structural developmental anomalies can affect the vertebral column but congenital anomalies of the lumbar segments are uncommonly encountered in clinical practice in adults. Especially, block vertebrae is a one of the congenital segmentation anomalies of the vertebral column that leading to parts of or the entire vertebrae being fused and the fusion may be ventral (affecting only the vertebral body), dorsal (affecting the vertebralarch)orboth.

Methods: A 40 years-old male patient admitted to our department of Orthopaedic policlinic with low back pain radiated to right lower extremity after lifting a heavy object since two weeks ago. He reported an insidious onset of intermittent low back pain that developed when working long hours that standing, walking and lying relieved his pain, whereas sitting and forward bending usually resulted in the increased of pain. Pain was not provoked with either cough or sneeze. There was no family history of spinal deformity, and history of previous trauma was unremarkable.

Results: On physical examination, gait was normal and he did not feel any motor or sensory deficit and also achilles and patellar reflexes were normal bilaterally. A posterior pelvic tilt and decrease in lumbar lordosis were noted in both sitting and standing. While, there was no weakness in abdominals, hip flexors and quadriceps in muscles strength test, straight leg raising test was positive on right lower extremity. There were no signs for inflammation (erythrocyte sedimentation rate, C- reactive protein) and serum electrolytes were normal. Following physical evaluation, plain radiographs indicated a L2 and L3 of one vertebral column were noted to have fused bodies with no fusion of vertebral arches (Figure 1A,B). In addition, magnetic resonance imaging (MRI) showed that L2-L3 congenital block vertebra and also L4-5 intervertebral disc, the right paramedian-foraminal extruded disc herniation is observed on the diffuse bulging floor and right root pressure is available (Figure 2 A,B). After local heating, administration of nonsteroidal anti-inflammatory and muscle relaxants drugs, the patient remained asymptomatic with L2-L3 congenital block vertebra in six weeks.

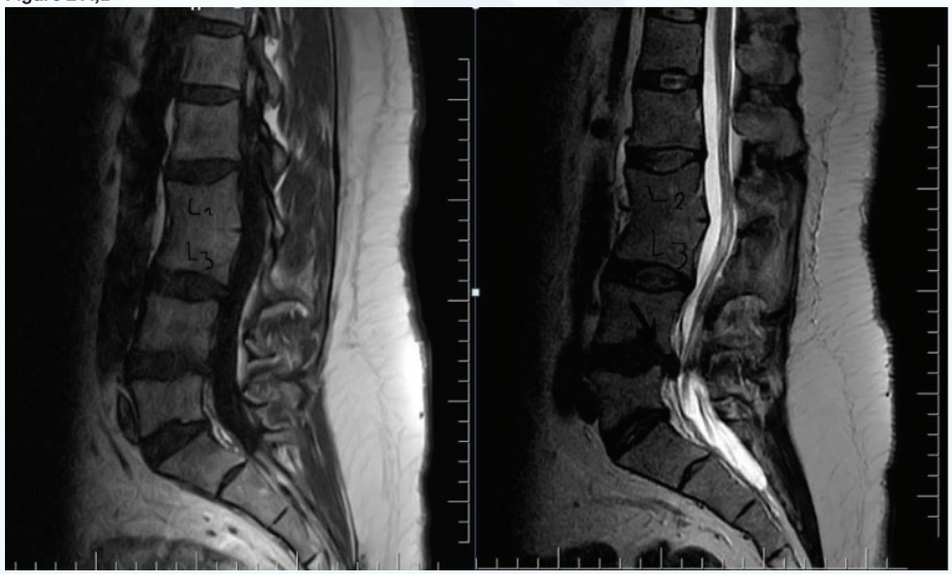
Conclusions: Herein, we have described a rare case of L2-L3 congenital block vertabrae detected as coincidental in a adult patient with low back pain. Any congenital or acquired abnormality in the lumbar vertebrae may be either asymptomatic in adults and older for many years and also all acute low back pain can requires radiological imaging.

Figure 1A,B



Plain radiographs indicated a L2 and L3 of one vertebral column were noted to have fused bodies with no fusion of vertebral arches.

Figure 2 A,B



Magnetic resonance imaging showed that L2-L3 congenital block vertebra and also L4-5 intervertebral disc, the right paramedian-foraminal extruded disc herniation is observed on the diffuse bulging floor and right root pressure is available

PP-10

Asymptomatic Thoracic Vertebral Compression Fracture İn Multiple Myeloma

Zafer Orhan, Mehmet Arıcan
Department of Orthopedic and Traumatology, Duzce University School of Medicine, Duzce, Turkey

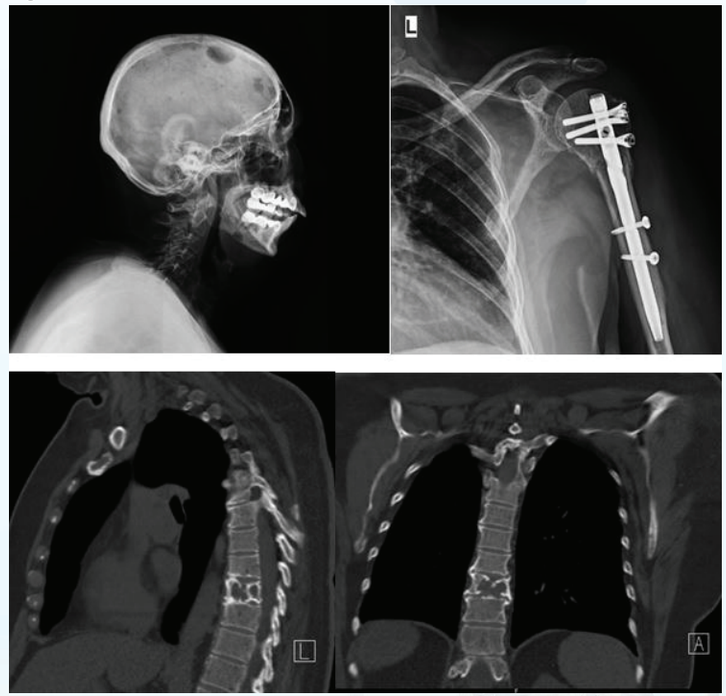
Background: Multiple myeloma is a neoplastic proliferation of plasma cells presents with hypercalcemia, osteolytic bony lesions and pathologic fractures. Although it can affect any age group, mainly occurs at patients > 40 years of age, with being more common in male. Vertebral compression fractures are the most common type of fractures in patients with multiple myeloma and to occur at the onset of multiple myeloma in 34% to 64% of patients. Patients with acute or subacute compression fractures typically have severe pain that is localized to the fractured level.

