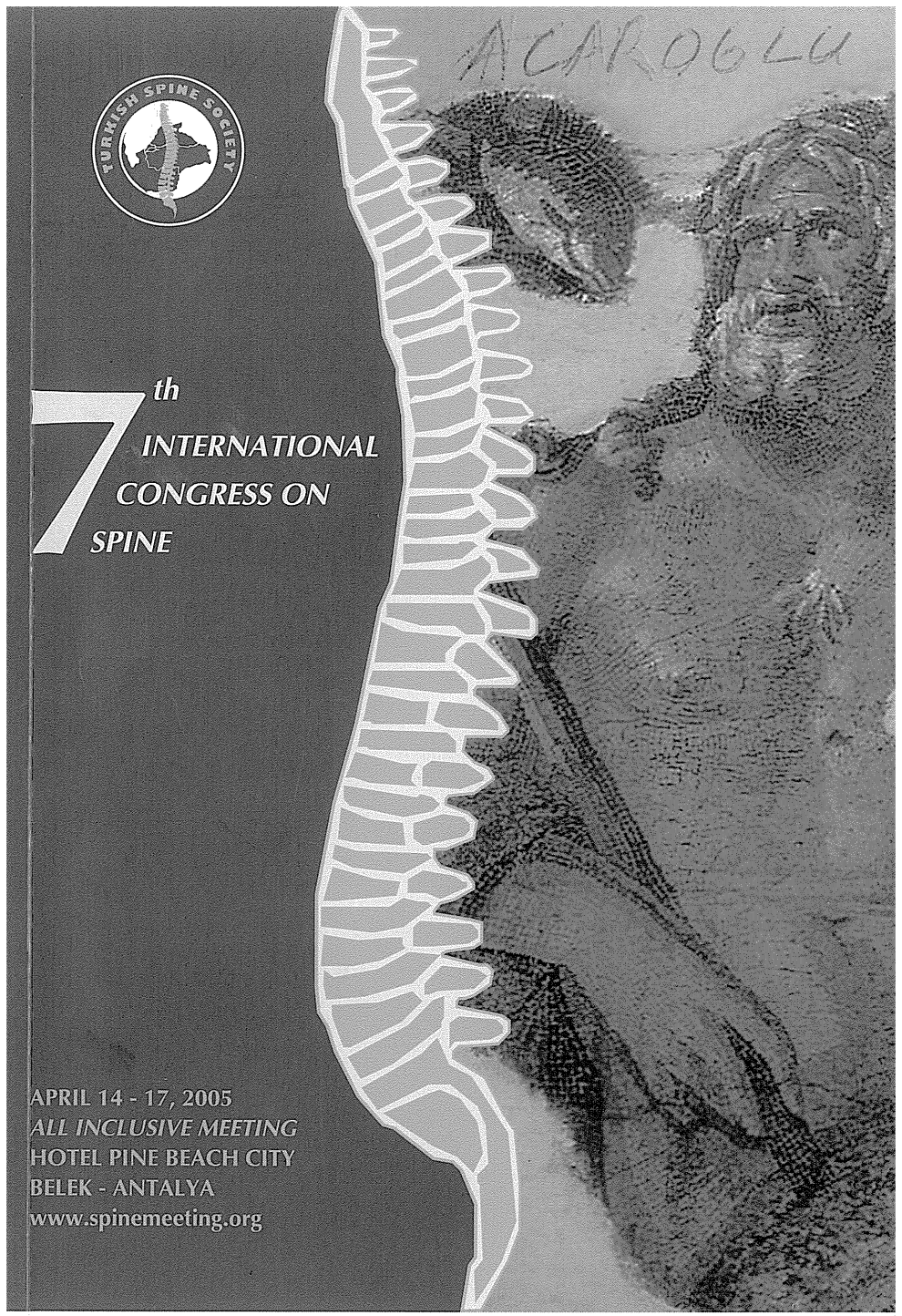
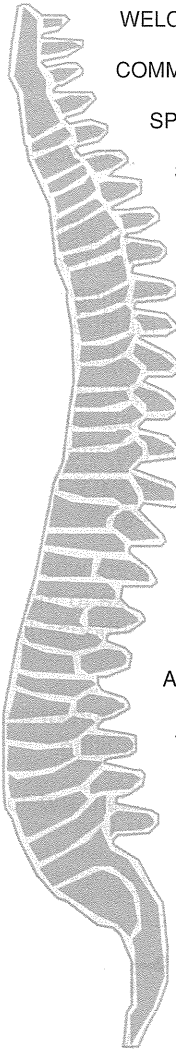


TURKISH SPINE SOCIETY

7th INTERNATIONAL CONGRESS ON SPINE

APRIL 14 - 17, 2005
ALL INCLUSIVE MEETING
HOTEL PINE BEACH CITY
BELEK - ANTALYA
www.spinemeeting.org

FINAL PROGRAMME AND ABSTRACT BOOK



WELCOME

Dear members and guests of the Turkish Spine Society,

We are pleased to have the opportunity to welcome you to the 7th International Meeting on Spine. The pre-meeting course and the scientific sessions are ready for fostering spinal disorders education and exchange of knowledge among members and guests. We would like to thank the program committee and the review committee who worked hard to put together a tremendous agenda. While maintaining the highest standards of scientific content, the meeting will also reflect the beauties and excitement of Antalya enabling the attendees to leave with unforgettable memories. The tours will provide exceptional opportunities to view the diverse attractions of the Antalya region.

We are grateful to our International and Turkish faculty members who will deliver stimulating talks during the meeting. We would also like to thank the Turkish Neurosurgical Society and Turkish Society of Orthopaedics and Traumatology for their utmost support to the meeting.

Lastly, I would like to mention and thank for the generous support of the industry without who have made major contributions to the meeting.

Thank you for all the scientific submissions, your participation and for being in Antalya.

Mahir GÜLŞEN, M.D.
President of the Congress

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TECHNICAL INFORMATION FOR SESSIONS

Speakers are requested to adhere strictly to the time limit and schedule indicated in the programme.

Please note that presentations from your own laptop will not be allowed to prevent spending any unnecessary time during the recognition of the laptops by the system. In order to avoid problems, qualified technicians will ensure that all presentations are downloaded on to a single central computer before the session and sent through a network to the correct room. In the lecture room, where your presentation takes place, a computer with your powerpoint display will be available. At the Congress Center, on April 14 and April 15, 2005, you will be able to go to the Speakers Preview Room to copy your presentation into the central computer. Highly qualified technicians will be there to help you.

REMEMBER

- Download and/or check your presentation in the Speaker Preview Room before your session.
- Please do not attempt to connect your laptop directly to the projector in the meeting room.

FREE PAPERS

Time allocated for each paper is 4 minutes. The time limit will be strictly controlled by the chairmen.

SPEAKER PREVIEW ROOM

The Speakers Preview Room / Computer Centre is located at the Convention Center.

OPENING HOURS:

April 14, 2005, Thursday	09:00 - 18:30
April 15, 2005, Friday	07:00 - 18:30
April 16, 2005, Saturday	07:00 - 18:30
April 17, 2005, Sunday	07:00 - 12:00

POSTER PRESENTATION & EXHIBITION

Posters will be displayed throughout the congress.

The poster exhibit area is the foyer of the Convention Center.

The posters should be placed before 07:30 on April 15, 2005.

Material to fix the poster on the poster board can be obtained from the registration desk.

WORKSHOPS

Surgical and nonsurgical technique workshops will feature demonstrations and lectures on specific topics related to spine care. This is great oppurtunity to sharpen your existing skills or learn a new technique!

ABSTRACT BOOK

All selected abstracts for the Congress are published in the Final Program & Abstract Book, which is given together with the Congress bag. Additional copies can be purchased from the registration desk.

PRE MEETING COURSE CD

The CD's of the "pre-meeting courses" will be delivered to all Congress participants during the Congress and included to the Registration fee.

AWARDS

The following awards will be given during the meeting.

"THE BEST ORAL PRESENTATION AWARD" JURY

Erhan Sesli	Selçuk Palaoğlu
Haluk Berk	Şükrü Çağlar

"THE BEST POSTER PRESENTATION AWARD" JURY

Mehmet Altınmakas	Sait Naderi
Osman Güven	Mehmet Zileli

LANGUAGE

The official language of the congress will be English and Turkish. Simultaneous translation will be available from English to Turkish / Turkish to English.

ON-SITE REGISTRATION / BADGE PICK-UP

On-site registration and badge pick-up will be open at 09:00 on April 14, 2005, Saturday. The registration facilities will be located in the foyer of the Convention Center.

Registration facilities will be open during:

April 14, 2005, Thursday	09:00 - 18:30
April 15, 2005, Friday	07:00 - 18:30
April 16, 2005, Saturday	07:00 - 18:30
April 17, 2005, Sunday	08:00 - 12:00

REGISTRATION FEE

The active participant's registration fee includes access to all scientific sessions, exhibitions, coffee breaks, lunches, the welcoming cocktail, the gala dinner, one congress bag, a copy of the final programme with abstracts, congress CD, and certificate.

The registration fee for accompanying persons includes access to the welcoming cocktail, the gala dinner.

Scientific sessions are not open to accompanying persons or exhibitors.

BADGES

Participants, exhibitors and accompanying persons are kindly requested to wear their badges during all Congress activities and social events. Entry will not be permitted without a badge. Replacement of lost badges incures a 25€ administrative charge. This charge will be reimbursed if the lost badge is found and returned. Please proceed directly to the Congress Secretariat with appropriate documentation.

REFUNDS

Please note that no refunds will be made during the Congress.

CERTIFICATE OF ATTENDANCE

All registered participants will receive a congress certificate which will be delivered on April 17, Sunday at 09:00 at the registration desk.

CME/CE CERTIFICATES

Our Congress is accredited by the Turkish Medical Association, additionally attendence certificates for the pre-meeting courses and congress will be presented.

CONGRESS VENUE

7th International Congress On Spine will take place between April 14-17, 2005 in Belek - Antalya, Pine Beach City.

EXHIBITION HOURS

An exhibition of the latest technical equipment and pharmaceutical products will be located in the Exhibition Hall at the Convention Center.

Exhibit hours will be:

April 14, 2005, Thursday	Installation of the stands
April 15, 2005, Friday	07:30 - 18:30
April 16, 2005, Saturday	07:30 - 18:30
April 17, 2005, Sunday	08:00 - 12:00

INTERNET CAFE

An internet-cafe is available for all attendees during the congress at the Convention Center. There will be wireless internet collection.

All meeting attendees are invited to check their e-mail and tour the World Wide Web for free at the internet cafe will be open daily from 08:00 to 18:30.

COFFEE BREAK

TIPMED® With the support of Tıpmed, coffee/tea are served at the foyer of the Convention Center on April 14-15, 2005 during the coffee breaks.

TIPSAN With the support of Tıpsan, coffee/tea are served at the foyer of the Convention Center on April 16-17, 2005 during the coffee breaks.

LUNCH

Lunch facilities will be served in the Hotel Restaurant. The active participant's registration fee includes lunch facilities.

TOUR DESK

The tours desk is located in the Registration desk and will be open from April 14, 2005, Thursday until April 17,2005, Sunday.

TRANSPORTATION - AIRPORT/HOTEL/AIRPORT

The transportation from airport/hotel/airport are free of charge on April 14, 2005 and April 17, 2005. The transpostation fee on 15th and 16th April 2005 is 50€/per person.

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TOUR SELECT

WELCOME COCKTAIL

April 14, 2005, Thursday

Between 19:30-21:30

Cost: Included in the registration fee.

With the support of Famet, Welcome Cocktail will be served on April 14, 2005 at the Pine Beach City.

Music, hors d'oeuvres, and cocktails will be served for an elegant evening of networking and reuniting.

Dress Code: Casual

GALA DINNER

April 16, 2005, Saturday

Between 20:00-23:30

Cost: Included in the registration fee.

With the support of Ege Medical, Gala Dinner will be served on April 16, 2005 at the Pine Beach City.

A four course dinner and unlimited local alcoholic and non-alcoholic beverages will be served to guests, accompanied by musical performance.

Dress Code: Black tie is required

ANTALYA HALF DAY CITY TOUR 25.-EURO

Antalya, Turkey's principal holiday resort, is an attractive city with palm tree lined boulevards and an award winning marina. Founded in the 2nd century B.C. by Attalus II, a King of Pergamum, it has been continuously inhabited: by the Romans, Byzantines, Seljuks, and the Ottomans.

Antalya has much to offer: amazing scenery, pine clad Taurus Mountains, the sparkling clear Mediterranean Sea, historical sites...

PROGRAM

- Pick up from hotel
- Trip to the city center by bus
- Promenade through the Old City and Harbor
- Stop at Dogugaraji for a typical bazaar (fruits, vegetables, spices)
- Visit of waterfalls
- Visit of a Shopping Center (carpets, jewellery)
- Return to Hotel

ANTALYA FULL DAY CITY TOUR PROGRAM 35.-EURO

Antalya, Turkey's principal holiday resort, is an attractive city with palm tree lined boulevards and an award winning marina. Founded in the 2nd century B.C. by Attalus II, a King of Pergamum, it has been continuously inhabited: by the Romans, Byzantines, Seljuks, and the Ottomans.

Antalya has much to offer: amazing scenery, pine clad Taurus Mountains, the sparkling clear Mediterranean Sea, historical sites...

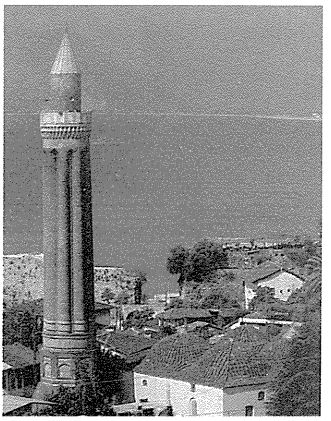
Kaleici (the Old City): enclosed by sea & land walls, this charming area with its narrow winding streets and old wooden houses has been restored as an attractive touristic center with its boutique hotels, restaurants, souvenir shops, bars and discos... the port's Marina is worth visiting.

Hadrian's Gate: Triple arched Roman edifice of marble built in AD 130 in honor of the Emperor Hadrian. One of the best preserved monuments in Antalya.

Yivli Minaret: the symbol of Antalya built in 1230. 38 m high with 8 fluted segments. Monument of Seljuk art.

PROGRAM

- Pick up from the hotel
- Visit of the Kursunlu Waterfalls
- Trip to the city center by bus
- Promenade through the Old City and Harbor: Hadrian's Gate, Yivli Minaret
- Lunch
- Stop at Dogugaraji for a typical bazaar (fruits, vegetables, spices)
- Visit of Antalya Archaeological Museum
- Visit of a Shopping Center (carpets, jewellery)
- Return to hotel



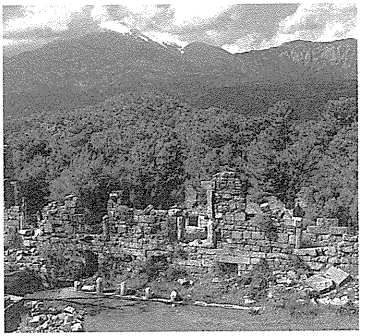
PHASSELIS 65.-EURO

Experience a wonderful trip along the the Turkish Turquoise Coast. The site of ancient Phaselis is one of the most charming in Lycia. It offers the visitor the chance to wander among ruins of the Roman & Byzantine periods. A theater, three agoras, and an aqueduct are among the scattered ruins to be seen. Guests will board a boat from the marina in Kemer which will take them along the Lycian coast, passing pine trees and the Taurus mountain chain to Olympos. The Lycian coast is the most Beautiful in Turkey. Guests will have the opportunity to swim in the crystal clear blue waters of the Mediterranean. Lunch will be Taken on board at Olympos. In the afternoon, we continue to the "Ucadalar" (Three Islands).

After a swimming break, begin our return journey to Kemer where buses will be boarded for the trip back to the hotel.

PROGRAM

- Pick up of the guests from the hotel
- Bus trip to Kemer through Antalya
- Boat trip from the Harbor in Kemer
- Trip along the Lycian coast towards Olympos
- Swimming break
- Arrival to Olympos
- Lunch & drinks on board
- Continue to "Ucadalar"
- Return to Kemer Harbor
- Boarding of buses for return
- Trip to hotel



TERMESSOS 70.-EURO

The trip to Termessos has been especially designed for friends of culture and nature. You will have the opportunity to enjoy the ancient Psidian city of Termesssos, 1050 meters high, while experiencing the unusual synthesis of a large number of rare plants and animal species which are under the protection of the Termessos National Park. It has been said that Alexander the Great surrounded the city in 333 B.C., which he called "an eagle's nest". (one of the only cities he failed to conquer !) The tour will end with the visit of the Duden Waterfalls.

PROGRAM

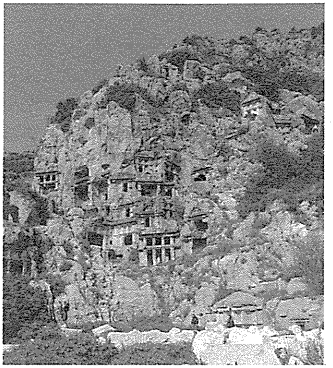
- Pick up from the hotel and drive to Termessos
- Arrival at Termessos and visit of the small Nature Museum
- A walking trip to the ancient city and theater
- Visit of the theater, agora, cistern and necropolis
- Walk back to the parking area
- Visit of the Duden Waterfalls
- Transfer back to the hotel

DEMRE-MYRA-KEKOVA 70.-EURO

Full day tour enabling guests to visit ancient history while relaxing and sunbathing during the yacht tour to the Sunken Islands.

After an early morning departure from the hotels and a short tea break in the Finike Marina, arrival and visit of the ancient city of Myra, an important Christian center and the home of St. Nicholas. St. Nicholas, also known as Santa Claus, was born in Patara, which is 80 km west of Myra, and served as a bishop there until his death. The Church of St. Nicholas, the Roman theater and the Lycian rock tombs are the highlights of the visit to Myra.

After having lunch, boats are boarded and the voyage begins to the famous sunken city of Kekova, the name given to the most scenic area of the Lycian coast. The area consists of Kekova Island, Ucagiz village, and Kale village, also known as the Lycian town of Simena. Visit of the rock tombs.



PROGRAM

- Pick up from hotel
- Tea break in Finike
- Arrival and visit of Myra
- Visit of the Church of St. Nicholas, the Roman theater and the Lycian rock tombs
- Lunch
- Boarding boats
- Visit of Kekova, Ucagiz and Return to hotels
- Visit of rock tombs
- Sail back to Demre
- Board buses for return trip to hotel

PERGE - ASPENDOS - SIDE 65.-EURO

Full day excursion to the ancient Pamphylian and Roman cities of Perge, Aspendos and Side.

Perge, situated 18 km northeast of Antalya is said to be the oldest settlement region of Pamphylia and was founded around 1000 BC. St. Paul stopped in Perge and gave his first speech on Christianity here. The ruins are spread across two hills.

Aspendos is one of the best preserved Greco-Roman amphitheaters in the world and has a seating capacity of 15,000 people.

Side, the center of slave trading and a harbor city during the Roman period, has colonnaded streets, harbor, agora and the Apollo Temple which is situated near the sea.

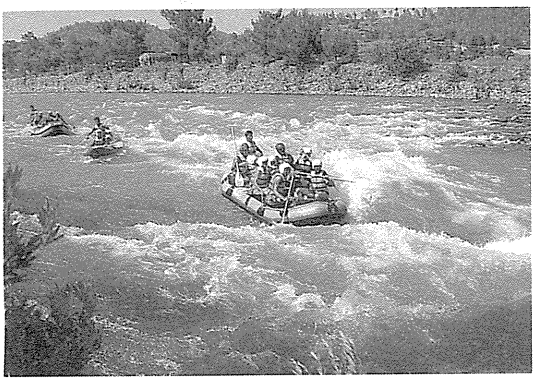
PROGRAM

- Pick up from hotel
- Departure for Perge
- Visit of Perge
- Departure for Aspendos
- Visit of Aspendos
- Lunch at a local restaurant
- Departure for Side
- Visit of Side
- Return to hotels

RAFTING 45.-EURO

In the Koprulu Canyon National Park of the Beskonak Valley, there is a wide river that flows through a magnificent landscape. The river has become a popular tourist attraction. After being briefed on the safety procedures and the course of the adventure by professional guides, the exciting rafting tour begins. Life jackets are a must. The boats take between 6-12 persons and are manned by a river guide. (no previous rafting experience is necessary !)

Lunch break will be given in a restaurant near the river.The Rafting continues after lunch. Swimming break is a possibility.



PROGRAM

- Pick up from hotel
- Arrival in Beşkonak Valley
- Orientation & briefing
- Boarding of boats
- Rafting
- Barbecue lunch

JEEP SAFARI 45.-EURO

A full day adventurous drive through the scenic roads of the Taurus mountain range. The chance to see the country from a different perspective.

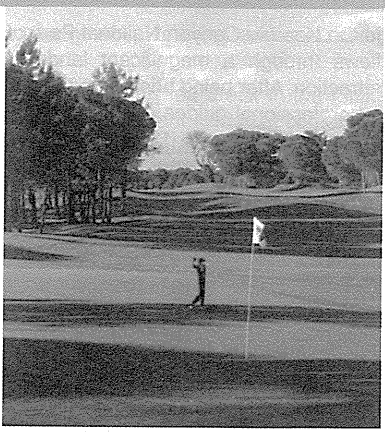
This tour will take you through many typical Turkish villages, where you will have the opportunity to visit a traditional Turkish house, sampling the simplistic village life and enjoying the warmth and hospitality of the locals.

PROGRAM

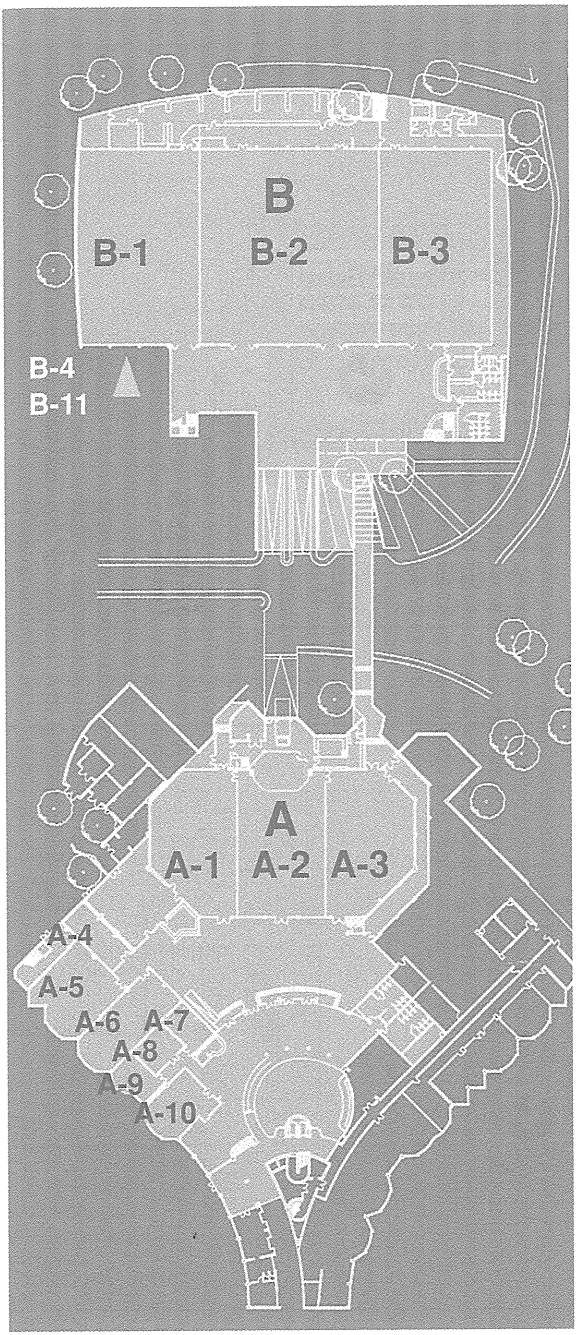
- Pick up from hotel
- Transpotation to Kemer via bus
- Boarding of jeeps
- Photo opportunity in Kemerbogazi
- Drive along old Lycian streets
- Visit of Turkish village
- Lunch
- Continuation of jeep tour
- Break at Alakir River
- Return drive to Kemer
- Boarding of bus for return
- Trip to the hotel

GOLF

Located in the resort area of Belek, on the Mediterranean coast. The club is 10 km from the Pine Beach City Hotel. National Golf Club is built in landscaped gardens and is surrounded by pine and eucalyptus forests. The British styled Clubhouse has a peaceful atmosphere and panoramic views of the golf course.



Please contact Tour Select Tour Desk for further informations.



B

Convention Center

A

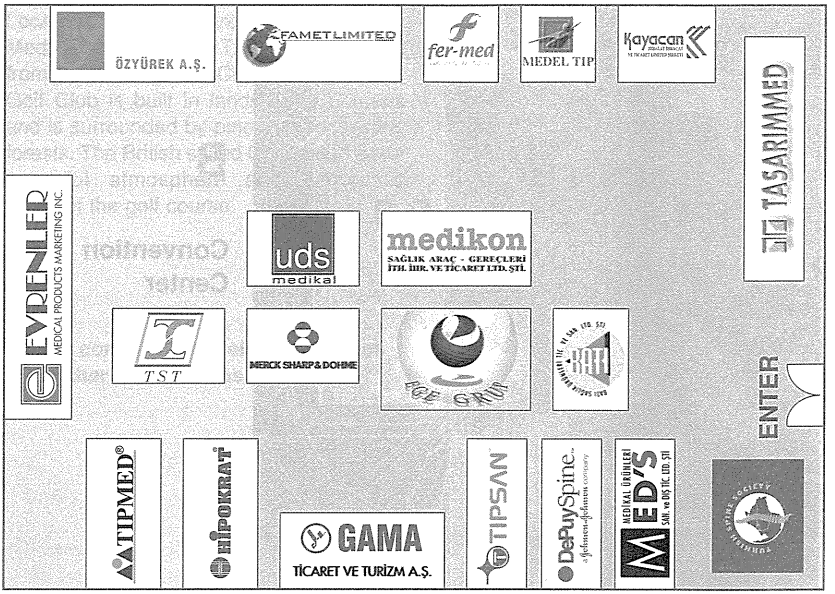
Hotel Building

ATTT

PLAN OF PINE BEACH CITY

EXHIBITON MAP

HALL B3



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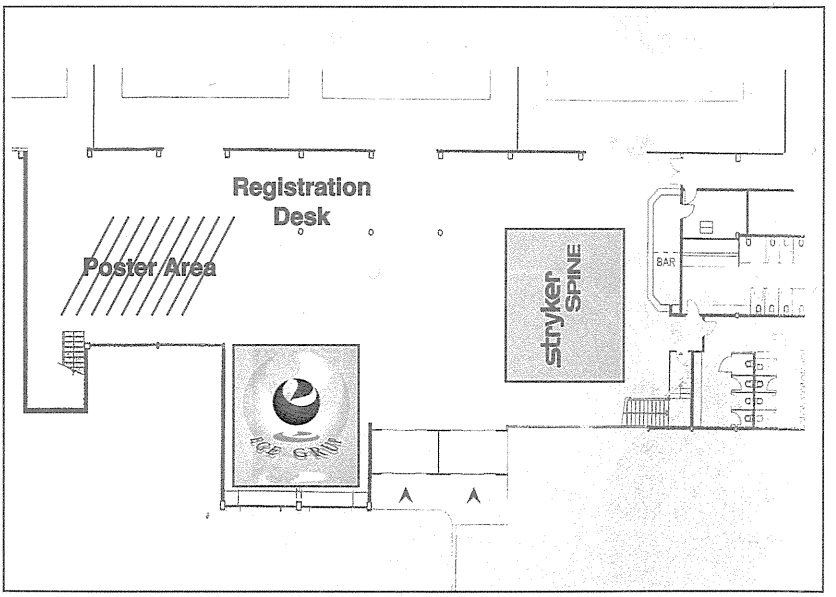

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Thursday, April 14, 2005

Hall B2	Hall A2
13:10-15:30 PREMEETING COURSE 1 Spinal Trauma	13:10-15:30 PREMEETING COURSE 2 Degenerative Spine
15:30-16:00 Coffee Break	
16:00-18:30 PREMEETING COURSE 1 Spinal Trauma	16:00-18:30 PREMEETING COURSE 2 Degenerative Spine
19:00 OPENING CEREMONY	
19:30-21:30 WELCOME COCKTAIL	

Friday, April 15, 2005

07:00-08:00 Business Meeting

Hall B2	Hall A2
07:50-08:00 Announcements and Welcome	
08:00-08:30 ICL 1 Total enbloc spondylectomy in the treatment of metastatic spinal tumours- Indications, techniques and avoidance of complications	
08:30-09:10 PANEL 1 Anterior vs. posterior surgical treatment of cervical myelopathy- techniques, pros and cons	
09:10-09:40 ICL 2 Adult degenerative spondylolisthesis	
09:41-10:30 FREE PAPERS Trauma	
10:30-11:00 Coffee Break	
11:00-11:30 ICL 3 Surgical management of adult deformity	
11:30-12:30 PANEL 2 Three different posterior instrumentation methods in treatment of idiopathic scoliosis-efficacy, pros and cons	
12:30-14:00 Lunch-Workshops	
14:00-14:40 PANEL 3 Innovative techniques in treatment of scoliosis of the growing spine	
14:40-15:00 ICL 4 Osteotomies for rigid kyphotic deformities of the thoracolumbar spine	
15:00-15:30 ICL 5 Motion preservation-disc replacement for degenerative disorders	
15:30-16:00 ICL 6 Management of primary neoplasms of the spinal column	
16:00-16:30 Coffee Break	
16:30-18:00 FREE PAPERS Deformity	16:30-18:00 FREE PAPERS Degenerative Disorders

Saturday, April 16, 2005

07:00-08:00 Business Meeting

Hall B2	Hall A2
07:50-08:00 Announcements	
08:00-09:00 PANEL 4 Lumbar interbody fusion techniques-pros and cons	
09:00-10:35 FREE PAPERS Basic Science	
10:35-11:00 Coffee Break	
11:00-11:30 ICL 8 Etiology and treatment of global imbalance	
11:30-12:00 ICL 9 Treatment of spondylolysis and isthmic spondylolisthesis	
12:00-12:30 Presidential guest Lecture	
12:30-14:00 Lunch-Workshops	
14:00-15:00 PANEL 5 Alternative surgical methods in the treatment of radiculopathy	
15:00-15:30 ICL 10 Osteotomies of the cervical spine	
15:30-16:00 ICL 11 Posterior dynamic instrumentation systems in avoidance of spinal fusion	
16:00 16:30 Coffee Break	
16:30-18:00 FREE PAPERS Degenerative Disorders-Miscallenous	16:30-18:00 FREE PAPERS Deformity

20:00-23:30 GALA DINNER

Sunday, April 17, 2005

Hall B2	Hall A2
07:50-08:00 Announcements	
08:00-09:00 FREE PAPERS Basic Science	
09:00-09:30 ICL 12 Management of sacral tumours	
09:30-10:30 PANEL 6 Advances in treatment of spinal infections	
10:30-12:20 FREE PAPERS Infection-Miscallenous-Tumour	
12:20-12:30 Closing Ceremony Announcement of Award Winners	

SCIENTIFIC PROGRAMME - PREMEETING COURSES

PREMEETING COURSE 1
HALL B2

THURSDAY, April 14, 2005

Moderators: Cüneyt Şar, M.D.
Hakan Caner, M.D.

	Spinal Trauma	Speaker
13:10-13:25	Spinal cord injury - Current concepts	Erkan Kaptanoğlu, M.D.
13:30-13:45	Cervical spine trauma - classification	Sedat Çağlı, M.D.
13:50-14:05	Upper cervical spine trauma - treatment options	Şükrü Çağlar, M.D.
14:10-14:25	Fixation/instrumentation of the upper cervical spine (techniques, tips)	Ziya Gökaslan, M.D.
14:30-14:45	Lower cervical spine trauma - treatment options	Ghassan Skaf, M.D.
14:50-15:05	Missed or maltreated cervical spine injuries- treatment options	Cüneyt Şar, M.D.
15:10-15:25	Rehabilitation for spinal cord injured patient	Müfit Akyüz, M.D.
15:30-16:00	Coffee Break	

Moderators: Yetkin Söyüncü, M.D.
F. Cumhur Öner, M.D.

16:00-16:15	Thoracic and thoracolumbar trauma - classification	F. Cumhur Öner, M.D.
16:20-16:35	Thoracic fractures (T1-T10) - treatment options	Erol Yalnız, M.D.
16:40-16:55	Thoracolumbar fractures (T11-L2) - treatment options	Erhan Sesli, M.D.
17:00-17:15	Lower lumbar (L3-L5) and sacral fractures - treatment options	Necdet Altun, M.D.
17:20-17:35	Minimal invasive posterior instrumentation for treatment of thoracolumbar fractures	F. Cumhur Öner, M.D.
17:40-17:55	Endoscopic treatment of thoracolumbar fractures	Jean-Charles Le Huec, M.D.
18:00-18:15	Treatment of late deformity due to thoracolumbar fractures	Emre Acaroğlu, M.D.
18:15-18:30	Treatment of osteoporotic fractures	Hakan Caner, M.D.
19:00	**OPENING CEREMONY**	
19:30-21:00	**Welcome Cocktail**	

PREMEETING COURSE 2

HALL A2

THURSDAY, April 14, 2005

Moderators: Şükrü Çağlar, M.D.
K. Daniel Riew, M.D.