Patients: A 62-year-old female patient who had previously operated proximal humerus fractures due to multiple myeloma in another orthopaedic centre was routinely checked our orthopaedics and traumatology clinic. She had a history for a multiple myeloma treated with medication since 2013. Furthermore, she routinely has thoracic computer tomography one times in a year for multiple myeloma. There was no family history of spinal deformity, and history of previous trauma was unremarkable.

Results: On physical examination, Any Pain was not provoked with either cough or sneeze or palpation on torachal region. Other than her laboratory values on admission were hb 8 g/dl, erythrocyte sedimentation rate of 66mm/hr, C-reactive protein of 7.86mg/dL, and albumin level of 3.79 g/dL, total protein 6.43g/dl, ca 9.3mg/dl, creatinine 0.473mg/dl. Radiographs of the arm showed a operated fracture of the left proximal humerus due to multiple lytic lesions, which are typical of myeloma. Thoracic computer tomography indicated that newly developed compression fracture on T9 vertebral bodies and decrease of vertebral height on(Figure 1).

Conclusions: İn conclusion, within this study, we have described a rare case of asymtomatic vertebral compression fracture in a patient with multiple myeloma. Routine orthopedic examination should be performed in patients with multiple myeloma and radiological examination should be requested if necessary. Finally, the patient must be properly informed when such pathology is detected.

Figure 1



Thoracic computed tomography indicated that newly developed asymptomatic compression fracture on T9 vertebral bodies and decrease of vertebral height on. In addition, plain radiographs indicated a operated fracture of the left proximal humerus due to multiple lytic lesions, which are typical of myeloma.

PP-11

A new placement technique of s2 screw for lumbosacral fixation

Ezgi Akar[1], Fatih Toprak[1], Ahmet Öğrenci[2], Sedat Dalbayrak[2]
[1]Department of Neurosurgery, Haydarpasa Numune Training and Research Hospital, Istanbul, Turkey
[2]Department of Neurosurgery, Hospital of Medicana Atasehir, Istanbul, Turkey

Introduction: Spinopelvic fixation can be used in correction of high-grade spondylolisthesis, and treatment of spinal deformity surgeries that require long segment fusion. Pseudoarthrosis is frequently seen in lumbosacral stabilizations ending in S1. Therefore, S2 screws started to be used to support S1. This study aims to describe a new screw insertion technique by using S2.

Method: The patient, who had been operated with a rigid instrumentation system, was followed up postoperatively with Visual Analogue Scale(VAS) value and Oswestry Insufficiency Index(ODI) score. Pseudoarthrosis developed at 3 years postoperatively and the patient's lower back pain increased. Dynamic stabilization was applied to patient with a polyetherketone(PEEK) rod(England Invibio, 6mm diameter) in revision surgery. Bilateral sacral screws was applied from S2 to the promontorium. The instrumentation was placed bilaterally from superolateral border of dorsal foramen of S2 to promontory. This point is approximately 2cm below S1 transpedicular screw entry point and inferolateral part of L5-S1 facet joint. The anterior S1 foramen should be on the lateral side of the inserted S2-promontorium screws. The strong grip of the screw was confirmed in the patient's peroperative manual examination. After this was seen, an additional S2 alar screw was placed from inferolateral border of the S1 dorsal foramen on the right side.

Results: In the first year follow-up of patient, low back pain VAS value was 3, and ODI score was 36%. In addition, the patient did not develop sacroiliac joint pain, since there was no sacroiliac joint infringement. Pseudoarthrosis didn't develop in patient at postoperative 26th month as a result of strong stabilization provided by screws applied from S2 to promontory accompanying instrumentation with dynamic system. However, fusion was achieved in L5-S1 level. This indicates strong stabilization of S2-promontory screws even with dynamic system.

Conclusions: Pseudoarthrosis and instrument failure are common after lumbosacral stabilizations. However, screw insertion from S2 into the promontory is proper for both rod connection and helps prevent sacroiliac joint disruption and decreases the requirement for iliac wing screws and tissue dissection. This is a big advantage of the method we mentioned above. Dual screw insertion from S2 and/or screw insertion in direction of S2 promontory may be a new alternative to provide robust instrumentation.

PP-12

Catastrophic complications on cervical spine in Ankylosing Spondylitis patients

Shen Shih-Chieh[1], Chun Li Lin[2]
[1]Biomedical Engineering, National Yang Ming Chiao Tung University, Taiwan, R.O.C.; Department of Surgery, Song Shan Branch, Tri-Service General Hospital, National Defense Medical Center, Taiwan, R.O.C.
[2]Biomedical Engineering, National Yang Ming Chiao Tung University, Taiwan, R.O.C.

Object: Spinal fracture is one of the severe complications in AS (ankylosing spondylitis) patients and often causes serious neurologic deficit. Iatrogenic spinal fracture may occur during medical care in hospital.

Methods: From 2002 to 2022, three AS patients suffering from iatrogenic spinal fracture are retrospectively reviewed. All the images of these patients were collected, including X-ray, computed tomography scan and magnetic resonance imaging of the spine. The literatures of iatrogenic injury in AS patients were reviewed and summarized. Two patients have fracture in cervical spine and one in thoracic spine. Both patients with cervical spine fracture were caused by endotracheal intubation for respiratory failure. The patient with thoracic spine fracture was caused by positional change during regular medical care.

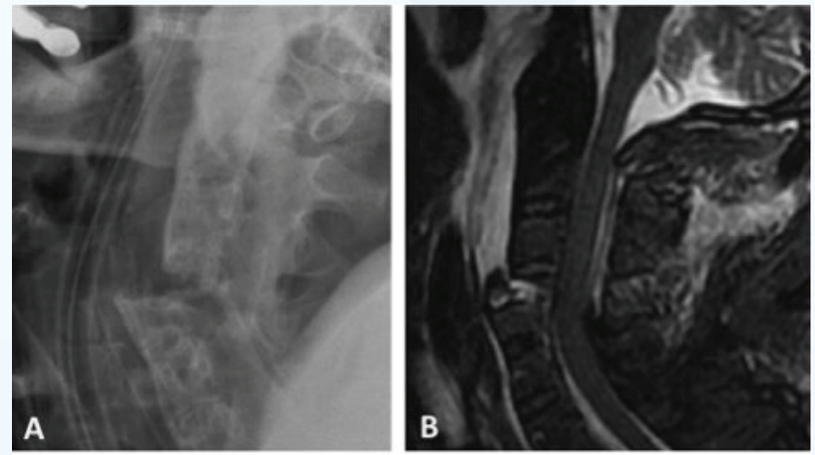
Results: Two patients have fracture in cervical spine and one in thoracic spine. Both patients with cervical spine fracture were caused by endotracheal intubation for respiratory failure. The patient with thoracic spine fracture was caused by positional change during regular medical care. Patients suffered from iatrogenic cervical spine injury with poor prognosis and loss of independence in activity of daily living.

Conclusion: Fragile spine system in patients with AS is sometimes disregarded by clinicians. Endotracheal intubation using fibroscope assistance in neutral position and adequate posterior neck support can prevent from iatrogenic cervical spine fracture during this procedure. Moving or changing position for patients with AS in caution is important.

Summary of Iatrogenic Spinal Fracture in AS in the Literature

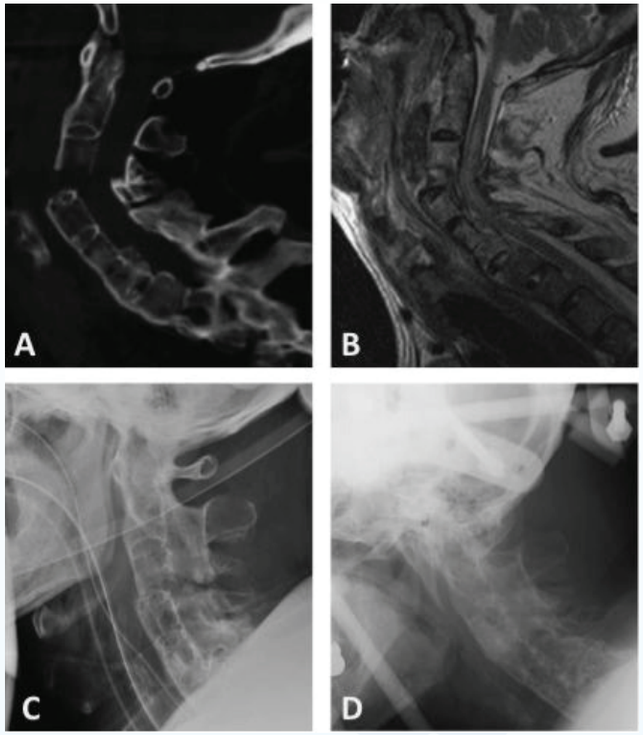
Author & Year	Age/ Sex	Fracture site	Background	Mechanism of injury	Comments
Ruf et al., 2006	39/M	C6/7	C1-2 surgery	Hyperextension	Quadriplegia, mortality
	55/M	C6/7	T7/8 surgery	Hyperextension	Quadriplegia, improved after emergent decompression
Danish et al., 2008	59/F	T11/12	Hip surgery	Hyperextension	Paraplegia, improved incompletely
	60/M	T11/12	Surgery for lumbar stenosis	Hyperextension	Paraplegia, improved incompletely
Oppenlander et al., 2015	68/M	C6/7	Endotracheal intubation	Hyperextension	Quadriplegia, mortality
Presentation	60/M	C4/5	Endotracheal intubation	Hyperextension	Quadriplegia, respiratory failure
	62/M	C4/5	Endotracheal intubation	Hyperextension	Quadriplegia, respiratory failure
	70/M	T4/5	3 months Halo-vest immobilization	Hyperextension	Paraplegia

Figure 1



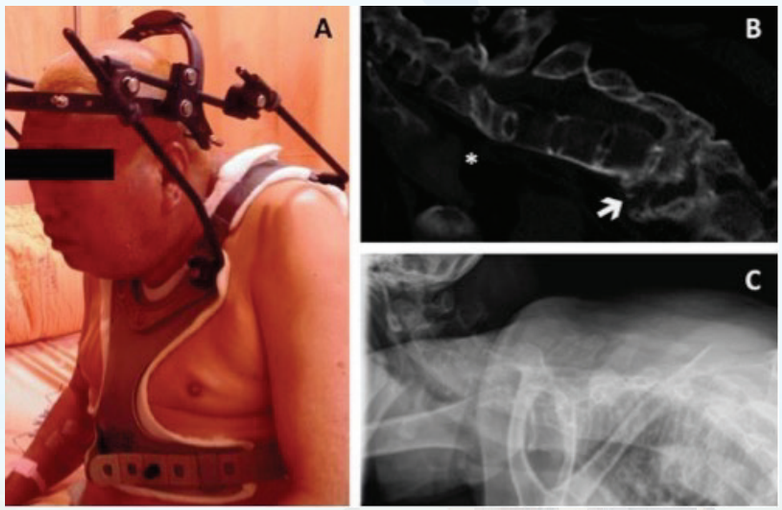
(A) Facture-dislocation of C4/5 after emergent endotracheal intubation. (B) MR image shows spinal cord compression on the fracture level.

Figure 2



(A) Fracture-dislocation of C3/4 after emergent endotracheal intubation (B) Spinal cord compression and swelling (C) Reduction of the fracture-dislocation followed by Halo-Vest immobilization (D) Arthrosis of the C3/4 fracture

Figure 3



(A) The patient was immobilized by Halo-Vest brace. (B) One month later, the asterisk points the fusion of the initial fracture. The arrow shows newly fractured T4 vertebrae. (C) Fusion of the fractures three months later.

PP-13

Influence of spinal-pelvic balance on the tactics of surgical treatment of lumbar spondylolisthesis

Akobir Ismailovich Ibragimov[1], Abdurakhmon Ubaydulloyevich Norov[1], Ravshan Muslimovich Yuldashev[2]
[1]Chair Neurosurgery, Center for the Professional Development of Medical Workers
[2]Department spinal surgery, Republican Specialized Scientific and Practical Medical Center for Neurosurgery

Objective: To improve the results of surgical treatment of spondylolisthesis by spinal-pelvic balance of the sagittal balance.