	Degenerative Spine	Speaker
13:10-13:25	Evaluation of patients with cervical spine disorders	Önder Aydıngöz, M.D.
13:30-13:45	Anterior approach for cervical radiculopathy and myelopathy	Azmi Hamzaoğlu, M.D.
13:50-14:05	Posterior approach for cervical radiculopathy and myelopathy	Fahir Özer, M.D.
14:10-14:25	Avoidance and treatment of adjacent level disease in the cervical spine	K. Daniel Riew, M.D.
14:30-14:45	Non-fusion techniques for cervical degenerative disorders	K. Daniel Riew, M.D.
14:50-15:05	Evaluation and management of cervical instability and kyphosis	Ziya Gökaslan, M.D.
15:10-15:25	Surgical complication avoidance	Sait Naderi, M.D.
15:30-16:00	**Coffee Break**	

Moderators: Haluk Berk, M.D.
Kemal Yücesoy, M.D.

16:00-16:15	Aging spine - pathophysiology	Haluk Berk, M.D.
16:20-16:35	Algorithmic approach to low back pain	Ayhan Attar, M.D.
16:40-16:55	Lumbar disc herniation and radiculopathy- surgical treatment	Mehmet Zileli, M.D.
17:00-17:15	Lumbar spinal stenosis - surgical treatment	Selçuk Palaoğlu, M.D.
17:20-17:35	Spinal injections and other non-surgical treatment methods for low back pain	Ömür Erçelen, M.D.
17:40-17:55	Fusion techniques for Lumbar Disc Degeneration (LDD)	Ufuk Aydınlı, M.D.
18:00-18:15	Failed back syndrome-management	Kemal Koç, M.D.
18:15-18:30	Non-fusion techniques for LDD	Jean-Charles Le Huec, M.D.
19:30-21:00	**Welcome Cocktail**	

FRIDAY, April 15, 2005

HALL B2

07:50-08:00 Announcements and Welcome
by Ahmet Alanay, M.D., Congress secretary

08:00-08:30 **ICL 1**

Total enbloc spondylectomy in the treatment of metastatic spinal tumours-Indications, techniques and avoidance of complications

Speaker : Ziya Gökaslan, M.D.
Moderator : Murat Hancı, M.D.

08:30-09:10 **PANEL 1**

Anterior vs. posterior surgical treatment of cervical myelopathy-techniques, pros and cons

Moderator : Mehmet Zileli, M.D.

Anterior surgery — Ziya Gökaslan, M.D.

Posterior surgery — K. Daniel Riew, M.D.

09:10-09:40 **ICL 2**

Adult degenerative spondylolisthesis

Speaker : Ensor Transfeldt, M.D.
Moderator : Adil Surat, M.D.

Free Papers
Session 1 (09:41-10:30)
Trauma
Hall B2
Moderators: Emre Acaroğlu, M.D., F. Cumhur Öner, M.D.

09:41-09:45 **Radiographic Measurement of the Sagittal Plane Deformity in Patients with Osteoporotic Spinal Fractures: Evaluation of intrinsic error**

Ahmet Alanay, Murat Pekmezci, Emre Acaroğlu, Muharrem Yazıcı, Oğuz Karaeminoğulları, Akin Çil, Bas Pijnenburg, Yasemin Genç, Adil Surat

09:46-09:50 **Correlation between grade of pain relieve and complications of vertebroplasty in patients with osteoporotic, metastatic vertebral fractures**

Igors Aksiks, Viktors Vestermanis, Edmunds Karklins, Karlis Kupcs

09:51-09:55 **The Surgical Treatment of Thoracolumbar Vertebra Fractures by Posterior Instrumentation without Fusion**

Erhan Sesli, Murat Öztürk, Tahir Süğün, Ahmet Kara

09:56-10:02 **Floor Discussion**

10:03-10:07	**Missed thoracic spinal fractures in multiple trauma patients** Yetkin Söyüncü, Hakan Özdemir, Hazim Sekban, Feyya Akyıldız, Semih Gür, Ahmet Turan Aydın
10:08:10:12	**Upper Cervical Spine Injuries: A Review of 101 Patients** Merih İş, Mehmet Zileli, Sedat Çağlı, Özkan Ateş, Erkin Özgiray, Sertaç İşlekel
10:13-10:17	**Spinal shortening for thoracolumbar burst fractures** Mohammad El-Sharkawi
10:18-10:22	**Penetrating Spine Injuries** Sedat Çağlı, Mehmet Zileli, Özkan Ateş, Merih İş
10:23-10:30	**Floor Discussion**
10:30-11:00	**Coffee Break**
11:00-11:30	**ICL 3** **Surgical management of adult deformity** **Speaker** : Norbert Passuti, M.D., **Moderator** : Emin Alıcı, M.D.
11:30:12:30	**PANEL 2** **Three different posterior instrumentation methods in treatment of idiopathic scoliosis-efficacy, pros and cons** **Moderator** : Nafiz Bilsel, M.D. Hybrid instrumentation with wires — Nuri Erel, M.D. Hook systems — Reşat Yılmaz, M.D Pedicle screw instrumentation — Tarık Yazar, M.D.
12:30-14:00	**Lunch Break-Workshops**
14:00-14:40	**PANEL 3** **Innovative techniques in treatment of scoliosis of the growing spine** **Moderator** : Emre Acaroğlu, M.D. Growing rod instrumentation — Behrooz Akbarnia, M.D. Expansion Thoracoplasty — Muharrem Yazıcı, M.D
14:40-15:00	**ICL 4** **Osteotomies for rigid kyphotic deformities of the thoracolumbar spine** **Speaker** : Ünsal Domaniç, M.D. **Moderator** : Emre Acaroğlu, M.D.
15:00-15:30	**ICL 5** **Motion preservation-disc replacement for degenerative disorders.** **Speaker** : Rudolf Bertagnoli, M.D. **Moderator** : Mahir Gülşen, M.D.

15:30-16:00	**ICL 6** **Management of primary neoplasms of the spinal column** **Speaker** : Peter Paul Varga, M.D. **Moderator** : Mahir Gülşen, M.D.
16:00-16:30	**Coffee Break** 

Free Papers
Session 2 (16:30-18:00)
Hall B2
Deformity
Moderators: Haluk Berk, M.D., Murat Hancı, M.D

16:30-16:34	**Video assisted thoracoscopic surgery (vats) in spinal deformities: is it really minimal invasive?** Mohamed El-Meshtawy
16:35-16:39	**Single stage posterior correction for Sheuermann's kyphosis** Ali Volkan Özlük, Nikola Azar, Savaş Mutlu, Yener İnce, Yusuf Öztürkmen, Mahmut Karamehmetoğlu
16:40-16:44	**Results of One Stage Thoracoscopic Spinal Release and Posterior Osteotomies for Correction of Kyphotic Deformity in Ankylosing Spondylitis** Mohamed El-Meshtawy, Heinrich Boehm
16:45-16:51	**Floor Discussion**
16:52-16:56	**Vertebrectomy and instrumentation via posterior approach for severe sagital and frontal plane deformity** Mehmet Tezer, Çağatay Özturk, Mehmet Aydoğan, F. Erkal Bilen, M. Nuri Erdem, Azmi Hamzaoğlu
16:57-17:01	**Surgical Management of Fifty Six Difficult and Neglected Scoliosis Cases From Developing Countries** Ziad Alzoubi
17:02-17:06	**Late revision surgery in adolescent idiopathic scoliosis** Cüneyd Mızranlı, F.Erkal Bilen, Mehmet Tezer, M. Fatih Korkmaz, Uğur Işıklar, Ömer Karatoprak
17:07-17:13	**Floor discussion**
17:14-17:18	**Safety And Efficacy Of Posterior Instrumentation For Patients With Severe Congenital Scoliosis** Mehmet Ayvaz, Ahmet Alanay, Muharrem Yazıcı, R. Emre Acaroğlu, Güney Yılmaz, Adil Surat
17:19-17:23	**Anterior instrumented fusion for congenital kyphoscoliosis** Mahir Gülşen, Cenk Özkan, Cüneyt Kavak
17:24-17:28	**Surgical treatment of neglected congenital scoliosis via posterior approach** Uğur Işıklar, Mehmet Tezer, Cüneyt Mızranlı, Çağatay Öztürk, Koray Çamurdan, Ömer Karatoprak
17:29-17:35	**Floor Discussion**

17:36-17:40	**Posterior vertebrectomy in kyphosis, kyphoscoliosis and scoliosis caused by hemivertebra** Mehmet Aydoğan, Çağatay Öztürk, Mehmet Tezer, Mercan Sarıer, Abdullah Göğüş, Azmi Hamzaoğlu
17:41-17:45	**Radiographic evaluation of posterior instrumentation and fusion with allograft bone for patients with congenital scoliosis** Mehmet Ayvaz, H.Gökhan Demirkıran, Ahmet Alanay, Muharrem Yazıcı, R. Emre Acaroğlu, Adil Surat
17:46-17:50	**Floor Discussion**
17:50	**Adjourn**

Free Papers
Session 2 (16:30-18:00)
Hall A2
Degenerative Disorders
Moderators: Fahir Özer, M.D., Erkan Kaptanoğlu, M.D.

16:30-16:34	**Motion Preservation - Disc Replacement for Lumbar Degenerative Disorders with the ProDisc® Prosthesis** Rudolf Bertagnoli
16:35-16:39	**Early Results of Lumbar Disc Arthroplasty For Symptotamic Disc** Mehmet Tezer, Uğur Işıklar, M. Fatih Korkmaz, Şükrü Dilege, Abdullah Göğüş, Azmi Hamzaoğlu
16:40-16:44	**Prospective Study of Anterior Lumbar Interbody Fusion Augmentation with Posterior Pedicle Screws or Translaminar Facet Screws** Esat Kıter, Ensor Transfeldt, Amir Mehbod, Timothy Garvey, Manuel Pinto
16:45-16:52	**Floor Discussion**
16:53-16:57	**Bryan Cervical Prosthesis in Cervical Disc Herniation: Clinical and Radiological Follow-up** Roberto Assietti, Annarita Mora,Vincenzo Amato, Francesco Montemezzo, Mario Morosi
16:58-17:02	**Anterior Cervical Discectomy for One- and Two-Level Cervical Disc Disease: The Effect of Anterior Plating** Mohamed Alameldeen, Hesham Hamed, Mohamed Elshafee
17:03-17:07	**Cervical fusion results of polyetheretherketone (peek) cages** Serdar Kahraman, Mehmet Daneyemez, Altay Bedük, Hakan Kayalı, Feridun Acar, Sait Şirin
17:08-17:14	**Floor discussion**
17:15-17:19	**Posterior Lumbar Interbody Fusion Versus Posterolateral Fusion With Instrumentation in Treatment of Adult Spondylolisthesis** Mohammad El-Sharkawi, Omar Refai, Hasan Ali, Esam El-Sherif

17:20-17:24	**A comparison of three surgical techniques: cages, pedicular screws and cages, pedicular screws** Parisini Patrizio, Di Silvestre Mario, Greggi Tiziana, Cioni Alfredo, Giacomini Stefano
17:25-17:29	**Posterior Lumbar Interbody Fusion With Tricortical Iliac Bone Graft For Treating Adult Spondylolisthehis** Mohammad El-Sharkawi
17:30-17:36	**Floor Discussion**
17:37-17:41	**The Posterior Endoscopic Discectomy For the Treatment of Lumbar Disc Herniation** Mercan Sarıer, Çağatay Öztürk, M. Nuri Erdem, Abdullah Göğüş, Mehmet Aydoğan, Azmi Hamzaoğlu
17:42 - 1746	**Transarticular Medial Approach With Partial Facetectomy For Lumbar Disc herniation** Figen Aslan, Ergin Sağdaş
17:46-17:50	**Floor Discussion**
17:50	**Adjourn**

SATURDAY, April 16, 2005 — HALL B2

07:50-08:00 Announcements

08:00-09:00 **PANEL 4**

Lumbar interbody fusion techniques-pros and cons

Moderator: Ufuk Aydınlı, M.D.

ALIF + posterior augmentation	Ensor Transfeldt, M.D.
TLIF and mini TLIF	Norbert Passuti, M.D.
XLIF	Behrooz Akbarnia, M.D.

Free Papers
Session 4 (9:00-10:30)
Hall B2
Basic Science
Moderators: Selçuk Palaoğlu, M.D, Erhan Sesli, M.D.

09:01-09:05 **Effect of Vertebroplasty on the Compressive Strength of Vertebral Bodies**
Spiros George Pneumaticos, Lyndon Nguyen, John Hipp, Michael H. Heggeness

09:06 09:10 **Risk of Adjacent Vertebral Body Fractures After Balloon Kyphoplasty: A Biomechanical Study**
Ioannis Gaitanis, Christopher Cronsell, Michael Voronov, Ekaterina Khmelnitskaya, Robert Havey, Frank Phillips, Michael Zindrick, Avinash Patwardhan

09:11-09:15 **Development of Osteoporotic Vertebra Model for In-vitro Experimental Applications in Biomechanics**
Atilla Akbay, Serdar Aydın, Özgür Ilgaz, Gökhan Bozkurt, Selçuk Palaoğlu

09:16-09:22 **Floor Discussion**

09:23-09:27 **Spinal implants and radiation therapy: The effect of various configurations of titanium implant systems in the single vertebral metastasis model**
Murat Pekmezci, Bahar Dirican, Muharrem Yazıcı, Bülent Yapıcı, Ahmet Alanay, Salih Gürdallı, Lale Atahan, Adil Surat

09:28-09:32 **Comparison of Vertebral Purchase Strength For Segmental Translation of Pedicle Screws, Sublaminar Wires, Pedicle Hooks and Modified Pedicle Hooks**
Nazir Cihangir İslam, Ensor E Transfeldt, Thomas Steffen, D. Schwender, Lara Cohen

09:33-09:37 **Biomechanical Comparison of Anatomic Trajectory versus Injectable Calcium Sulfate Graft Augmented Pedicle Screw for Salvage in Cadaveric Thoracic Bone**
Alihan Derincek, Chunhui Wu, Amir Mehbod, Ensor Transfeldt

09:38-09:44 **Floor Discussion**

09:45-09:49	**Blindness increases the incidence of left sided scoliosis; a pinealectomized chicken model** Egemen Turhan, Emre Acaroğlu, Gökhan Bozkurt, Ahmet Alanay, Muharrem Yazıcı, Adil Surat
09:50- 09:54	**Anatomic Variations of Thoracic Duct and Its importance in Spine Surgery** Ömer Akçalı, Amaç Kıray, İpek Ergür, Süleyman Tetik, Emin Alıcı
09:55- 09:59	**The Effect of Pedicle Screw Placement Across the Neurocentral Cartilage on the Morphology of the Spinal Canal and Pedicle in Immature Pigs** Akin Çil, Muharrem Yazıcı, Kenan Dağlıoğlu, Üstün Aydıngöz, Ahmet Alanay, Emre Acaroğlu, Mahir Gülşen, Adil Surat
10:00-10:06	**Floor Discussion**
10:07-10:11	**Biomechanical Behavior of Anterior and Posterior Fixation of the Subaxial Cervical Spine Following Flexion Distraction Injuries** Spiros George Pneumaticos, Lyndon Nguyen, John Hipp, Ronald W. Lindsey
10:12-10:16	**Biomechanical Modelling of Intradural Pressure Alterations in Spine Trauma** Serkan Kurnaz, Ömer Akçalı, İzge Günal
10:17-10:21	**Effect of melatonin and melatonin receptors on caspase-3 and myeloperoxidase activity after spinal cord injury** Erkan Kaptanoğlu, Selçuk Palaoğlu, Özerk Okutan, İhsan Solaroğlu, Kamer Kılınç
10:22-10:26	**Metoprolol Treatment Decreases Tissue Myeloperoxidase Activity After Spinal Cord Injury in Rats** H. Beril Gök, İhsan Solaroğlu, Özerk Okutan, Behzat Çimen, Erkan Kaptanoğlu, Selçuk Palaoğlu
10:26-10:34	**Floor Discussion**
10:35-11:00	**Coffee Break**
11:00-11:30	**ICL 8** **Etiology and Treatment of Global Imbalance** **Speaker** : Courtney W. Brown, M.D. **Moderator** : Mehmet Altınmakas, M.D.
11:30-12:00	**ICL 9** **Treatment of spondylolysis and Isthmic spondylolisthesis** **Speaker:** David Bradford, M.D. **Moderator:** Azmi Hamzaoğlu, M.D.
12:00-12:30	**Presidential Guest Lecture** Adil Surat, M.D.
12:30-14:00	**Lunch-Workshops**

14:00-15:00 **PANEL 5**

Alternative surgical methods in the treatment of radiculopathy

Moderator: Ensor Transfeldt, M.D.

Microdiscectomy	Selçuk Palaoğlu, M.D.
Endoscopic diskectomy	Mehmet Tezer, M.D.
X-tube and loupe	Emre Acaroğlu, M.D.

15:00-15:30 **ICL 10**

Osteotomies of the Cervical Spine

Speaker: K. Daniel Riew, M.D.

Moderator: Fahir Özer, M.D.

15:30-16:00 **ICL 11**

Posterior dynamic instrumentation systems in avoidance of spinal fusion

Speaker: Yizhar Floman, M.D.

Moderator: Fahir Özer, M.D.

16:00 16:30 **Coffee Break**

Free Papers
Session 5 (16:30-18:00)
Hall B2
Degenerative Disorders-Miscallenous
Moderators: Mehmet Zileli, M.D., Ufuk Aydınlı, M.D.