Material-methods: The work is based on the analysis of the results of the examination and surgical treatment of 62 patients with a diagnosis of spondylolisthesis who were hospitalized in the Department of Spinal Pathology of the Republican Scientific and Practical Medical Center for Healthcare of the Republic of Uzbekistan for the period from 2017 to 2020. All patients underwent preoperative instrumental examination, patients underwent standard and functional radiography, CT and MRI of the lumbosacral region. The age of the patients varied from 16 to 60 years. There were 28 men and 34 women. When assessing the sagittal balance, we measured the angles of the pelvic tilt (Pelvis Tilt), the slope of the sacrum (Sacral Slope) and the pelvic index (Pelvis index) as well as lumbar lordosis (Lumbar lordosis). Considering the sacral tilt (SS) and Pelvic Tilt (PT) angles, the Pelvic Index (PI) is subtracted. PI=PT+SS. Depending on the angle of the Pelvic Index and lumbar lordosis, the tactics of surgical treatment is determined. 10 (16.2%) patients with a pelvic index less than 35 degrees underwent decompressive laminectomy with cage placement. Decompressive laminectomy with the establishment of TPF systems without reduction of mixed vertebrae was performed in 37 (59.6%) patients with a pelvic index of 35-50 degrees. The pelvic index from 50-80 degrees was 15 (24.2%) patients who underwent surgery Decompressive laminectomy with reduction of a mixed vertebra with stabilization by TPF systems. The results of surgical treatment were characterized as follows: The results of surgical treatment of patients with spondylolisthesis were assessed using the VAS scale and the Oswestry scale (ODI).

A good result with complete neurological regression was achieved in 54 (87%) patients, satisfactory in 7 (11.4%) and unsatisfactory in 1 (1.6%).

Conclusion: Assessment of the sagittal balance in spondylolisthesis will improve the results of surgical treatment and regression of the pain syndrome, as well as restore the quality of life of patients.

PP-14

Results of differentiated surgical treatment of spondylolisthesis complicated by spinal canal stenosis.

Akobir Ismailovich Ibragimov[1], Abdurakhmon Ubaydulloyevich Norov[1], Ravshan Muslimovich Yuldashev[2]
[1]Chair Neurosurgery, Center for the Professional Development of Medical Workers
[2]Department spinal surgery, Republican Specialized Scientific and Practical Medical Center for Neurosurgery

The purpose of this study is to analyze the results of differentiated surgical treatment of spondylolisthesis complicated by spinal canal stenosis.

The work is based on the analysis of the results of examination and surgical treatment of 103 patients diagnosed with spondylolisthesis who were hospitalized from 2017 to 2020. The age of the patients ranged from 17 to 72 years and the mean age was ±42 years. There were 46 men and 57 female patients.

All patients underwent surgical treatment. The type of surgical intervention depended on the type and degree of spondylolisthesis. Decompressive laminotomy with interbody fusion with a cage was performed in 22 (21.3%) patients, decompressive laminotomy with tranpedicular fixation was performed in 18 (17.4%) patients, decompressive laminectomy with tranpedicular fixation and interbody fusion with a cage was performed in 57 (55.4%) patients) sick. 6 (5.82%) patients with a high degree of spondylolisthesis underwent for the first time an original operation - decompressive laminectomy with transpedicular-transcorporeal fixation.

The results of surgical treatment were characterized as follows: a good result was achieved in 82 (79.6%) patients, satisfactory in 19 (18.5%) and unsatisfactory in 2 (1.9%).

Conclusion: Adequate posterior decompression of the neurovascular formations of the spinal canal with interbody stabilization with a cage and/or reliable transpedicular fixation is the method of choice for surgical treatment of spondylolisthesis complicated by spinal canal stenosis.

PP-15

Percutaneous endoscopic transforaminal discectomy, experience of 300 cases

Mohammad Altarawneh[1], Taher Janbek[2]
[1]Department of neurosurgery, Prince Hamza hospital
[2]Department of neurosurgery, specialty hospital

The endoscopic approach for lumbar discectomy was introduced in the clinical practice in 1980 to remove the prolapsed disc and decompress nerve using the least disruptive surgical technique. Over the years, thanks to the technical development either in the quality of images or the development of many different instrumentations there has been a huge spreading of endoscope use across the different surgical fields. As a minimally invasive spinal procedure, Percutaneous endoscopic transforaminal discectomy has gained more interest since it requires only an 8-mm skin incision, and damage of the paravertebral muscles would be the minimum, it would be the least invasive spinal surgery at present. We presented a series of 300 cases of lumbar disc herniation managed surgically only by a percutaneous transforaminal endoscopic technique in two units and by the same team. We found by our experience that transforaminal percutaneous endoscopic discectomy as a treatment option for selective lumbar disc herniation is an effective option with a small incision, quick recovery, short hospital stay, and excellent clinical outcome compared to either open surgery or other minimally invasive procedures.

Our experience in numbers

total number	300
operating time (min)	60
blood loss (ml)	nill
hospital stay	day case
recover time (week)	2
return to work (%)	100 %
change in surgical approach	2
limb weakness	1
limb parastheisa	5
nerve root injury	1
dural tear	2
postoperative urinary retention	0
incision length	6 mm

PP-16

Assessment of the Craniocervical junction in Jordanian population: Normal values on CT.

Salem Al Dwairy[1], Salem Al Dwairy[2]
[1]Department of general and special surgery. Hashemite University. Zarqa. Jordan.
[2]Neurosurgery department. Prince Hamzah Hospital, Amman, Jordan

The Craniocervical junction (CCJ) is a complex transitional zone. It comprises a complex balance between the different elements of the cranium and the spine. Some authors suggest that the CCJ should be distinct anatomically and radiologically from the cranium and, in particular, the cervical spine. Beside housing the spinal cord and the lower cranial nerves, it is approximated by major vasculature supplying the brain and the spinal cord. Accordingly, anatomical and radiological assessment of this complex junction is of paramount importance to understand and treat different pathologies affecting this region.

The normal craniometric relationships of the CCJ are an important, and yet, poorly studied relationships. They are also based on measurements taken from plain radiographs where bone structures are superimposed.Moreover, Most of what we know about these relationships are based on studies performed on patients with congenital malformations and/or Basilar invagination.

Accurate measurements of the normal CCJ craniometry relationships based on normal CT studies can be helpful in the diagnosis and management of pathologies that might affect this region. For instance, basilar invagination is a radiological diagnosis. Diagnosis is made when the tip of the odontoid process is located above the Chamberlain's line. However, authors have not agreed on one diagnostic criteria, a 2 mm and a 5 mm of the tip measured above the line have been proposed for the diagnosis of this condition.

In view of the above considerations, we performed a craniometric evaluation of the CCJ, based on 3D CT parameters of the CCJ in asymptomatic individuals.

PP-17

Vertebroplasty in the treatment of traumatic fractures of the thoracolumbar spine

Mukhsin Rajabov, Abdurakhmon Norov
Bukhara branch of Republic Scientific Center of Emergency

The aim of the study is to study the effectiveness of vertebroplasty in the treatment of uncomplicated traumatic fractures of the vertebral bodies of the thorac-ic and lumbar spine.

The 68 patients with acute traumatic fractures of the vertebral bodies were operated on. There were 40 men (59%), women - 28 (41%), the age of the patients was from 22 to 65 years. The duration of the period from the moment of injury to vertebroplasty in 43 (63.2%) patients ranged from 1 to 3 days, the remaining 25 (36.2%) patients applied within 4 to 30 days. Traumatic fracture of the vertebral body in 32 cases occurred as a result of a traffic accident, in 30 cases of a fall from a height and in 6 cases due to a sports injury.

All patients underwent plain radiography of the spine, MSCT and MRI. We would like to draw your attention to the fact that X-ray of the spine did not fully determine the extent of damage and its data could not serve as an indication for performing EP. Compression or wedge-shaped deformity of the vertebral bodies of I degree - the height of the vertebral body or its anterior sections is reduced by less than 1/2 of the original was noted in 38 (55.6%) patients, II degree - by 1/2 of the original - in 30 (44,4%).

The indication for intervention was the presence of a compression fracture of the vertebral bodies of grade I–II without concomitant damage to the musculo-skeletal system and neurological symptoms. Vertebroplasty was performed under local anesthesia, with the patient in the prone position on the day of hospitalization of the patient in the neurosurgical department.

When performing interventions on the thoracic and lumbar spine, transpedicular access was used. Vertebroplasty was performed primarily on one side. In case of insufficient filling of the vertebral body with cement, vertebroplasty was performed on both sides.

PP-18

Cervical Total Disc Replacement: A Suitable Option for Collapsed Discs

Leopoldina Pereira[1], Vitor Pinto[1], Djamel Kitumba[3], Rui Reinas[1], Oscar L Alves[2]
[1]Serviço de Neurocirurgia, Centro Hospitalar Vila Nova de Gaia/Espinho, Vila Nova de Gaia, Portugal
[2]Neurocirurgia, Hospital Lusiadas Porto, Portugal
[3]Faculdade de Medicina da Universidade Agostinho Neto, Luanda, Angola

Introduction: Cervical total disc replacement (CTDR) is considered a contra-indication for patients with compressive significant spondylosis and a loss of >50% of intervertebral disc height.

The aim of this study is to assess the long-term survivorship of slit disc spaces submitted to CTDR in terms of disc height variation and kinematics.

Methods: We performed a 5-year retrospective study of patients with collapsed disc spaces submitted to CTDR at our institutions by comparing baseline with the last post-operative radiological measurements. Geometric measurements included intervertebral disc heights, index level, and C2-7 angles were measured using the Cobb method. Index level and global ranges of motion (ROM) were calculated from flexion and extension lateral radiographs. Continuous variables are presented as means and standard deviations. Accordingly a statistical significance was set at 0.05.

Results: From a total of 157 patients operated, twenty-eight with collapsed disc spaces were selected, enrolling a total of 39 slit discs submitted to CTDR. Patients were followed for a mean period of 23 months (12-46m).

Nine (32.1%) patients presented with single-level, 13 (46.4%) with 2-level, 5 (17.8%) with 3-level, and 1 (3.5%) patient with 4-level disc disease.

The mean preoperative ADH increased from 2.2 (SD 0.47mm) to 8.0 (SD 0.85mm) $p < 0.05$).

The mean index level angle changed significantly from 1.1 (SD 3.4°) to 3.9 (SD 4.4°), p = 0,004) as did the mean C2-C7 angle from 7.9 (SD 14.13°) to 12.4 (SD 13,44°) (p = 0,001).

Regarding the preoperative ROM, mean values at index level and global cervical spine were 8.7 (SD 3,96°) and 42.4 (SD 20,08°), respectively. Postoperatively, index level and global ROM were 11.8 (SD 6,04°) and 49.1 (SD 16.08°), respectively. A statistically significant increase at index level ROM of 3.06 (SD 7,04°) (p = 0,01) was observed. No correlation was found between changes in disc height and ROM parameters. A trend was found for an incremental increase in ADH in smaller discs, and pre-operative taller disc spaces resulting in more mobile segments.

Conclusion: Preoperative disc height should not, individually, per se limit the indication for CTDR. Collapsed discs showed significant improvement of disc height in conjunction with increased postoperative index-level and global ROM. The biomechanical survivorship of CTDR is not affected by reduced disc height, but can instead effectively contribute to restore sub-axial spine biomechanics to a physiological range.

PP-19

Rate of the joint hypermobility in patients with low back pain and its importance for the spinal surgery: A prospective study and review of the literature

Nese Keser[1], Arzu Atici[2], Ozge Selahi[1], Fatma Topaloglu[1]
[1]Fatih Sultan Mehmet Training and Research Hospital, Department of Neurosurgery, İstanbul, Turkey
[2]Fatih Sultan Mehmet Training and Research Hospital, Department of Physical Therapy and Rehabilitation, İstanbul, Turkey

Objectives: Joint hypermobility is an observed condition that is hereditary or very rarely acquired, defined as the ability to move the synovial joints beyond the normal range of motion (ROM). Its prevalence varies according to gender, age, and race, reaching 15% in adults and 30% in childhood. It causes early degeneration in synovial joints and cannot be detected if not investigated and called generalized joint laxity (GJL) in the childhood and adolescent period, and the Beighton scoring system is used for its determination (Table 1). GJL examination is performed with five simple maneuvers that take a maximum of one minute of the physicians, and cases with a score of ≥4 are considered hypermobile (Figure 1). In adults, it is called benign joint hypermobility syndrome (BJHS), and Brighton criteria are used in its diagnosis (Table 2). If the movement in a region increases due to joint hypermobility, it can lead to faster and more severe degeneration in the joint located between the relatively less mobile parts. This condition is seen in the presence of lumbosacral transitional vertebrae and adjacent segment disease (ASDz), which is a complication of lumbar stabilization. It has shown that lumbar fusion predisposes to ASDz due to increased ROM in adjacent segments, and motion-sparing procedures significantly reduce the likelihood of reoperation due to ASDz. In BJHS cases, since the ROM has already increased, degeneration in the adjacent joint will be exacerbated in fusion surgery. Therefore, these cases have a high potential to cause failed back surgery syndrome (FBSS). However, this issue has not been emphasized enough in the literature. We aimed to investigate the prevalence of BJHS and draw spinal surgeons' attention to this phenomenon.