16:31-16:35 **Pain Management: Ct Guided Percutaneous Transforaminal and Translaminar Steroid Injections**

Robert Seigel, John Whitaker

16:36-16:40 **The Associations Between Pain, Mood, Disability, Quality of Life, Trunk and Extremites Muscle Strength After Lumbar Disc Surgery**

Raziye Nesrin Demirtaş, Yasemin Kavlak, Halil Hakan Uysal, Ramazan Durmaz, Ali Aslantaş, Erhan Coşan, Metin Ant Atasoy, Fezan Şahin Doğan

16:41-16:45 **Computerized Tomography Guided Transforaminal Epidural Steroid Injection For Lumbosacral Radicular Pain In Spinal Stenosis**

Oğuz Okan Karaeminoğulları, Orçun şahin, Fatih Boyvat, Rahmi Can Akgün, Utku Gürün, Hüseyin Demirörs, Reha Nevzat Tandoğan

16:46-16:52 **Floor Discussion**

16:53-16:57 **Transarticular Medial Approach With Partial Facetectomy (TMAPF) For Foraminal stenosis and Spondylolysthesis**

Figen Aslan, Ergin Sağdaş

16:58-17:02 **Early Results of Anterior İnterbody Cage Fusion and Anterior Cervical Discectomy Without Fusion For Cervical Disc Disease**
Ömür Kasımcan, Kutay Çakıroğlu, Hülagu Kaptan, Mehmet Oğuz Kılıçarslan, Murat Çobanoğlu, Ali Rıza Özcan, Ömer Emre Yağlı, Recep Özgün, Celal Kılıç

17:03-17:07 **Radiographic Predictors of Outcome after Posterolateral Fusion and Instrumentation in the Treatment of Degenerative Lumbar Disorders**
Metin Özalay, Oğuz Karaeminoğulları, Gürkan Özkoç, Mustafa Uysal, Murat Ali Hersekli, Aytekin Karaman, Reha N. Tandoğan

17:08-17:14 **Floor discussion**

17:15-17:19 **Cauda Equina Syndrome: Early Surgery Improves Outcome**
Salman Sharif, Ejaz Aslam

17:20-17:24 **Floating discs: Should they be included in the fusion?**
Alihan Derincek, Amir Mehbod, Manuel Pinto, Ensor Transfeldt

17:25-17:29 **Prevalence of sacroiliac joint dysfunction in nonspesific chronic low back pain**
Filiz Can, Zafer Erden, Gürsoy Coşkun, Meltem Işıntaş Arık, Ahmet Alanay

17:30-17:36 **Floor Discussion**

17:37-17:41 **A New Titanium Expandable Prothesis for Vertebral Defect Replacement**
Mohamed el-Meshtawy, Heinrich Boehm

17:42-17:46 **Major surgical complications in spine surgery: Is age a significant risk factor?**
Gary Lam, Manuel Pinto, John Lonstein

17:47-17:51 **Percutaneous Transpedicular Screw Fixation (TPSF) of the thoracic and lumbar spine: Introduction of a new technique**
Mohamed El-Meshtawy

17:52-18:00 **Floor Discussion**

Free Papers
Session 5 (16:30-18:00)
Hall A2
Deformity
Moderators: Muharrem Yazıcı, M.D., Necdet Altun, M.D.

16:31-16:35 **Safety Of Posterior Segmental Instrumentation and Fusion For Dystrophic Spinal Deformity in Patients With Neurofibromatosis Type I**
Mehmet Ayvaz, Muharrem Yazıcı, Ahmet Alanay, İbrahim Akel, R. Emre Acaroğlu, Adil Surat

16:36-16:40	**Early surgical treatment for spine deformity in patients under 10 years old** Parisini Patrizio, Di Silvestre Mario, Greggi Tiziana, Cioni Alfredo, Giacomini Stefano, Bakaloudis Georgeos, Lolli Francesco
16:41-16:45	**Floor Discussion**
16:46-16:50	**Coronal and Sagittal Malalignment of the Spine Due to Total Congenital Dislocation of the Hip (CDH)** Mustafa Ağar, Bülent Dağlar, Bülent Adil Taşbaş, Kenan Bayrakçı, Alper Deveci, Uğur Günel
16:51-16:55	**Comparative study of propofol and midazolam effects on immune function and wake-up test in patients with idiopathic scoliosis** Bahar Öç, Ahmet Alanay, Fatma Sarıcaoğlu, Bilge Çelebioğlu, Emre Acaroğlu, Muharrem Yazıcı, Fugen Ersoy, Ülkü Aypar
16:56-17:00	**Floor discussion**
17:01-17:05	**Turkish SRS-22 questionnaire and minimum 10 years follow-up surgical results of ais patients classified according to lenke classification** I. Teoman Benli, Serdar Akalın, Mahmut Kış, Erbil Aydın, Bülent Ateş, Vedat Uruç
17:06-17:10	**Radiological changes in adjacent segment to fusion in adolescent idiopathic scoliosis patients and correlation with SF-36 in long term follow-up** Erdem Basoğlu, Can Koşay, Emin Alıcı, Alper Gültekin, Tolga Karcı
17:11-17:15	**Floor discussion**
17:16-17:20	**The validity of Lenke's Criteria for Defining Structural Proximal Thoracic Curves in Patients with Adolescent Idiopathic Scoliosis** Akın Çil, Murat Pekmezci, Muharrem Yazıcı, Ahmet Alanay, Emre Acaroğlu, Vedat Deviren, Adil Surat
17:21-17:25	**Behaviour of lumbar region after thoracic fusion in Lenke type 1 curves: Effects of three different types of instrumentation** Mahir Gülşen, Cüneyt Kavak, Cenk Özkan, Serdar Özbarlas
17:26-17:30	**The effect of residual lower end vertebra tilt on the outcome of surgical correction in patients with AIS** Muharrem Yazıcı, Akın Çil, Murat Pekmezci, Emre Acaroğlu, Ahmet Alanay, Vedat Deviren, Adil Surat
17:31-17:37	**Floor Discussion**
17:38-17:42	**Treatment of Lenke Type 1 curves in adolesant idiopathic scoliosis: Comparison of three different types of instrumentation** Mahir Gülşen, Cüneyt Kavak, Cenk Özkan, Serdar Özbarlas

17:43-17:47	**Comparing the results of the instrumentation of pedicle screws versus hybrid system in adolescent idiopathic scoliosis (ais) surgery** Ömer Karatoprak, Koray Unay, Nadir Şener
17:48-17:52	**Floor Discussion**
17:55-18:00	**Adjourn**
20:00-23:30	Gala Dinner

SUNDAY, April 17, 2005 — HALL B2

07:50-08:00 Announcements

Free Papers
Session 7 (08:00-09:00)
Hall B2
Basic Science
Moderators: Erol Yalnız, M.D., Ayhan Attar, M.D.

08:00-08:04 **The Effect of Partial Facetectomy vs. No Facetectomy on Vertebral Purchase of Colorado-2 Pedicle Hook**
Nazir Cihangir İslam, Thomas Steffen, Ensor E Transfeldt, James D Schwender, Lara Cohen

08:05-08:09 **Load Sharing Between Cortical and Trabecular Bone Within a Human Thoracic Vertebral Body: An In Vitro Biomechanical Study**
Cumhur Kılınçer, Serkan İnceoğlu, Moon Jun Sohn, Lisa Ferrara

08:10-08:14 **The comparison of in vitro results of surgical reconstruction with the results of computer analysis in sheep vertebra corpectomy models**
Çağatay Öztürk, Ufuk Aydınlı, Hüseyin Lekesiz, Reşat Özcan

08:15-08:21 **Floor discussion**

08:22-08:26 **Adjacent Level Spondylosis After Anterior Cervical Fusion: An Experimental Model**
Taşkın Yurtseven, Mehmet Zileli, Dilek Özenç, Deniz Nart, Ecmel Işık, Fikri Öztop

08:27-08:31 **In vitro comparison of bioresorbable and metallic cervical fusion plates in stabilizing a single-level ACDF**
Andrew L. Freeman, Alihan Derincek, Brian P. Beaubien, William D. Lew, Glenn R. Butterman, Kirkham Wood

08:32-08:36 **The effect of localization of titanium mesh cages on stability after corpectomy: a finite element analysis**
Oğuz Karaeminoğulları, Çağatay Öztürk, Ufuk Aydınlı, Hüseyin Lekesiz, Reşat Özcan

08:37-08:43 **Floor Discussion**

08:44-08:48 **Hydroxyapatite coating enhances fixation of titanium pedicle screws: a mechanical and in vivo study in a calf.**
Ömer Selim Yıldırım, Hayati Aygün, Bünyamin Aksakal, Zafer Okumuş, Ali Okur

08:49-08:53 **An Implant-Related Infection Model in Rat Spine**
Ender Ofluoğlu, Mehmet Zileli, Derya Aydın, Y. Sancar Barış, Ömer Küçükbasmacı, Nevriye Gönüllü, Önder Ofluoğlu, Halil Toplamaoğlu

08:54-09:00 **Floor Discussion**

09:00-09:30 **ICL 12**

Management of sacral tumours

Speaker: Mehmet Zileli, M.D.

Moderator: Mahir Gülşen, M.D.

09:30-10:30 **PANEL 6**

Advances in treatment of spinal infections

Moderator: Selçuk Palaoğlu, M.D.

Tuberculosis	Osman Güven, M.D.
Non-spesific infections	Serdar Akalın, M.D.
Postoperative infections	Can Koşay, M.D.

Free Papers
Session 8 (10:30-12:20)
Hall B2
Infection-Miscallenous-Tumour
Moderators: Teoman Benli, M.D., Sedat Çağlı, M.D.

10:31-10:35 **Anterior instrumentation in tuberculosis spondylitis. The results of minimum 5 years follow-up**
İ. Teoman Benli, Serdar Akalın, Ahmet Alanay, Bülent Ateş, Erbil Aydın

10:36-10:40 **Brucellar Spondylodiscitis of the Spine**
Özkan Ateş, Mehmet Zileli, Sedat Çağlı, Süleyman Çaylı, Sertaç Merih, İş İşlekel

10:41-10:45 **Floor Discussion**

10:46-10:50 **Using Perceptions of Pain Severity in a General Population to Normalize VAS Pain Reports**
Robert L. Kane, Boris Bershadsky, Todd Rockwood, Khaled Saleh, Nazir Cihangir İslam

10:51-10:55 **Posterolateral approach for posterior stabilization, fusion and transforaminal interbody fusion in lumbar spine**
Ufuk Aydınlı, Burak Akesen, Mehmet Karakayalı, Ayvaz Bakunov, Çağatay Öztürk

10:56-11:00 **Early results of new techniques of minimal invasive methods: Percutaneous instrumentation and percutaneous interbody fusion**
Mahir Gülşen, Cenk Özkan, Sunkar Biçer, Cüneyt Kavak

11:01-11:05 **Effect of Adding Interspinous Wiring to the Post. Spinal Implants in the Surgical Treatment of Thoracolumbar fractures with Ruptured Posterior Ligament Complex**
Erhan Sesli, Tahir Sadık Süğün, Ahmet Duran Kara, Murat Öztürk

11:06-11:14 **Floor Discussion**

11:15-11:19 **Controllable factors on duration of surgery and blood loss in anterior spine surgeries**
Necdet Sağlam, Osman Ekinci, İlhan Ocak, Nazir Cihangir İslam

11:20-11:24	**Controllable factors on duration of surgery and blood loss in posterior spine surgeries** Necdet Sağlam, Osman Ekinci, İlhan Ocak, Nazir Cihangir İslam
11:25-11:29	**Floor Discussion**
11:30-11:34	**The Management of cervicomedullary Compression in Patients with Congenital and Acquired osseous-ligamentous Pathologies; Analysis of 26 patients** Kadir Kotil, Mustafa Akçetin, Turgay Bilge, Necmettin Güzel
11:35-11:39	**Os Odontoideum: A Review of 10 Patients** Erkin Özgiray, Mehmet Zileli, Sedat Çağlı, Sertaç İşlekel, Merih İş, Özkan Ateş
11:40-11:46	**Floor Discussion**
11:47-11:51	**Primary Tumors of the Cervical Spine: A Review of 35 Surgically Managed Cases** Mehmet Zileli, Cumhur Kılınçer, Sedat Çağlı, Yusuf Erşahi
11:51-11:55	**Aneurysmal Bone Cysts of the Spine** Sedat Çağlı, Mehmet Zileli, Merih Iş, Özkan Ateş
11:55-11:59	**Floor Discussion**
12:00-12:04	**Current Treatment of metastatic spinal tumors** Mehmet Tatlı, Aslan Güzel
12:05-12:09	**Reconstruction with Chest tube-PMMA in Metastatic Tumors of the Vertebra** Utku Kandemir, Mehmet Ayvaz, Ahmet Alanay, Muharrem Yazıcı, İbrahim Akel, R. Emre Acaroğlu, Adil Surat
12:10-12:14	**Total Spondylectomy for a Cervical Spine Tumor** Mehmet Zileli, Sedat Çağlı, Özkan Ateş, Merih İş
12:15-12:20	**Floor Discussion**
12:20-12:30	**CLOSING CEREMONY** **Announcement of Award Winners**

REHABILITATION OF SPINAL DISORDERS

Guest Lecturers : Ina Diener, P.T.
Stephen May, P.T.
Andry Vleeming, M.D.

PROGRAMME

THURSDAY, April 14, 2005 — HALL A 10

13:10-13:30	**Opening Address** Filiz Can
13:30-13:50	**Biomechanics of the lumbar spine** Zafer Erden
13:50-14:00	**Discussion** Zafer Erden
14:00-14:20	**The role of neural tissue movement in pain** Ina Diener, P.T.
14:20-14:30	**Discussion** Ina Diener, P.T.
14:30-15:15	**Examining and mobilising the peripheral neural system in spinal pain disorders- current concepts** Ina Diener, P.T.
15:15-15:25	**Discussion** Ina Diener, P.T.
15:30-16:00	**Coffee Break** 

FRIDAY, April 15, 2005 — HALL A 10

09:15-09:35	**European guidelines on pelvic girdle pain and its consequences** Andry Vleeming, M.D.
09:35-09:45	**Discussion** Andry Vleeming, M.D.
09:45-10:05	**Prevelance of mechanical classification syndromes in McKenzie system** Stephen May, P.T.
10:05-10:15	**Discussion** Stephan May, P.T.
10:30-11:00	**Coffee Break**
11:10-11:30	**General principles of treatment in McKenzie system** Filiz Can
11:30-11:40	**Discussion** Filiz Can
11:40-12:00	**Ergonomical principles of the spine** Mine Uyanık
12:00-12:10	**Discussion** Mine Uyanık
12:10-14:00	**Lunch**
14:00-14:45	**Workshop: Movement stability and low back pain: the specific role of the pelvis** Andry Vleeming, M.D.
14:45-15:00	**Discussion** Andry Vleeming, M.D.
15:00-15:45	**Workshop: Lumbar spine treatment with McKenzie system** Stephan May, P.T.
15:45-16:00	**Discussion** Stephan May, P.T.
16:00-16:30	**Coffee Break**
16:30-17:15	**Workshop: Cervical spine treatment with McKenzie system** Filiz Can
17:15-17:30	**Discussion** Filiz Can

7th INTERNATIONAL CONGRESS ON SPINE

APRIL 14-17, 2005

ANTALYA – TURKEY

SCIENTIFIC PROGRAMME ABSTRACTS

O01

The Effect of Partial Facetectomy vs. No Facetectomy on Vertebral Purchase of Colorado-2 Pedicle Hook

NAZİR CİHANGİR İSLAM (Haydarpaşa Numune Hospital, Turkey),
THOMAS STEFFEN, ENSOR E TRANSFELDT,
JAMES D SCHWENDER, LARA COHEN

INTRODUCTION: Partial facetectomy can improve the seating of the hook on the pedicle by different ways. The recommended pedicle hook placement in Colorado-2 system is without facetectomy. There is no biomechanical study in the literature comparing the strength of hook/laminar interface between the partial facetectomy and no facetectomy in the Colorado-2 pedicle hook (C2PH) design against 45 degrees posterolateral pull-out force.

MATERIAL&METHODS: T4, T5, T8 and T9 levels of 5 fresh frozen human cadavers were instrumented with C2PH. Half of the implant sites were undergone to facetectomy. The potted specimens, embedded in U shaped metal profile filled by PMMA, were mounted with a 45 degrees of angle to the lower platform of MTS Mini Bionix Model Machine and a pull-out force 45 degrees posterolateral to the specimen was applied by the upper arm of the MTS machine. The lower platform was blocked and the upper arm permitted only for hinge movement between the rod and instrument during the posterolateral pull-outs.

RESULTS: All of the no facetectomy cases (100%) showed gap between pedicle and the hook and medialization in the x-rays. Half (%50) of the facetectomy cases showed ideal seating while the others (%50) showed some medialization or gap. The failure forces and failure patterns of no facetectomy (609N) and facetectomy (636N) groups were quite similar. But a trend of difference appeared when the ideally seated facetectomy group (778N) compared with the other cases (493N) of this group ($p<0.1$).