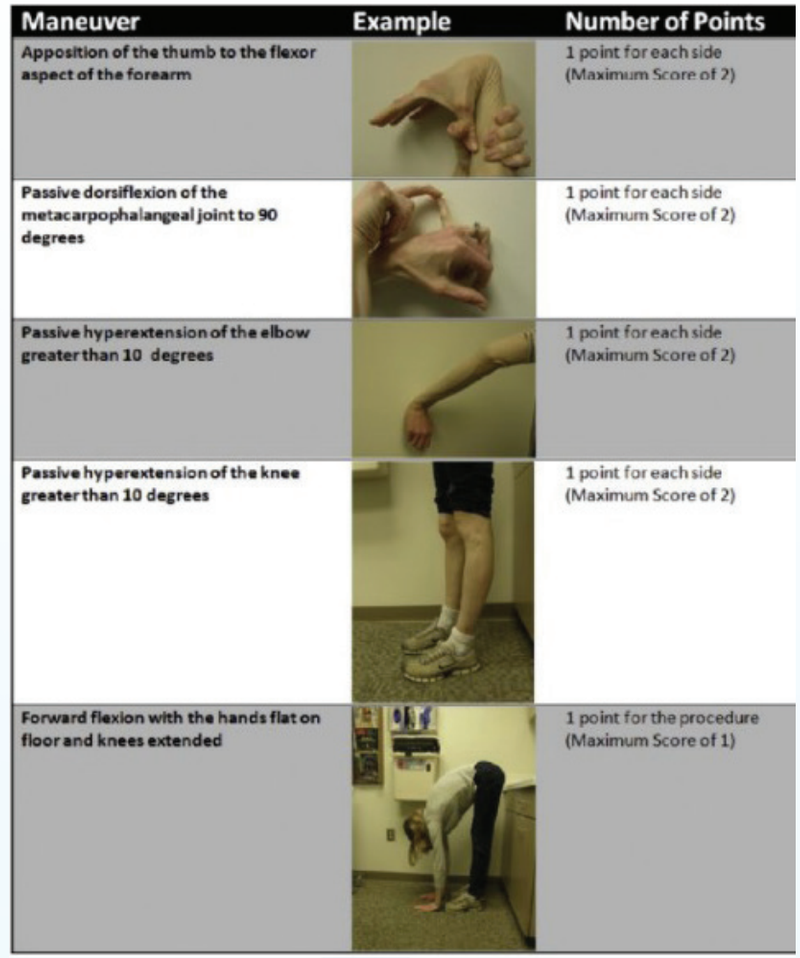
Materials-Methods: In six months, patients aged between 20-50 years with low back pain were included in the study. Cases that met the study criteria were evaluated for GJL with the Beighton score and BJHS with the 1998 Brighton criteria (Tables1-2).

Results: Of the 172 cases, 65% were female, 35% were male, and 14% had BJHS (Table 3).

Conclusions: We suggest that joint hypermobility examination should become routine not only in physical medicine and rehabilitation but also in neurosurgery and orthopedics outpatient clinics. Thus surgical treatment planning can be done individually, and with the avoidance of fusion surgery, the probability of adjacent segment disease and FBSS can be reduced for the BJHS cases.

Istanbul Spine Masters & ISMISS Turkey
Poster Presentations

Figure1



Maneuvers used to calculate the Beighton score

Table 1

	Right	Left
Passive dorsiflexion of five metacarpal joints beyond 90˚C	1	1
Passive apposition of the thumb to the flexor aspect of the forearm	1	1
Passive hyperextension of the elbow beyond 10˚C	1	1
Passive hyperextension of the knee beyond 10˚C	1	1
Hand rest flat on the floor when standing upright with knees in extension	1	
Total	9	

Beighton scoring system

Table 2

Major criteria	• Beighton score of 4/9 or greater (either currently or historically) • Arthralgia for longer than three months in 4 or more joints
Minor criteria	• Beighton score of 1, 2, or 3/9 (0, 1, 2, or 3/9 if aged >50 years) • Arthralgia in one to three joints or back pain for more than three months, spondylolysis, spondylolysis/spondylolisthesis • Dislocation/subluxation in more than one joint or one joint on more than one occasion • Soft tissue rheumatism with >3 lesions (e.g., bursitis, tenosynovitis, epicondylitis) • Marfanoid habitus (tall, slim, span/height ratio >1.03, upper/lower segment ratio • Cutaneous lesions: striae, hyperextensibility, thin skin • Eye signs: Drooping eyelids, myopia, or antimongoloid slant • Varicose veins or a hernia or uterine/rectal prolapse

Revised 1998 Brighton criteria

Table 3

		Mean±SD	Min-Max
Age (Year)		36.82±7.62	20-50
		n	**%**
Age (Year) group (n) (%)	**20-30**	37	21.5
	31-40	72	41.9
	41-50	63	36.6
Gender (n) (%)	**Male**	60	34.9
	Female	112	65.1
Job (n) (%)	**Working**	94	54.7
	Not working	78	45.3
Smoking (n=171) (n)	**<5 / day**	107	62.6
	≥5 /day	64	37.4
Consanguineous Marriage (n)	**Absent**	136	79.1
	Present	36	20.9
BMI group (n)	**≤25**	62	36
	>25	110	64
Fingertip-to-Floor (n)	**Not touching**	110	64
	Touching	62	36
		Mean±SD	**Min-Max**
Waist Circumference (cm)		95.11±10.71	69-125
BMI		26.89±4.43	18-41.6
Beighton score		0.64±1.32	0-5
		n	**%**
Brighton Criteria	**Absent**	109	63.4
	Present	63	36.6
Joint Hypermobility	**Absent**	148	86
	Present	24	14

Abbreviations: BMI: Body Mass Index

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Poster Presentations

PP-20

The radiofrequency ablation in the treatment of FBSS.