CONCLUSION: Facetectomy can reduce the strength of the lamina in cases which the hook does not seat ideally. This effect probably due to destruction of the integrity of the lamina and facetectomy can become a risky procedure if the hook misses the pedicle. But facetectomy can facilitate the ideal seat of the pedicle hook onto the pedicle in Colorado-2 pedicular hooks and contribute more strength even without using any additional tools.

O02

Comparison of Vertebral Purchase Strength For Segmental Translation of Pedicle Screws, Sublaminar Wires, Pedicle Hooks and Modified Pedicle Hooks

NAZİR CİHANGIR İSLAM (Haydarpaşa Numune Hospital, Turkey),
ENSOR E TRANSFELDT, THOMAS STEFFEN, D. SCHWENDER, LARA COHEN

INTRODUCTION: Anchoring of pedicle hooks to the lamina provides improved stability and increased pull-out strength. Studies compared anchored pedicle hooks to standard pedicle hooks as well as pedicle screws against posteriorly directed pull-out force. However, scoliosis correction creates a posterolateral resultant force. The goal of this study was to perform mechanical testing simulating the posterolateral force created with the translational correction of scoliosis.

METHODS: After the measurement of BMD, 26 fresh frozen human cadavers were instrumented with Colorado Pedicle Hook (CPH), CPH-Staple (CPHS), USS-Pedicle Hook (USSPH), Colorado Pedicle Screw (CPS), and Luque Sub-Laminar Wire (LSLW) in the unconstrained but only the hooks were used in the constrained study. Pull-outs were performed in 45° posterolateraly with MTS Mini Bionix Model Machine. The lower platform was free in all movements in horizontal plane in unconstrained but blocked in constrained part of the study. The upper arm restricted only rotation in the unconstrained but permitted only for hinge movement in the constrained part of the study.

RESULTS: LDCs of CPH and CPHS showed similar characteristics as observed in CPS and USSPH. Differences in failure forces among CPHS (430+/-118), USSPH (603+/-328), and CPS (592+/-293) were insignificant, however, LSLW (788+/-290) and CPH (175+/-93) were significantly different from others in unconstrained part of the study. In the constrained part, no difference was observed between CPHS (442+/-164) and USSPH (560+/-213). Only CPH (288+/-189) increased its strength.

CONCLUSION: The LDCs of CPH and CPHS show that the latter keeps its hook properties but increases its strength with addition of the staple. Behavior of USSPH resembles CPS. While CPHS and USSPH were showing significantly higher strength than CPH, especially during the unconstrained pull-outs, they also kept their strength in constrained system. CPH and CPHS never violated the neural structures.

O03

Risk of Adjacent Vertebral Body Fractures After Balloon Kyphoplasty: a Biomechanical Study

IOANNIS GAITANIS (Loyola University, Unidet States),
CHRISTOPHER CRONSELL, MICHAEL VORONOV, EKATERINA KHMELNITSKAYA, ROBERT HAVEY, FRANK PHILLIPS, MICHAEL ZINDRICK, AVINASH PATWARDHAN

INTRODUCTION: This biomechanical study investigated the incidence, location, morphology, and load required to create subsequent VB fractures adjacent to balloon kyphoplasty.

METHODS: Ten fresh human thoracolumbar specimens (9F/1M), mean age 78±8.9yrs, each consisting of 5 adjacent vertebrae were used. BMD was measured. VB cortices were instrumented with strain gauges. After cancellous bone disruption in the middle VB, the specimens were compressed under follower load until a fracture was observed with >25% anterior height loss. Fracture reduction was performed by balloon kyphoplasty under a physiologic preload of 250N. After bone cement hardening the specimen was recompressed until an adjacent fracture was observed either on video fluoroscopy or detected as discontinuity in the strain gauge data. The vertebral kyphosis after the initial fracture and after balloon kyphoplasty, the location and morphology of the adjacent fracture, and fracture load were recorded.

RESULTS: The initial VCF increased the vertebral kyphosis (6.2°vs.18°, $p<0.01$). Balloon kyphoplasty significantly corrected the VB deformity; however, the residual kyphosis remained larger than the intact value (6.2°vs.11°, $p<0.01$). The adjacent VB fracture occurred above the initial VCF in six specimens, and below in four. The mean fracture load was 698±328N. The BMD of the adjacent fractured VB was smaller than un-fractured VB (99.0 vs. 119 mg/cc, $p<0.05$). Macroscopic examination showed four specimens with endplate depression and cortical wall fractures, three with only endplate depression, and three with only cortical wall fractures.

DISCUSSION: Fracture load for VB adjacent to kyphoplasty appears to be much smaller compared with that reported for the first VCF in osteoporotic spines. Low BMD was a strong risk factor for location of subsequent fractures. The residual kyphosis and bone cement augmentation may also contribute to increased stress at adjacent levels, increasing the risk of subsequent fractures

O04

Biomechanical Comparison of Anatomic Trajectory Versus Injectable Calcium Sulfate Graft Augmented Pedicle Screw for Salvage in Cadaveric Thoracic Bone

ALİHAN DERİNCEK (Twin Cities Spine Center, United States), CHUNHUI WU, AMIR MEHBOD, ENSOR TRANSFELDT

INTRODUCTION: There are many ways to salvage pedicle screws such as using larger and/or longer size pedicle screws, augmentation or inserting screws in a different trajectory. Although polymethylmethacrylate immediately increases the construct stiffness, it may cause bone necrosis, toxin relaxation and/or neural injury. On the other hand, calcium sulfate bone grafts have a high potential for biologic incorporation and no thermal damage effect. The anatomic trajectory technique can use both primary and revision procedures. The object of this study is to compare the biomechanical performance of the two pedicle screw revision techniques in order to assist in clinical decision making.

MATERIAL AND METHODS: Polyaxial pedicle screws were first inserted with a straight forward approach on both sides of 17 fresh human cadaveric thoracic vertebrae. The maximal insertion torque (MIT) for each screw was measured and then axial pull-out strength (POS) were recorded. Afterwards, these pedicle screws were randomly assigned to be replaced either by calcium sulfate graft augmentation or anatomic trajectory for salvage. The graft augmented screws were placed utilizing the previous holes. Finally, MIT and POS of the revision screws were recorded.

RESULTS: The mean MIT decreased with the anatomic trajectory salvage technique when compared to the straight forward approach, 0.23 Nm vs 0.38 Nm, respectively ($p=0.003$). The anatomic trajectory revision resulted in decreased POS when compared to the POS of the straight forward, 297 N vs 469 N, respectively ($p=0.003$). The graft augmentation increased the POS when compared to the POS of the straight forward, 680 N vs 477 N, respectively ($p=0.017$). The mean POS ratio of revised screw to original was 0.71 for anatomic trajectory screws and 1.8 for graft augmented screws ($p=0.002$).

CONCLUSION: This study demonstrated that graft augmented pedicle screw achieved better POS than the anatomic trajectory technique in cadaveric thoracic spine.

O05

Metoprolol Treatment Decreases Tissue Myeloperoxidase Activity After Spinal Cord Injury in Rats

H. BERİL GÖK (Ankara Atatürk Research Hospital, Turkey), İHSAN SOLAROĞLU, ÖZERK OKUTAN, BEHZAT ÇİMEN, ERKAN KAPTANOĞLU, SELÇUK PALAOĞLU

INTRODUCTION: Neutrophil infiltration has been reported to play an important role in spinal cord injury (SCI). In addition to their cardioprotective effects, beta-blockers have been found to have neuroprotective effects on central nervous system. In the current study, the authors investigated the effect of metoprolol on myeloperoxidase (MPO) activity, a marker of neutrophil activation, in spinal cord after experimental traumatic injury in rat.

MATERIALS AND METHODS: Rats were divided into six groups. Controls (1) received only laminectomy. The sham operated group (2) received laminectomy and spinal cord samples were taken at 4 hr of laminectomy. The trauma only group (3) underwent 50-g/cm contusion injury with no medication. Groups 4, 5, and 6 received 30 mg/kg methylprednisolone, 1 mg/kg metoprolol, and 1 mL saline, respectively. All the medications were given intraperitoneally as a single dose, immediately after trauma. Spinal cord samples were taken at 4 hr of trauma and studied for MPO activity.

RESULTS: The results showed that tissue MPO activity increased after injury. Both metoprolol and methylprednisolone treatments were decreased MPO activity indicating that reduction in neutrophil infiltration in damaged tissue. The effect of metoprolol on MPO activity was found to be similar to the methylprednisolone.

CONCLUSION: Metoprolol showed neuroprotection property after contusion injury to the rat spinal cord by decreasing MPO activity. Further studies are required to identify the protective effect of metoprolol after spinal cord injury.

O06

Load Sharing Between Cortical and Trabecular Bone Within a Human Thoracic Vertebral Body: An in Vitro Biomechanical Study

CUMHUR KILINÇER (Trakya University, Turkey), SERKAN İNCEOĞLU, MOON JUN SOHN, LISA FERRARA

INTRODUCTION: The vertebra has a composite structure, composed of trabecular centrum surrounded by cortical shell. The cortical and trabecular components share the load when the vertebra undergoes axial loading. The issue of load sharing between the centrum and shell of the vertebral body and its relevance to age related fractures is poorly understood and published results are contradictory.

MATERIAL and METHODS: Seven cadaver spines including T5-T12 levels were used for this study. Each vertebrae was separated and surrounding musculature was removed. Each corpus was separated from its posterior elements and cleaned using alcohol and ether for strain gauge application at the mid level of the vertebral body. Four uniaxial strain gauges were attached to the cortex in parallel to the longitudinal axis of each vertebra. Each vertebra was placed in MTS Allience RT/10 materials testing machine and exposed to compressive load. The testing is repeated with different loads (200-400-600 N) and speeds (1-5-10-25 mm/sec). After intact testing, trabecular bone was removed in a step-wise fashion [25%, 50%, 75%, and 100% of the trabecular bone (TB)] through a window at the bottom end-plate. All tests were repeated after each step. Using the strain data from "100% TB removal" the percentage of the load at the cortical bone was calculated for each condition.

RESULTS: The strain recorded from the cortex increased steadily as the TB was removed gradually. Although load sharing rate showed some changes for different levels, loads, and speeds; approximately 40-45% of the total load was experienced by cortex in a intact vertebra. The effects of level, osteoporosis and testing conditions on the load sharing were analysed using statsitical methods.

CONCLUSIONS: Results suggested that the cortical bone took almost 40-45% of the total axial load acting upon a vertebra. Moreover, this percentage did not show significant change even though the trabecular bone vanished 50%.

O07

Spinal Implants and Radiation Therapy: The Effect of Various Configurations of Titanium Implant Systems in the Single Vertebral Metastasis Model

MURAT PEKMEZCİ (Hacettepe University, Turkey), BAHAR DİRİCAN, MUHARREM YAZICI, BÜLENT YAPICI, AHMET ALANAY, SALİH GÜRDALLI, LALE ATAHAN, ADİL SURAT

INTRODUCTION: Combination of surgery and radiotherapy is a common clinical practice in management of spine

tumors. Although it is known that metallic implants disturb radiotherapy beams, it has been a mystery how these disturbances reflect in case of spinal irradiation in the presence of a spinal implant. The aim of this study is to investigate the effect of various spinal implant combinations on the radiotherapy dose in a vertebra metastasis model.

MATERIALS AND METHODS: Standard saw bones and the following implant combinations were used, posterior instrumentation with or without anterior column titanium cage reconstruction, anterior instrumentation and anterior column reconstruction with titanium cage or bone cement. 60Co and LINAC irradiation was performed twice and thermoluminescent dosimeters were used to measure the dose changes at the spinal canal.

RESULTS: The posterior instrumentation models resulted in 5 to 7 % decrease in the radiation dose delivered to the spinal canal at all energy levels, whereas the anterior instrumentation systems resulted in <1% decrease with LINAC, and <2% increase with 60Co irradiation. When the center of the spinal canal was evaluated individually, the anterior instrumentation with cement reconstruction model resulted in 5,5% increase in the delivered radiation dose with 60Co irradiation, whereas, other instrumentation models with both energy levels resulted in a dose disturbance of <1%.

CONCLUSIONS: Our results demonstrate that spinal implants have variable dose perturbation effects depending on the spinal implant construct and energy level of the radiotherapy beam. The majority of these changes are statistically different from implant-free irradiation, but the clinical significance of these changes is questionable. However, in order to stay on the safe side, anterior instrumentation with anterior titanium cage reconstruction system, which has the least dose perturbation effect, should be the implant of choice.

O08

The Effect of Pedicle Screw Placement Across the Neurocentral Cartilage on the Morphology of the Spinal Canal and Pedicle in Immature Pigs

AKIN ÇİL (Hacettepe University, Turkey), MUHARREM YAZICI, KENAN DAĞLIOĞLU, ÜSTÜN AYDINGÖZ, AHMET ALANAY, EMRE ACAROĞLU, MAHİR GÜLŞEN, ADİL SURAT

INTRODUCTION: Transpedicular fixation has been less commonly applied to pediatric population especially because of the risk of damage of the NCC. The aim of this study is to investigate the effects of pedicle screw insertion on spinal canal and pedicle morphology in immature pigs, and if transpedicular fixation has an effect, to document whether this occurs due to inhabitance of the screw inside the growth plate (neurocentral cartilage-NCC) or due to compression applied across the NCC.

MATERIALS AND METHODS: Twelve newborn pigs (4-6 weeks of age) were operated. Left sided pedicles from L1 to L5 were studied, while right sides served as controls. Pigs were randomly assigned into 3 groups: I; Pedicles were probed only. II; Screws were inserted. III: After screw insertion, a washer and a nut were engaged at the pedicle entry point so that gradual compression across the NCC was achieved. After 4 months, spiral CT was used to measure the pedicle lengths, and size of the halves of the spinal canal.

RESULTS: In group I, the operated hemicanal area was not statistically different from the nonoperated side ($p=0.159$). Pedicle screw insertion either with ($p=0.007$) or without ($p=0.005$) compression resulted in smaller hemicanal area and shorter pedicles at the operated side, respectively ($p=0.008$ and $p=0.021$). Approximately %4-9 shortening of the pedicle lengths, and %20-26 narrowing of the hemicanal areas on the instrumented side occured with transpedicular instrumentation (Group II, III).

CONCLUSION: Even without compression, pedicle screws passing through the NCC in immature pigs disturb spinal canal growth significantly. Clinical relevance for young children should be further studied.

O09

Biomechanical Modelling of Intradural Pressure Alterations in Spine Trauma

SERKAN KURNAZ (Dokuz Eylül University, Turkey), ÖMER AKCALI, İZGE GÜNAL

INTRODUCTION: The severity of biomechanical instability in spine traumas may affect the neurologic status, however, the relationship between neurologic and biomechanical instability is still controversial. The aim of this study was to detect intradural pressure alterations under fixed loadings in a spine model with biomechanical instability, and thus to evaluate the concept of neurologic instability from a different perspective.

Materials and methods :Nine sheep lumbar spine segment (L1 to L5) were tested. Spine segments were freed from the muscles and a transducer catheter was placed into the subarachnoid space. Intradural space was filled with radio opaque dye and both ends of the dura were closed with knots. The catheter was connected to the pressure measurement monitor. A special biomechanical testing device was designed for this study. The samples were loaded with 400 Newton (physiologic loading) under flexion, extension, right and left side bendings. Interspinous and intervertebral disc space heights and intradural pressure alterations were recorded. All measurements were repeated after left facet joint, right facet joint, and disc excisions, respectively. During testing, two examples were out of the study because of the dural tears. The results of the seven segments were compared with the Wilcoxon and Friedman tests for statistical analysis.

RESULTS: Under flexion and side bendings, there were no differences of intradural pressure alterations between intact spine, one or two facet joint excision, and the spine with three elements removed. However, under extension loading, an increase in intradural pressure was recorded ($p=0.018$). This pressure alteration was more prominent in intact spine.

CONCLUSION: Injuries of the spine elements may cause alterations of intradural pressure during physiologic movements. The clinical studies are needed to outline the relation of these pressure alterations with neurologic injuries.

O10

Anatomic Variations of Thoracic Duct and its Importance in Spine Surgery

ÖMER AKÇALI (Dokuz Eylül University, Turkey), AMAÇ KIRAY, İPEK ERGÜR, SÜLEYMAN TETİK, EMİN ALICI

Intruduction:The evaluation of the anatomic features of the thoracic duct may be important for spine surgery because iatrogenic or traumatic injuries are reported. Anatomic studies are only few and morphology of the thoracic duct is still unclear. The aim of this study was to evaluate the anatomic variations of the thoracic duct.

MATERIALS AND METHODS: Nine thoracic ducts were dissected from formaldehyde-preserved male cadavers. The drainage patterns, ductus diameter in upper-mid and lower thoracic segments, tributaries and morphology of cisterna chili were determined. The position of thoracic duct in respect to the vertebra and the relationships with the azygos vein were ascertained. Means and standard deviations were used as descriptive measures to define variations.

RESULTS: Thoracic duct was detected in all cases. Main tributaries were located at the upper (T4-6) and lower (T10-12) thoracic segments. In all cases, thoracic duct was located in the midline at the thoracolumbar junction, however, at the upper part, it was tend to place slightly left side of the anterior longitudinal ligament. Two major anatomic variations were detected in thoracic duct. Thoracic ducts were superficial according to the azygos vein, but in one case, a major tributary was placed under the azygos vein. Eight of nine cadavers had cisterna chili. It was placed at T12-L1 junction and generally located at the midline.

CONCLUSION: Two different anatomic variations were detected. The location and the anatomic variations of the thoracic duct may complicate the anterior surgery and these variations should be considered.

O11

Adjacent Level Spondylosis After Anterior Cervical Fusion: An Experimental Model

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OBJECTIVE: Adjacent level spondylosis is a major inconvenience of the fusion after anterior cervical discectomy. Animal models for adjacent level spondylosis is lacking in the literature. This study is planned to develope an animal model of adjacent level spondylosis.

METHOD: 64 white rabbits underwent anterior cervical surgery. Ten rabbits are sacrificed for morphometric measurements to produce a plate system. 20 rabbits underwent anterior discectomy at C3-C4 level and a plate with two screws at C3 and C4 bodies was placed (Group A). 20 rabbits had discectomy at C3-C4 and C4-C5, and a plate was placed at C3, C4 and C5 bodies (Group B). 14 rabbits had sham operations without discectomy or fixation (Group C). All groups are divided into two subgroups: one is sacrificed 6 months and the other subgroup is sacrificed 12 months after surgery. Whole cervical spine is excised and fixed in 10% formaline solution. Upper and lower segments of the fixation levels were examined according to Miyamoto Classification in a blind fashion and a five Grade scaling system was used.

RESULTS: All animals having plate fixations showed significant fusion at discectomy levels and different grades of adjacent level spondylosis. One or two level plate fixation did not cause significant difference of upper or lower disc levels in 6 month evaluations. The number of Grade 3 & 4 degeneration was 16,7% in Group A1, 11,1% in Group A2, 18,8% in Group B1 and 42,9% in Group B2 ($p<0.05$). Pathological grading of animals with two level discectomy and plate fixation at 12 months showed significantly more spondylosis in adjacent levels than 6 months evaluation and one level fixation.

CONCLUSION: This study describes a reproducible animal model for adjacent level spondylosis after ACDF and plate fixation. Animals with two level fixation and 12 month follow-up had significantly more severe degeneration at adjacent levels, than 6 month evaluations and than animals with one lone level plate fixation.

012

The Comparison of in Vitro Results of Surgical Reconstruction with the Results of Computer Analysis in Sheep Vertebra Corpectomy Models

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INTRODUCTION: The reconstruction of corpectomy defect is essential to restore biomechanical stability of the vertebral column. This study aims to compare the reconstruction methods made by bone cement and chest tube together with bone cement in terms of stability against axial compressive loading; to make the same experiments by using finite element analysis.

MATERIALS AND METHODS: There were 10 sheep lumbar 4-6 vertebral unit in each three group. Group 1 served as control and L5 corpectomy defect was reconstructed with bone cement only in group 2 and with chest tube (silastic tube) and bone cement in group 3. Axial compressive loads were applied to specimens and failure points were recorded. The same measurements were made by using finite element analysis of L4-6 spinal unit by static analysis.

RESULTS: In vitro failure points were meanly 8490 N for group 1, 3762 N for group 2 and 5788 N for group 3. There were statistical differences between each group ($p<0.05$). In finite element analysis, the average tension was 200 MPa in group 1, 93.3 MPa in group 2 and 25.2 MPa in group 3.

CONCLUSION: Finite element analysis showed the exact effects of axial compressive loadings in two different corpectomy + reconstruction methods. We conclude that finite element analysis can be used instead of the human cadaver studies and provide many different test options by using the same model.

O13

The Efect of Localization of Titanium Mesh Cages on Stability After Corpectomy: A Finite Element Analysis

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INTRODUCTION: The reconstruction of corpectomy defect is essential to restore biomechanical stability of the vertebral column. This study aims to compare the finite element models in which corpectomy defects were reconstructed by titanium mesh cages placed anterior, middle and posterior one-third of the vertebral corpus.

MATERIALS AND METHODS: By help of computed tomography images of sheep vertebra, a three level computer model of L4-L6 spine was created and L5 corpectomy was performed. Titanium mesh cages were placed in anterior 1/3in one model, middle and posterior 1/3 in the others.

RESULTS: The average tension values were meanly 320 MPa for anteriorly placed model, 124MPa for middle and 45 MPa for posteriorly placed models respectively.

CONCLUSION: Finite element analysis showed the exact effects of axial compressive loadings in three different corpectomy-reconstruction models. The posterior placement of titanium mesh cage increases the axial stability and decreases the force transfer to the distal segments.

O14

Hydroxyapatite Coating Enhances Fixation of Titanium Pedicle Screws: A Mechanical and in Vivo Study in a Calf.

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INTRODUCTION: Previous studies showed that hydroxyapatite (HA) coatings improve fixation of stainless steel pedicle screws, with increased pull-out resistance and reduced risk of loosening. To our knowledge in this area only few HA coatings took place on titanium pedicle screws. However, the coating method used were plasma spray. Due to disadvantagous of this method we used sol-gel method.

MATERIALS AND METHODS: An experimental study was performed to investigate the effects of HA coating on titanium pedicle screws . For this the torque resistance in a calf for uncoated and coated screws were evaluated.

The study was approved by the Ataturk University regional ethical committee for animal experiments. An eight month old male calf (120kg) used in this study. Surgical procedure was performed under aseptic conditions and assisted general anesthesia. A calf were operated in order to implant the pedicle screws at T10-13 and L1-3 segments. Totally fourteen pedicle screws, which were seven HA coated, and seven uncoated were inserted in pedicle overall seven vertebral segment. Each segment had two pedicle screws in which one in the right, with uncoated, and the other in left side, coated by HA. The animal was pharmacologically euthanized 4 months later. The insertion and extraction torques were recorded using the same torque gauge manometer having a range of 25–500 Ncm (Torsiomax 775/50).

RESULTS: The mean insertion torque was found as 80.7±46Ncm for the HA-coated screws and 117.8±46Ncm for standard uncoated screws. The mean extraction torque of HA coated was found to be as 246.4±36Ncm which was significantly greater than uncoated screws 85±23 Ncm. The differences in extraction torque was significant ($p<0.001$). Histopathologic examination showed affluent new bone formation around HA-coated screws compared with uncoated screws.

RESULTS: HA coating of titanium pedicle screws by sol gel method resulted improved fixation with increased torque resistance and reduced risk of risk of screw loosening.

O15

Blindness Increases the Incidence of Left Sided Scoliosis: A Pinealectomized Chicken Model

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STUDY DESIGN: Randomized prospective study using experimental scoliosis model in pinealectomized chicken.

OBJECTIVES: To investigate the effect of the side of visual impairment on the incidence and laterally of the curves on a pinealectomized chicken model.

METHODS: Sixty newly hatched white leghorn chicks were divided equally into three study groups of no visual impairment (n=20) (group 1), left sided blindness by enucleation (n=20) (group 2), and right sided blindness (n=20) (group 3). Pinealectomies and enucleations were performed on the 2nd day after hatching. AP X-rays were obtained on the 5th and 10th weeks, and the incidence, side and magnitude of the resulting scoliotic curves were recorded.

RESULTS: Pinealectomy model yielded a general scoliosis incidence of 60%. The occurrence of scoliosis was not different between the groups (65%, 55%, 60% respectively, p=0.812). The incidences at 5th and 10th weeks were both 40%, due to the death of six chicken between the 5th and 10th weeks, as well as the appearance or disappearance of curves in this time period, again not different between the groups. The laterality of the curves however, was significantly different (p=0.045). The visually impaired groups tended to have left thoracic curves as frequently as the right thoracic curves (7 R, 4 L in Gr. 2: and 7 R, 6 L in Gr. 3), whereas in group 1, the thoracic curves were predominantly right sided (12 R, 1 L). The average magnitude of the curves was 30.47±19.32 deg., not significantly different between the groups (27.6±16.7 deg, 23.7±21.5 deg, 39.8±17.7 deg respectively, p=0.109).

CONCLUSIONS: Unilateral visual impairment does not have a significant effect on the overall incidence and magnitude of scoliosis in pinealectomized chicken. It does affect the laterality of the curves though, visually impaired subjects having a significantly higher likelihood of left thoracic curves, regardless of the side of blindness.

O16

Biomechanical Behavior of Anterior and Posterior Fixation of the Subaxial Cervical Spine Following Flexion Distraction Injuries

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PURPOSE: To compare the stability of anterior cervical locking plates with interbody fusion alone and in combination with either lateral mass constructs, or posterior interspinous wiring.

METHODS: Eight een fresh frozen cervical spines were tested sequentially with the application of an axial load with flexion-extension and lateral bending moment arms. Measurement of the relative motion of the C4-5 segment in both the axial and sagittal planes was facilitated by the use of metal markers. Each specimen was tested intact, following sectioning of anterior and posterior soft tissues, after anterior plate fixation and interbody fusion and with augmentation with lateral mass fixation or posterior interspinous wiring.

RESULTS: Intact specimens had an average range of motion of 5.78 +/- 2.49 degrees, whereas the destabilized spines averaged 16.17 +/- 2.17 degrees. No statistically significant differences were found between specimens with only anterior plate fixation 1.84 +/- 0.85 degrees, with addition of posterior plating 1.66 +/- 2.16 degrees, or with addition of posterior interspinous fixation 0.73 +/- 0.51 degrees. However, there was a statistically significant difference between the intact specimens and both groups which included posterior fixation along with anterior plate fixation. In addition, all groups with either anterior plating alone or with the addition of posterior fixation showed a statistically significant difference when compared to the destabilized specimens.

CONCLUSION: Anterior plating and interbody fusion at the C4-5 motion segment following flexion-distraction injuries significantly increases the motion segment stability, and is comparable to supplemental posterior plating or interspinous wiring augmentation.

O17

Effect of Vertebroplasty on the Compressive Strength of Vertebral Bodies

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PURPOSE: To compare the effect of vertebroplasty on the compressive strength of unfractured vertebral bodies.

METHODS: Four cadaveric thoracic spines were used for this experiment, for a total of forty vertebral bodies. Prior to testing, each thoracic spine was submitted to bone density testing and radiographic evaluation to rule out any obvious fractures. Under image intensification, six cc of a mixture of polymethylmethacrylate (PMMA) with barium (8 g of barium per 40 g of PMMA) was injected into every other vertebral body of each spine specimen. Following vertebroplasty, all soft tissues were dissected from the spine and the vertebral bodies were separated and potted into circular frames to allow for mechanical testing. Testing to failure was performed using a combination of axial compression and anterior flexion moments. Two pneumatic cylinders applied anterior and posterior loads at a distance ratio of 4:3 relative to the anterior vertebral body wall while two additional cylinders applied lateral loads, each at a constant rate of 200 N/s.

RESULTS: Average failure loads for non-vertebroplasty specimens was 6724.02 +/- 3291.70 N, whereas the specimens injected with PMMA failed at an average compressive force of 5770.50 +/- 2133.72 N. No statistically significant difference in failure loads could be found between intact specimens and those which had undergone vertebroplasty.

CONCLUSION: We were surprised to note that under these loading conditions, no significant increase in compressive strength of the vertebral bodies could be documented. This suggests that some caution be applied to the concept of "prophylactic" vertebroplasty in patients at risk for fracture.

O18

In Vitro Comparison of Bioresorbable and Metallic Cervical Fusion Plates in Stabilizing a Single-Level ACDF

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INTRODUCTION: Anterior cervical discectomy and fusion (ACDF) with plating is a widely accepted treatment for degenerative cervical disc pathology. Metal plates have been successfully used to increase the fusion rate. However stress shielding, image degradation, dsyphagia, and implant failure are problems associated with metal plate instrumentation. Bioresorbable polymeric plates may be preferable in that they provide bioresorbable qualities and may provide less stress shielding. The purpose of this study was to compare the flexibility of a bioresorbable graft containment plate with that of a static titanium plate following simulated ACDF.

METHOD: Twelve human cervical spinal segments (C2-3, C4-5, C6-7) were tested intact to ±2.5Nm in flexion-extension and axial torsion with a 20N axial preload, and resulting motions were recorded. Discectomy and grafting were performed, and tests were repeated after plating with either bioresorbable poly(L,D-lactide) plates (n=6, Inion) or static titanium plates (n=6, DePuy). The range of motion (ROM) was calculated for all states, and percent reduction in ROM was calculated for intact vs. uninstrumented ACDF vs. two types of plated ACDFs. Groups were compared using a t-test.

RESULTS: Uninstrumented ACDF did not provide a repeatable change from the intact ROM (mean reduction ± SD = 3±35%). Compared to uninstrumented ACDF, metal plates significantly reduced the ROM by 65±11%($p<0.001$), and bioresorbable plates significantly reduced ROM by 55±13% ($p<0.001$). The percent reduction in ROM provided by the two plates did not differ significantly ($p=0.16$).

Conclusions: Bioresorbable and titanium plates both stabilized a single-level simulated ACDF in this study. While the two plate systems did not differ significantly in vitro, in-vivo behavior is currently being investigated. However, this study does suggest that significant stabilization is achieved by bioresorbable graft containment plates in the immediate post-operative state.

O19

Effect of Melatonin and Melatonin Receptors on Caspase-3 and Myeloperoxidase Activity After Spinal Cord Injury

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INTRODUCTION: The aim of the present study was to demonstrate the effect of melatonin on caspase-3 (apoptosis) and myeloperoxidase activity (neutrophyl infiltration) after experimental spinal cord injury. Luzindole, a melatonin receptor blocker, has been used in order to show the effect of melatonin receptors on this neuroprotection.

MATERIALS AND METHODS: Randomly selected adult Wistar rats were used for the study (n=8 for each). The groups were Control (no trauma), Trauma (50 g-cm, weight drop), Treatment with Methylprednisolone (MPSS, 30mg/kg), Melatonin (10mg/kg), Luzindole and Melatonin (5mg/kg and 10 mg/kg, respectively), and Vehicle (5% ethanol). Tissue samples from spinal cord were obtained 24 hours after clinical evaluation.

RESULTS: Trauma itself has increased the caspase-3 and myeloperoxidase activity at the injury site. Although melatonin prevented an increase in myeloperoxidase activity after spinal cord injury, it did not prevent the increase in caspase-3 activity in the rat spinal cord after injury. The effect of melatonin on MPO activity seems to be partly due to melatonin receptors. When melatonin was used after luzindole, increase in caspase-3 activity was prevented comparing to trauma.

CONCLUSION: These results indicate that one of the neuroprotective mechanisms of melatonin after spinal cord injury is prevention of neutrophyl infiltration but not the caspase-3 dependent apoptotic cell death.

O20

Development of Osteoporotic Vertebra Model for in-vitro Experimental Applications in Biomechanics

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Introduction Tests of newly developed spinal instrumentation material to an osteoporotic vertebra model is generally neglected because of high costs of osteoporotic vertebrae. Production of osteoporotic vertebra in animals is expensive and time consuming. Objective of this study is to produce osteoporotic vertebrae in-vitro for experimental applications in biomechanics.

MATERIAL AND METHOD: This study was performed on 24 fresh lumbar vertebrae from 4 calf. Vertebrae were divided into 2 groups (experimental and control).BMD was measured to see pre process BMD by DEXA. A hole was opened in the pedicles of each vertebra.These holes were extended with a blunt tip probe.In experimental group each vertebra was put into a glass, filled with an acid decalcifier.The decalcifier solution in 50cc volumes was introduced through the holes with an infusion pump.After keeping and irrigating, the vertebrae in the decalcifier solution for 24 h.vertebrae were washed with saline.These procedures were made with saline at control group.The vertebrae were subjected toDEXA to measure post processBMD. After then both pedicles of each vertebra were tapped and pedicle screws were introduced. Following, each vertebra was secured into material testing machine.Pullout test was done at the rate of 5mm/min.

RESULTS:We used paired t-test forBMD data.The mean BMDmeasurement for pre-process was found as 1,43±0.08g/cm2 and for post process was found as 1,12±0.08g/cm2.The paired t-test showed the difference to be statistically significant($p<0,05$).The mean peak pullout load was found 704,54±190,33 N in post process group and 1709,09±352,72 N in control group.The t-test showed the difference to be statistically significant ($p<0,05$).

CONCLUSION:The statistical analysis showed that BMDmeasurement values and pedicle screw pullout forces could be reduced by this method.This method could be utilized for produce osteoporotic vertebrae for experimental applications in biomechani

O21

Video Assisted Thoracoscopic Surgery (Vats) in Spinal Deformities: Is it Really Minimal Invasive?