Abdurakhmon Norov, Karim Rakhmatov, Mukhsin Rajabov
Bukhara Regional Multidisciplinary Medical Center, Bukhara, Uzbekistan

Purpose of the study: To study the effectiveness of radiofrequency ablation (RFA) in the treatment of FBSS. Material and methods. The work is based on the analysis of examination data of 102 patients with the FBSS. The age of the patients varied from 17 to 72 years. There were 52 men and 30 women. The patients were divided into two groups. The first group (main) consisted of 52 patients, in the treatment of which, along with traditional treatment, RFA was included, and the second group (control) consisted of 50 patients with the syndrome of the operated spine, who received traditional treatment and sacral epidural blockades. The pain syndrome was assessed using the VAS scale, and the quality of life was assessed using the Oswestry scale. Results. The clinical picture in patients with the FBSS proceeded in the form of vertebral, radicular and mixed types of flow. Vertebral syndrome was diagnosed in 25 (24.5%) patients and was characterized by the presence of chronic low back pain with limited movement in the lumbar spine. Radicular syndrome was diagnosed in 16 (15.6%) patients and was expressed by pains of varying intensity along the affected root. Mixed syndrome was characterized by a combination of vertebral and radicular syndrome and was detected in 61 (59.9%) patients. Depending on the type of clinical syndrome, patients of the main group underwent pulsed (IRFA) or thermal (RFA) radiofrequency ablation. Thus, patients with vertebral syndrome underwent thermal RFA of facets of the affected level on both sides. Patients with radicular syndrome underwent IRFA of the “sick” root. Patients with mixed syndrome (vertebroradicular) underwent RFA of facets and IRFA of roots. Treatment outcomes were assessed using the VAS scale. Analysis of the results of treatment in the immediate and intermediate period showed that a good result was achieved in 31 (59.6%) of the main and 25 (50%) of the control group, satisfactory in 18 (34.6%) patients of the main and 19 (38%) control group, an unsatisfactory result was noted in 3 (5.8%) patients of the main and 5 (10%) of the control group. Conclusion. Thus, radiofrequency ablation is a minimally invasive method of choice for the treatment of pain in patients with the syndrome of the operated spine.

PP-21

Vertebroplasty in treatment traumatic fractures of the thoraco-lumbar spine

Mukhsin Rajabov, Abdurakhmon Norov
Bukhara Branch of Republic Scientific Center of Emergency, Bukhara, Uzbekistan

The work is devoted to the surgical treatment of compression fractures of the vertebral bodies of the thoracolumbar spine using the method of vertebroplasty (VP).

The aim of the study is to study the effectiveness of vertebroplasty in the treatment of uncomplicated traumatic fractures of the vertebral bodies of the thoracic and lumbar spine.

The 68 patients with acute traumatic fractures of the vertebral bodies were operated on. There were 40 men (59%), women - 28 (41%), the age of the patients was from 22 to 65 years. The duration of the period from the moment of injury to the EP in 43 (63.2%) patients ranged from 1 to 3 days, the remaining 25 (36.2%) patients applied within 4 to 30 days. Traumatic fracture of the vertebral body in 32 cases occurred as a result of a traffic accident, in 30 cases of a fall from a height and in 6 cases due to a sports injury.

All patients underwent plain radiography of the spine, MSCT and MRI.

The indication for the intervention was the presence of a compression fracture of the vertebral bodies of I-II degree without concomitant damage to the musculoskeletal system and neurological symptoms. VP was performed under local anesthesia, with the patient in the prone position on the day of the patient’s hospitalization in the neurosurgical department.

Analysis of the results of treatment in the immediate and intermediate period showed that a good result was achieved in 60 (88.2%) patients, satisfactory in 8 (11.8%).

Conclusion: Thus, VP is a minimally invasive method of choice for the treatment of un-complicated traumatic fractures of the vertebral bodies, which contributes to a sharp decrease in pain and activation of patients in the early postoperative period.

PP-22

Effectiveness of Nitinol In Motion-preserving Stabilization of Lumbar Spine

Sergey Kolesov, Arkadii Kazmin, Andrey Panteleev, Maxim Sazhnev, Vladimir Pereverzev, Elena Isaeva, Natalia Morozova, Vladimir Schvets
Department of Spine Pathology, Central Institute of Traumatology and Orthopedics named after N.N. Priorov

Introduction: The standard of surgical treatment of lumbar DDD is decompression of neural structures of the spinal canal with the instrumentation. However, these interventions leads to a number of complications, such as: adjacent segment disease, pseudoarthrosis, bone resorption around the pedicle screws. Dynamic stabilization proved to be an effective surgical technique in our prospective study conducted on 252 patients. All patients showed significant improvement according to the ODI, SF-36 and VAS scales at all control periods up to 5 years after surgery.

Material and Methods: We analyzed the results of surgical treatment of 123 patients with degenerative diseases of the lumbar spine, who were treated using nitinol rods from 2011 to 2017 in our department. The control group consisted of 129 patients, who were treated using standard rigid rods made of titanium. Taking into account the results of preoperative examination of patients, the tactics of further surgical treatment were determined, based on which the patients (252) were divided into 5 groups depending on the level of fixation. Radiographs, CT, MRI and clinical outcomes were examined preoperatively, and at 6, 24, 48 and 60 months follow-up.

Results: The results were evaluated according to the VAS, SF-36 and ODI questionnaires. In both cases (rigid and dynamic stabilization), statistically significant improvements were noted in the postoperative period ($p < 0.01$). In both groups, in comparison with preoperative values, improvement was observed in all control periods, which were highly statistically significant ($p < 0.01$).

Assessment of mobility in the segment stabilized using dynamic nitinol rods demonstrated average conserved range of motions of 4.8°.

In total, 16 of the 252 treated patients had complications (6.35%). In the group with dynamic nitinol rod stabilization, there were 5 complications (4.0%), and in the group with rigid rods - 11 (8.53%).

Conclusion: Pedicle screw fixation of the lumbosacral spine with the use of nitinol rods is an effective technology that allows to conserve mobility in the lumbosacral spine in combination with a stable fixation.

PP-23

Thoracic spinal Extradural meningioma: Case report and literature review

Basel Tarazi[1], Selcuk Palaoglu[2], Uygur Er[2]
[1]Department of Neurosurgery, Acıbadem Ankara Hospital, Ankara, Turkey
[2]Department of Neurosurgery, Hacettepe University Hospital, Ankara, Turkey

Background: Extradural spinal meningiomas are rare, and few appear as lipomatous meningiomas in an “en-plaque” form. The transitional fibroblastic subtype, with lipid accumulation within the tumoral cells, is typically more aggressive and surgically challenging to resect.