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This prospective study aims to assess the minimal invasive character of thoracoscopic techniques. Traditionally most of the reconstructive procedures for the management of spinal deformities are performed through open approaches. Now these procedures can be performed using VATS. However there is a great controversy about the minimal invasive character of VATS. From August 1996 till March 2001, 178 patients with spinal deformities; Kyphosis (n=100) and Scoliosis (n=78) underwent anterior thoracoscopic spinal surgery combined with posterior instrumentation. The following points were studied: the success and safety of the thoracoscopic techniques (blood loss, operative time, operative difficulties, ICU stay, chest tube drainage and postoperative complications), the coronal and sagittal contour analysis. Conversion to open thoracotomy was not necessary in any case. The mean operative time of the thoracoscopic approach was 105 minutes (SD. 55 minutes) and the mean blood loss was 1540 ml (SD. 466 ml). Bleeding more than 2000 ml (48 patients) and ventilatory support > 72 hours (27 patients) were the most common postoperative complications. No deaths were occurred as a result of the surgical technique. The chest tube out-put was 435.5 ml in average (SD.112 ml). The follow up period was 41 months in average (range 24- 58 months). Based on our results of applying the thoracoscopic techniques for deformity patients, we think that the thoracoscopic anterior spinal surgery is a valuable minimal invasive technique. It combines the goals of improving visualization and minimizing the surgery-related patient morbidity with the goals of achieving efficacious, safe, and equivalent results when compared with its open surgical counterpart.

O22

Results of One Stage Thoracoscopic Spinal Release and Posterior Osteotomies for Correction of Kyphotic Deformity in Ankylosing Spondylitis

MOHAMED EL-MESHTAWY (Assiut University, Egypt), HEINRICH BOEHM

STUDY DESIGN: A retrospective study of 24 ankylosing spondylitis patients with rigid kyphotic deformities of the thoracic and thoracolumbar spine who underwent combined anterior Thoracoscopic osteotomies-fusion and posterior multiple corrective osteotomies done at one stage in the prone position.

METHODS: From 1996 through 1999, twenty-four patients with progressive kyphotic deformity of the thoracic (n=14) and thoracolumbar (n=10) spine underwent a new technique that allows the combined use of thoracoscopic anterior osteotomy and fusion, and posterior multiple V-shaped osteotomies with transpedicular fixation. The average age of the patients was 46 years(32-59). There were 18 males and 6 females. Eighty levels posteriorly and sixty- nine levels anteriorly were osteotomised in the 24 patients. The average preoperative thoracic kyphosis angle was 69 degrees (51-89) while the average lumbar lordosis was20 degrees(+5-45). The Cobb angle of the planned area for ventro-dorsal osteotomies was 19.5 degrees in average (5-35). The mean follow up period was 41 months (24-62months).

RESULTS: All patients were satisfied with cosmesis after surgery. The mean amount of correction was 34.5 degrees (15-60). The mean degree of loss of correction was 6.5 degrees (0-12) at the final follow up. The operative time of endoscopic procedure was 80 minutes (50-110). In no case was conversion to emergency open thoracotomy necessary. Regarding the clinical and radiographic parameters, excellent and good results were obtained in 22 patients(91.6%) at the final follow up. There was no mortality or vascular complications. No neurological complications recorded except in one patient who had neurological deterioration postoperatively progressed from incomplete to complete paraplegia in the course of follow up.

CONCLUSIONS: Thoracoscopic anterior osteotomy and fusion approved to be safe and efficient approach

O23

Safety of Posterior Segmental Instrumentation and Fusion for Dystrophic Spinal Deformity in Patients with Neurofibromatosis Type I

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INTRODUCTION: To evaluate the safety of third generation posterior segmental instrumentation of dystrophic spinal deformities in patients with Neurofibromatosis type I.

MATERIALS AND METHODS: The records of 17 patients with diagnosis of neurofibromatosis type I and spinal deformity were reviewed. The patients with dystrophic spinal deformity treated with third generation posterior instrumentation were included. Ten patients (4 female,6 male) with an average age of 10 years(4-17) and follow-up of 37,5 months(4-120) formed the subjects of this study. Four patients had previous subcutaneous rod and one patient had Luque instrumentation. Five patients had dural ectasia. All patients were neurologically intact before surgery. All patients had posterior instrumentation and nine had additional anterior release and fusion. Halo traction was used in 2 patients. Sublaminar wiring was used in five and spinous process wiring was used in four patients. Intracanal anchorage by sublaminar wires or laminar hooks at the level of intraspinal pathology is avoided. Allograft was used for fusion in all patients

RESULTS: The major curve was corrected from preoperative average of 79º(60-115) to postoperative 36,2º(16-78)(54,1%). Thoracic kyphosis was corrected from 65,3º(38-90) to 35,4º(16-50)(45,7%) postoperatively. Hyperkyphosis was normalized in eight patients. Sagittal and coronal balance restored to normal or improved. No neurological complication or infection was observed. In one patient instrumentation was revised due to inappropriate caudal end vertebra selection.

CONCLUSION: Third generation posterior instrumentation of dystrophic spinal deformities in neurofibromatosis type I can be done safely and corrections comparable with idiopathic curves can be achieved. Even the dystrophic vertebra can be instrumented with versatility of third generation posterior systems.

O24

Safety and Efficacy of Posterior Instrumentation for Patients with Severe Congenital Scoliosis

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PURPOSE: To evaluate the safety and efficacy of posterior segmental instrumentation and correction of congenital scoliosis.

MATERIALS AND METHODS: Inclusion criteria of this retrospective study were patients with congenital scoliosis who were treated with long segment instrumentation (more than 6 functional units). 42(32 female, 10male) patients formed the basis of the study. Average age of the patients was 12(4-24)years and average follow-up was 30(1-120)months.31 patients had spinal dysraphism.15 patients had previous and 3 patients had simultaneous surgeries due to spinal dysraphism.18 patients had mild neurological abnormalities preoperatively but all were ambulatory. In 13 patients anterior release was done in addition to posterior instrumentation and fusion. Wake-up test was used for spinal monitoring.

RESULTS: The major curve was corrected from of 68,7º(46-114) to 39.4º (20-65) with a 42.6%correction. The compensatory curves were corrected from 44,2º (24-85) to 22º (10-48) 50,2% correction rate. The average loss of correction for 31 patients with at least 2 years f/up was 2.4º for major and 3.5º for the compensatory curve.1 patient had a paraparesia associated with misplaced upper thoracic pedicle screws with total recovery after revision, 1 ambulatory patient with neuruological compromise had deterioration in her neurological status only to recover partially. 2 patients had superficial and 1 patient had a deep infection for which an implant removal was necessary. Implant failure with pseudoarthrosis occurred in 1 patient who was revised successfully.

CONCLUSION: Spinal instrumentation was relatively safe and efficient for patients with congenital scoliosis when translation, compression and vertebral column shortening were the maneuvers to realign the spinal column, avoiding distraction.

O25

Turkish Srs-22 Questionnaire and Minimum 10 Years Follow-Up Surgical Results of Ais Patients Classified According to Lenke Classification

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In this study, 109 patients of adolescent idiopathic scoliosis operated with TSRH instrumentation system were retrospectively evaluated after minimum 10 years of follow-up and were classified according to Lenke Classification and Turkish version of SRS-22 questionnaire was applied. Average follow-up period was 136.9±12.7 months and mean age was 14.4±1.9. According to Lenke Classification, 24 patients had Type I, 14 patients had Type II, 22 patients Type III, 27 patients had Type IV, 10 patients had Type V and 12 patients had Type VI curves. When all the patients were included, preoperative mean Cobb angles of upper thoracic, thoracic and thoracolumbar / lumbar curves in the frontal plane were 26.0º±13.9º, 56.9º±22.6º and 35.4º±17.6º respectively. Upper thoracic, thoracic and thoracolumbar / lumbar curves were corrected by 67.5±22.2%, 65.9±18.2% and 61.5±20.9% respectively postoperatively with a statistically significant change(p: 0,00) (Final rates of correction: 56.0±23.9%, 56.7±17.7% and 53.5±22.4%). Normal physiologic thoracic and lumbar sagittal contours were provided in 93.6 % of the patients. Although none of the patients had a balanced curve preoperatively, in 96.3 % of the patients totally or clinically well balanced curves were provided postoperatively. At the last visit these balanced curves were maintened with a statistically insignificant decrease. Overall, main values pain, general self-image, function, mental status and satisfaction from treatment questionnaire were 3.8±0.7, 3.6±0.7, 4.0±0.8, 3.6±0.7 and 4.7±0.3 respectively at the last control visit. Regarding these values, any statisticaly significant difference was not noted related to the curve types. In the light of these findings, 10 years follow-up of the patients treated with TSRH instrumentation demonstrated an efficient correction in the frontal and sagittal plane deformities and trunk balance and life quality of the patients were generally improved subjectively.

O26

Surgical Management of Fifty Six Difficult and Neglected Scoliosis Cases From Developing Countries

ZIAD ALZOUBI (Jordan Spine Centre, Jordan)

INTRODUCTION: 56 cases of 90-135o curves that referred to the author from several Arabic neighboring countries, where scoliosis screening and/or surgery are either not existent or very poor.

MATERIALS: 56 cases of severe scoliosis ,Cobb angle more than 90o admitted for surgical correction.

METHODS: Complete pre-surgery assessments of all cases were performed, which included radiological exams, 3D CT, MRI, neurological and cardio pulmonary assessments. The risks of surgery were then discussed with patients (and their guardians), and were weighed against the risks of cardio pulmonary complication if surgery were not to be performed. All 56 patients were then treated surgically. The aim of these surgeries was to achieve partial correction and fusion to avoid progressive cardio pulmonary and neurological complications. Thirty-two were treated by anterior approach with corpectomy ,discectomy and release, followed by posterior instrumentation using ISOLA system. Twenty-four cases of revision, paralytic and neglected idiopathic were treated by posterior approach and eggshell procedure, and with instrumentation whenever it was needed.

RESULTS: 35-70% correction occurred with an average of 53%. In 46 cases, there were no intra-operative or early post-operative complications. Three male cases had unilateral paresis on the concave side. However, all 3 cases improved almost completely within 3-7 months after surgery. One death occurred due to incomplete paralysis and fatigue of respiratory muscles. Late Complications: Five cases of upper hooks distraction, and one needed late re-implantation and cutting the upper part of the rod on the convex side.

CONCLUSION: We present our experience in the problems we encountered and the troubleshooting approaches we followed to solve these problems. We highlight the need for establishing spinal centers in the underdeveloped countries to increase the awareness of the pathology of scoliosis both for medical practitioners and the public.

O27

Anterior Instrumented Fusion for Congenital Kyphoscoliosis

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INTRODUCTION: Mild deformities at early age is currently managed by posterior arthrodesis with or without instrumentation. A combined procedure, anterior release and posterior instrumentation is usually needed to achive correction when the deformity is large or the patient is an older child or adolescent. Although the surgical procedure involves an anterior approach posterior instrumentation is preferred. To our knowledge there is no reported series on one stage anterior fusion and instrumentation in the treatment congenital kyphoscoliosis.

Method: Seven patients treated by anterior instrumented fusion with the diagnosis of congenital kyphoscoliosis were reviewed after an average follow-up of 44 (24-62) months. Two patients were male and five were female and the average age was 11 (8-13) years. The deformity was type I in five patients and type II in two patients. Mean extent of the deformity was over six vertebrae (range,5-8), and instrumented fusion extended over six vertebrae (range,4-9). Neurosurgical release was done in two patients due to diastematomyelia prior to corrective surgery.

RESULTS: Average kyphotic deformity improved from 69 (47-90) degrees to 40 (22-60) degrees postoperatively and 43 (25-62) degrees at final follow-up (38% correction). Scoliotic deformity averaged 51 (16-88) degrees preoperatively, 29 (8-65) degrees postoperatively and 31 (8-68) degrees at final follow-up (39% correction). Loss of correction exceeding 100 was not observed. Junctional kyphosis occured in one patient and was treated by subsequent posterior instrumented fusion. No neurological or other major complication occured.

CONCLUSION: Corrections achieved in both coronal and sagittal planes compares well with the results obtained with posterior and combined anteroposterior procedures. Significant correction may be achieved in congenital kyphoscoliosis through one stage anterior instrumented fusion.

O28

Comparing the Results of The Instrumentation of Pedicle Screws Versus Hybrid System in Adolescent Idiopathic Scoliosis (Ais) Surgery

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OBJECTIVE: In this study the results of the patients with AIS who were operated with hybrid system (HS) (the combination of hook, sublaminar wires and pedicle screws) and only pedicle screws (PS) were evaluated retrospectively and compared statistically.

MATERIAL AND METHOD: 32 women and 14 men, overall 46 cases with AIS who were underwent a posterior surgery were considered. The mean follow up was 15.3 months (range:12-35). HS was used in 26 of the cases and PS was used in 20 of the cases. In both group, cases with similar average of ages (HS group:15.6/;HS group:14.5;p=0.142), with similar preoperative major Cobb angles (HS group:60.5°;PS group:61.8°;p=0.253) and with similar number of the vertebrae which were included in the fusion (HS group:12.1; PS group:12.3;p=0.717) were added. Anterior release was applied to 8 of the cases from the HS group and 6 cases from the PS group. Thoracoplasty was applied to 6 patients from HS group and 3 patients from PS group. Cases were evaluated with different kinds of parameters at preoperative, early preoperative and 12th month.

RESULTS: Results were considered with respect to Mann Whitney U test. According to this, similar results were gained in statistical meaning ($p>0.05$) at the evaluation of the correction (67.7% in HS group and 70.3% in PS group), the loss of correction (4.1° in HS group and 3.6° in PS group), translation of the apical vertabra (38.0% in HS group and 36.0% in PS group) and in the time of surgery (360 min in HS group and 357min in PS group). A statistical significant difference ($p<0.01$) in the derotation of the apical vertebra (14.3° in HS group and 20.7° in PS group) and in the amount of hemorrhage (1813 ml in HS group and 1564 ml in PS group) were established.

CONCLUSION: Results of correction have been reported as 50% with hook instrumentation, 60% with sublaminar wire and 70% with PS. There is a requirement of studies in which the curve flexibility is evaluated.

O29

The Validity of Lenke's Criteria for Defining Structural Proximal Thoracic Curves in Patients with Adolescent Idiopathic Scoliosis

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INTRODUCTION: Lenke et al. classified curves of adolescent idiopathic scoliosis patients and assigned the term "structural" or "nonstructural" to each curve. However, there is still not much consensus on the definition of structural proximal thoracic (PT) curve, and structurality criteria for PT curve have not been validated, yet. Aim is to delineate the efficiency of using Lenke's criteria during the decision of whether to include the PT curve into instrumented fusion or not in AIS patients treated with a posterior translational instrumentation.

MATERIALS AND METHODS: Thirty-seven consecutive AIS patients (6 male, 31 female) with an average age of 15 years (11-24) and average follow-up of 55 months (24-90) were studied. Two groups were constructed according to the involvement of PT curve into instrumented fusion. Group I; uppermost extent of the instrumentation either T2 or T3 indicating inclusion of PT curve into instrumentation, Group II; uppermost extent of the instrumentation at T4 or lower indicating partial or no inclusion of the PT curve into instrumented fusion. Radiographic evaluation included measurement of PT , main thoracic (MT), thoracolumbar-lumbar curves and sagittal Cobb angles of T2-T5, T5-T12, and T10-L2.

RESULTS: The 2 groups were statistically equivalent in terms of age at operation, followup, preoperative PT and MT, and their corresponding side bending curve magnitudes, as well as the parameters related to shoulder balance, preoperatively.

The 2 groups were also statistically equivalent in terms of immediate postoperative and latest follow-up PT and MT. CONCLUSION: It was observed that Lenke's description for structurality of PT curves can effectively determine which curves need fusion and which curves do not. Since there was no difference among inclusion of a nonstructural PT curve into fusion or solely fusing the MT curve in terms of outcomes, extension of fusion to T2 or T3 is unnecessary.

O30

Radiographic Evaluation of Posterior Instrumentation and Fusion with Allograft Bone for Patients with Congenital Scoliosis

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INTRODUCTION: Posterior fusion and instrumentation is being used for neglected cases of congenital scoliosis cases. Successful fusion by using autograft and instrumentation has been reported in the limited number of papers on the treatment of neglected congenital cases. However, there is not yet any report analysing the fusion rate for the patients with congenital scoliosis treated by posterior instrumentation and fusion using allograft only. Use of allograft may not be an ideal option to achieve fusion in congenital scoliosis due to the bony abnormalities and missing posterior elements. The aim of this study was to investigate the efficacy of posterior fusion with allograft in patients with congenital scoliosis.

MATERIALS AND METHODS: 21patients (16female,5male) with congenital scoliosis who underwent posterior spinal fusion with instrumentation using allograft bone were evaluated retrospectively. The av. age at surgery was 11,5 (Range) years and average follow up was 28 (24-48) months 9 patients had simultaneous or prior laminectomies to address the intraspinal abnormalities. Standing A-P and lateral spine radiographs before and after surgery, and at the most recent followup were evaluated by one independent observer at 2 times. Radiographic parameters described by Bridwell et al were used to evaluate the fusion.

RESULTS:Two patients were found to have no fusion, 6 patients 'probably fusion' and 14 'definitely fusion'. The average preoperative curve of 68,7 º was corrected to 38,7 º degrees postoperatively. The average loss of correction at the final follow-up was 3,3º. Overall success rate of fusion was 90.4%.