Case Describtion: A 43-year-old female presented with back pain and progressive paresthesias in both lower extremities. Based on the radiological findings, the tentative preoperative diagnosis was lymphoma. However, the biopsy confirmed a Meningioma. The patient underwent a microsurgical extradural Thoracal (Dorsal) laminectomy with posterior approach, resulting in full tumor resection. Histopathologically, the final report documented a tipic lipomatous meningioma.

Conclusion: Purely extradural meningiomas are very infrequent but they should be included in the differential diagnosis of extradural lesions. They are easily mistaken pre and intraoperatively for metastatic tumors, with possible consequences on the proposed surgical treatment, and therefore, on the morbidity. Because prognosis is related to the extent of resection, we believe it would be better to completely remove the lesion, if considered safe. In case of doubts, an intraoperative pathology support could be useful. Finally, because of opposing views in the long-term prognosis and rate of surgical cure, it is very important to be aware of these lesions, undergoing patients to very close follow-ups.

Literature Review

Article Author	Epidural with an intradural component/total	Exclusively epidural	Age	Gender	Tumor location	Bony changes on Neuroimaging
Tissier, 1898[42]	1		14	M	C2-C5	
Soderbergh and Sundberg, 1916[59]	1		59	M	C3-C4	
Mass, 1918[26]	1		54	F	D4-D6	
Naffziger and Ha, 1933[42]	4		54	M	D8	
			60	F	D9	
			55	M	C6-D2	
			34	F	C7-D2	
Enderle, 1934[59]	1		44	M	L3-L4	
Neisi, 1938[42]	1					
Ingraham, 1938[27]	1		10	M	C3-C5	
Rasmussen, 1940[46]	10/140					
Elsberg, 1941[17]	4/73					
Oddsson, 1947[41]	1		32	M	L/S	
Bull, 1953[9]	6/59					Pedicle destruction (1 case)
Henschen, 1955[24]	3		42	F	C5	
			17	F	D1	
			31	M	D5	
Arseni, 1958[3]	9/114					
Rand, 1960[47]	1	1	8	F	dorsal	Destruction of left D6-D7 hemilamina and erosion of pedicle
Lombardi, 1961[33]	3/71	3				Widened intervertebral foramen
Haft, 1963[22]	1	1	24	M	D5-D7	Normal
Early, 1966[16]	1	1	14	M	D3-D5	Erosion of D4 body
Soo, 1966[58]	2	1	64	F	D4-D6	Normal
		0	7	M	C1-D7	Widened pedicles
Vakili, 1967[56]	1		61	M	D1	
Pecker, 1967[44]	3		25	F	C2-C5	Normal
			43	F	C6-D1	Enlargement of C7-D1 foramen
			65	F	D4-D6	Erosion of D3-D5 pedicles
Rath, 1967[48]	1	1	20	F	C3-C6	Normal
Abbott, 1968[1]	1	0	57	M	D4	
Hallpike, 1968[18]	1	1	33	M	D6-D7	Erosion of the right D6 pedicle
Singh, 1968[51]	1		35	F	D4	
Fortuna, 1969[14]	4	1	53	F	D7-D10	
		1	74	F	D7-D8	
		1	40	F	D4-D6	
		1	31	M	D1-D2	
Mittal, 1960[40]	1		40	F	D12	
Balaparameswararao, 1970[2]	3/14		40	F	L3-L5	
			54	F	L4-L5	
			30	F	D3-D4	
Calogero, 1972[10]	4	0	40	F	D4	
		0	54	M	L3	
		0	28	F	D9-D11	
		0	33	M	D7	
Borghi, 1973[7]	5		28	F	C7-D2	Erosion of C7 and D1 pedicles
		0	23	F	D1	Normal
			32	F	C5-D1	Normal
		0	28	F	D5-D6	D6 pedicle thinned
			60	F	D3-D4	Erosion of pedicle
Bret, 1976[8]	2/60					
Sartor, 1977[52]	1	1	29	M	C1-C4	
Roux, 1996[50]	7/54	5				
King, 1998[31]	4/78	2				
Kumar, 1980[32]	1	1	55	M	D6	
Motomochi, 1980[43]	1		14	M	C4-C7	
Stern, 1980[55]	3	1	49	F	D3-D6	
		0	60	M	D2-D6	
			56	F	D2-D3	
Kaya, 1982[30]	1		11	M	C4-C7	
Levy, 1982[34]	7/97	0				In 2 cases, vertebral posterior arc and pedicle disruption
Milz, 1983[38]	2	1	70	F	D4-D6	Normal
		1	45	F	D8	Normal
Kyoushima, 1987[29]	1					
Steohison, 1987[53]	2	0	76	F	D5-D6	Calcifoarachnoiditis
			63	F	D12-L1	-
Solero, 1989[52]	9/174	9				
Chen, 1992[11]	1		14	F	C2-C6	
Di Rocco, 1994[12]	1		14	F	D6-D7	
Christopherson, 1997[13]	1		13	F	D2-D3	
Sato, 1997[49]	1	1	39	M	C1-C3	
Yoshiura, 1998[57]	1	0	16	F	C2-C4	
Ashari, 2000[5]	1					
Gamache, 2001[17]	1					
Messori, 2002[36]	1	1	14	F	C5-C7	Calcifications
Zevgaridis, 2002[60]	1	1	75	F	D11-D12	
Cohen-Gadol, 2003[13]	7/40	0				
Takeuchi, 2006[54]	1	1	50	M	C1-C4	Enlargement of the C3-C4 foramen
Yamada, 2007[60]	1	1	22	F	C1-C5	Calcification in the spinal canal; tumor infiltration over both the sides of the transvers processes
Barbanera, 2007[6]	1	0	53	F	C7-D1	C6-C7 vertebral bony destruction
Frank, 2007[20]	1	1	45	F	C5-C7	Enlargement of C6-C7 foramen
Santiago, 2009[51]	1	1	42	M	D2-D3	Bone remodelling of the left posterior segment of the D3 body
Tuli, 2012[55]	1	1	42	F	D4-D6	Normal
Savardekar, 2014[54]	2	2	35	F	C3-C6	C4 and C5 lateral spinous processes infiltration
			23	F	D4-D5	Normal
Nasr, 2014[45]	1	1	70	M	D6	T5 body signals changes

M=Male, F= Female. Blank cells in column 3 indicate that we had no information if the lesion was only epidural or intra and epidural; Blank cells in column 7 indicate that there was no mention of bony changes in the text

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February 24 - 26, 2022

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