CONCLUSION:With the use of segmental spinal instrumentation, satisfactory spinal fusion could be achieved with allografts in congenital scoliosis. Since the morbidity of allograft is lower, it may be a reasonable alternative to autografts in the treatment of neglected congenital scoliosis.

O31

Single Stage Posterior Correction for Sheuermann's Kyphosis

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INTRODUCTION: Scheuermann disease is a common cause of structural kyphosis of the thoracic and thoracolombar spine. The indication for surgery is a kyphosis of more than 60 degrees that is increasing and can not be controlled by the brace and pesistent pain despite consevative managemant. The operative treatment consists of a two-staged combined anterior-posterior and a single-staged posterior surgery. The aim of this study was to compare the results of posterior surgery with the results of the combined anterior-posterior surgery reported previously in the literature.

MATERIALS AND METHODS: Surgical treatment was performed for 19 patients with Scheuerman's kyphosis (5 females, 14 males, average age 17,6 (13-33)). Posterior segmental instrumentation, correction with shortening of posterior colon and posterior fusion were choosen as operative methods. The outcomes of patients were reported for 26,3 (6-82) months in average.

RESULTS: The median preoperative kyphosis was 78,5° (65°-96°), immediate postoperative kyphosis averaged 42,6° (22°-54°). The average correction was %45 (21-72). At final follow up the median kyphosis had increased to 46,2° (24°-60°) with 3,6° loss of correction. During follow up an increase of kyphosis in 3 patients. One of patient had developed reversibl paraplegia

CONCLUSION: The results of this study suggest that with correct indication and well performed surgical technique the posterior approach is sufficient to get succeful correction from both a functional and cosmetic standpoint. In the preoperative planning, levels to be fused should be well planned. We advise using of pedicular screws for all segments if it is possible. In adults with anterior bony bridging or in the presence of structural deformity, combined anterior and posterior surgery is indicated. Despite the fact that the procedure is technically demanding, in general satisfactory results can be obtained with posterior instrumentation and fusion.

O32

Posterior Vertebrectomy in Kyphosis, Kyphoscoliosis and Scoliosis Caused by Hemivertebra

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INTRODUCTION: Vertebrectomy and instrumentation via posterior approach only is being increasingly used in sagittal, frontal plane and combined deformities. Purpose of this retrospective study is to evaluate the clinical and radiological results of (hemi) vertebrectomy and instrumentation only via posterior approach in spinal deformities.

MATERIALS AND METHODS: Between the years of 1998 and 2004, 19 patients (3 scoliosis, 5 kyphosis, 11 kyphoscoliosis) hemivertebrectomy and interbody fusion using posterior instrumentation with titanium mesh cage (TMC) via only posterior approach. The age of the patients ranged from 2 to 22 and hemivertebrectomy was performed at thoracal level in 6, thoracolumbar in 8 and lumbar in 5 patients. TMC was used for anterior column support and interbody fusion in patients who had residual anterior gap preventing bone to bone contact. Correction and stabilization were achieved by posterior polyaxial pedicle screws.

RESULTS: Average follow-up is 4.6 (1-7) years. We did not confront any loss of correction, pseudoarthrosis, and TMC collapse or implant failure.

CONCLUSION: It is possible to perform surgeries for intramedullary pathologies (i.e. tethered cord resection etc.) in the same stage by this type of surgery. And as the procedure shortens the vertebral column, it increases the effectiveness of additional neurosurgical procedures. However, there are some disadvantages of the technique. There is some difficulty to perform enough decompression in the opposite site by this method. And the major disadvantage compared to standard posterior and combined anterior-posterior procedures is the possibility of significant bleeding. As a conclusion; hemivertebrectomy and instrumentation via posterior approach only is a good one-stage surgical treatment option which avoids the surgical trauma and morbidity related to anterior surgery. However, it is a technically demanding surgical procedure requiring extreme care and experience in spine surgery.

O33

Vertebrectomy and Instrumentation Via Posterior Approach for Severe Sagital and Frontal Plane Deformity

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INTRODUCTION: Vertebrectomy and instrumentation via posterior approach is being increasingly used in the surgical treatment for severe sagital plane deformity. This approach is especially useful in patients who may not tolerate an anterior surgical procedure due to poor medical conditions but have severe spinal cord compromise caused by osteoporotic fractures in the aging spine, combined sagital and frontal plane congenital deformities with or without intramedullary abnormalities, healed post-infectious deformities. Purpose of this retrospective study is to evaluate the clinical and radiological results of vertebrectomy and instrumentation only via posterior approach in various spinal pathologies.

MATERIALS AND METHODS: Twenty-nine patients had vertebrectomy and interbody fusion using titanium mesh cage via posterior approach and posterior instrumentation between the years of 1998 and 2004. Etiological distribution was as follows: 10 patients (over 60 years of age) with severe osteoporotic fracture and neurological deficit, 3 patients with severe posttraumatic deformity, 6 patients previously operated for scoliosis and presented with severe decompensation and combined (sagittal and frontal plane) deformity, 6 patients had post-infectious severe sagital plane deformity and spinal cord compression, 1 deformity due to Ehlers-Danlos syndrome, 1 due to mucopolysaccharidosis, 1 due to Marfan syndrome and 1 due to neurofibromatosis. The age of the patients ranged from 12 to 82 years.

RESULTS: Average follow-up is 4.5 (1-6) years. We did not confront any loss of correction, pseudoarthrosis, and titanium mesh collapse or implant failure.

CONCLUSION: Vertebrectomy and instrumentation via posterior approach is a good surgical treatment option in elderly patients whose medical condition does not permit an anterior procedure for spinal cord compromise and in patients who have pseudoarthrosis and severe sagital and frontal plane deformity.

O34

Surgical Treatment of Neglected Congenital Scoliosis Via Posterior Approach

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INTRODUCTION: Patients with late diagnosed or neglected congenital scoliosis have rigid scoliotic, kyphoscoliotic and lordoscoliotic deformities which result in trunk imbalance. In addition, associated intramedullary abnormalities necessitate a challenging preoperative planning. Purpose of this study is to evaluate the results of surgeries performed via posterior approach only.

MATERIALS AND METHOD: Twenty-nine patients aged 7- 29 (mean; 18.3) years were operated. Sixteen of 29 patients had associated intramedullary abnormalities besides congenital scoliosis. These include diastomatomyelia and tethered cord in 10 patients, only tethered cord in 5 patients and retethering in one patient. The operation method was chosen according to the magnitude and type of deformity. Treatment of intramedullary pathologies was done in all patients in the same session of anesthesia. Correction and stabilization were achieved by posterior pedicle screws. Titanium mesh cages were used in patients with residual anterior gap and anterior column support.

RESULTS: Average follow-up period was 4.7 (2-10) years. In three patients, the superficial wound infection; in two patients, transient lower extremity paresis was seen. Wound infection responded well to local wound care and neurological complications completely recovered during the follow-up after revision surgery. The fusion was achieved in all patients and neither implant failure nor pseudoarthrosis was observed.

CONCLUSION: During the diagnosis and treatment planning of late diagnosed or neglected congenital scoliosis cases, excellent and high-technology neuroradiological investigations are mandatory. The treatment of intramedullary pathologies in the same surgery is another advantage of this kind of surgery. However, long operation time, risk of infection and cerebrospinal fluid leakage after the operation constitute the disadvantages.

O35

Late Revision Surgery in Adolescent Idiopathic Scoliosis

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INTRODUCTION: Our purpose in this study was to determine and analyze the reasons or problems like trunk imbalance, pseudoarthrosis, implant failure, junctional kyphosis and degenerative changes at the proximal or distal parts of the instrumentation leading to revision surgery in early or late periods in AIS patients and discuss the possible methods or approaches for solution.

MATERIALS AND METHODS: Thirty-three AIS patients who had revision surgery between the years of 1994 and 2003 and had minimum of two-year follow-up were evaluated. The average age was 17.8 (9-50) years. Reasons leading to revision surgery were pseudoarthrosis in 8, coronal plane decompensation in 2, sagittal plane decompensation (due to short fusion) in 3, complex frontal and sagittal plane deformity (due to pseudoarthrosis) in 7, rib-hump deformity in 2, implant failure (anterior instrumentation proximal screw pull-out and posterior instrumentation distal screw pull-out) in 2, deep infection (not responsive to debridement and irrigation) in 3, caudal junctional degenerative problem in 2, late implant related reaction in 2, neural impingement by implant devices in 2 patients.

RESULTS: Posterior fusion with compression instrumentation was performed for simple pseudoarthrosis patients. Posterior osteotomy or vertebrectomy or combined surgery was performed for patients who had complex frontal and sagittal plane deformity due to pseudoarthrosis.

CONCLUSION: Revision surgery for spinal deformity is extremely challenging and decision making requires considerable experience and expertise in complex reconstructive spinal surgery. It is essential to determine the major problem of the patient and the use of good quality neuroradiological investigation for planning. The use of posterior osteotomy, posterior transpedicular osteotomy or vertebrectomy is becoming more popular nowadays. We believe that this kind of complicated deformity surgery should be done by experienced spine surgeons.

O36

Early Surgical Treatment for Spine Deformity in Patients Under 10 Years Old

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INTRODUCTION: To assess the efficacy of early combined surgery for young patients affected by early onset spinal deformities.

MATERIAL AND METHODS: A consecutive series of 35 patients aged 10 years or younger, affected by spinal deformities and surgically treated between 1990 and 2000 was reviewed.There were 13 males and 22 females with a mean age at surgery of 6.1 years old (range 1 – 10yrs). Twenty-eight cases underwent planned anterior and posterior surgery whereas the remaining 7 patients were treated by a posterior fusion alone using paediatric segmental devices.

RESULTS: At an average follow-up of 5 years (range 3-10), of the 18 cases with regular curve shape (10 I, 1 S, 6 congenital deformities, 1 spondylometaphyseal displasia, 1 Marfan syndrome) treated by planned anterior convex epiphysiodesis and posterior instrumentation 17 had no progression of deformity and 1 fair progression of deformity. Repeated surgery was required in two cases: 1 new instrumentation for implant breakage and 1 reinsertion of thoracic hooks.In the six cases treated by planned anterior hemivertebra resection and posterior instrumentation we observed solid fusion in all, only in one case 1 repeated surgery was required for new instrumentation .

Both cases treated by planned anterior fusion and posterior instrumentation (1 neurofibromatosis cervical kyphosis and 1 Sacrum agenesia) resulted in stable fusion.

Seven cases treated only by posterior instrumentation (4 I.1.S., 1 spondylometaphyseal dysplasia, 1 Freeman Sheldon Syndrome, 1 Arthrogryposis) resulted in 4 with progression of deformity. Worth mentioning is the fact that 7 out of 10 revision procedures performed for this series occurred in the posterior only group.

CONCLUSIONS: Planned anterior convex epiphysiodesis or hemivertebra resection supplemented by posterior segmental instrumentation can control curve progression in early on-set spinal deformities better than previous techniques.

O37

Radiological Changes in Adjacent Segment to Fusion in Adolescent Idiopathic Scoliosis Patients and Correlation with SF-36 in Long Term Follow-up

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The aim of this study is to analyze radiological changes in adjacent intervertebral discs and their correlation with SF-36 findings in adolescent idiopathic scoliosis patients with posterior spinal instrumentation and fusion.

31 adolescent idiopathic scoliosis patients treated with posterior spinal instrumentation and fusion with mean follow up of 10 years (6-16 years) were included in this study. Intervertebral disc height in adjacent and one below and upper adjacent segment to fusion were measured in preoperative and follow-up lateral radiographs. Radiographic measurements of lumbar intervertebral disc height in 36 age-matched healthy volunteers constituted the control group. Radiographic measurements for each segment at follow-up were compared with preoperative measurements and control group . Magnetic resonance imaging was also performed and disc degeneration was assessed at follow-up in the study group. Clinical outcome was analyzed with SF-36 questionnaire and correlation with intervertebral disc changes was assessed.

A decrease in intervertebral disc height at follow-up from preoperative values was detected in all lumbar segments (L1-2 p=0.08, L2-3 p=0.01, L3-4 p=0.23, L4-5 p=0.249).

Mean disc height measurements of control group were higher than control group but were not statistically significant except for L2-3 level (L1-2 p=0.93, L2-3 p=0.10, L3-4 p=0.333, L4-5 p=0.404). Degenerative changes in MRI were increased in upper adjacent segment compared with lower adjacent segment (p=0.01). SF-36 scores did not show correlation with any parameters.

Decrease in disc height can be seen in idiopathic scoliosis patients with instrumentation and fusion at 10 years follow-up but may not be a significant finding since disc heights of study group at follow-up were higher than the control group. Upper adjacent segment showed more degenerative changes than lower adjacent segment. There appears to be no correlation between SF-36 results and radiographic parameters.

O38

Coronal and Sagittal Malalignment of the Spine Due to Total Congenital Dislocation of the Hip (CDH) Text

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INTRODUCTION: Variations in sagittal and coronal alignment of the spine is seen in patients with inappropriately treated or neglected CDH.

MATERIALS &METHODS: 48 cases with uni- and 58 with bilateral CDH were included (mean age: 36,5; 32 men, 74 women).Hips were classified according to Eftekhar as acetabular dysplasia (AD)(n=16), intermediate acetebulum (IA) (n=28), total dislocation with pseudoacetabulum (PA)(n=29) and without PA(NC)(n=32). AP and lateral standing radiographs were taken. Leg length discrepancies (LLD), the angles by Cobb's method of each neighbour segments and total lumbar lordosis in two planes, sacral slope and sacral inclination (SI) were measured.

RESULTS: AP L2-L3(p=0,040), lateral L1-L5(p=0,010) and L1-S1 segmental angle (p= 0,016) changes according to Eftekhar classification. L2-L3 segmental angle in PA was higher than that in IA; L1-L5 total lumbar lordosis angle in NC was higher than that in PA and L1-S1 total lumbosacral angle was higher in NC than that in PA and in IA. Sacral inclination (p=0,000), AP L1-L2 (p=0,027), L2-L3(p=0.001), L3-L4(p=0,033), L4-L5 (p=0,040), L1-L5 angle (p=0,001) was changed related to be bilateral or unilateral dislocation. SI in bilateral cases was higher then in unilateral cases.On the other significant parameters, the unilateral cases mean values were greater.

CONCLUSION: In CDH, the pathologic changes of the acetabulum and entire pelvis influences the spine. In unilateral cases, the coronal plane deformities of the spine becomes more evident because of the greater amount of the LLD.The increase of the lordosis of the distal lumbar segments was dependent in two factors: the level of the dislocation and the distance of the center of the femoral head from the midsacral line. In patients with total dislocation without a HP,the spinal malalignment is more severe because of their more shorter legs despite the increase of the ROM of the hip. In CDH, pseudoacetabulum is a positive factor on the spinal complaints and a negative factor on the functional status.

O39

Treatment of Lenke Type 1 Curves in Adolesant Idiopathic Scoliosis: Comparison of Three Different Types of Instrumentation

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PURPOSE: To analyze the results of anterior single rod instrumentation (AF), posterior hybrid (PHF) (hook- pedicle screw combination) and posterior pedicle screw (PPF) instrumention in Lenke type 1 curves.

METHODS: A retrospective analysis of 39 patients of AIS of Lenke type 1 curve with a mean follow-up of 54 months (24-91 months). Mean age was 14 (10-18). There were 23 females and 16 males. Parameters included preoperative, post operative and at the latest follow-up sagittal and coronal curve magnitudes, apical vertebral translation (AVT) and rotation (AVR), coronal C7 –CSVL displacement. Number of instrumented levels, hospital stay, estimated blood loss, operation time, instrumentation costs were also analyzed. Student's t test was used for statistical analysis.

RESULTS: The average age, gender and curve magnitude were similar between three groups. Significant differences were found in correction of curves, AVT, AVR and mean number of instrumented levels. PPF has obtained better correction of AVT. AF has more curve and AVR correction, better C7-CSVL correction, lesser fused segments, shorter operation time, lesser blood loss and lower instrumentation cost.

CONCLUSIONS: Lenke Type 1 curves can be treated succesfully with three methods. Advantages of anterior single rod instrumented correction are as follows: Better correction in coronal, sagittal and transversal planes, shorter operation time, lesser blood loss, lower instrumentation cost and safer instrumentation.

Table I: Coronal correction

	Number of cases	Preop Cobb	Postop Cobb	Follow-up	Mean curve correction
AF	15	54.4° (40-74)	14.4° (6-30)	19.1° (10-40)	73% (*)
PHF	16	60.8° (45-80)	21.3° (4-36)	25.8° (10-40)	65%
PPF	8	68.7° (45-80)	23.8° (12-30)	25.5° (15-36)	63%

*: $p<0.05$ compared with other two groups

Table II: AVT, AVR, C7-CSVL correction and mean number of instrumented levels

	Mean AVT correction	Mean AVR correction	Mean number of levels	Mean C7-CSVL correction (mm)
AF	58%	50%	7.4 (*)	8.4
PHF	48%	30% (*)	9.5	5.6 (*)
PPF	63% (*)	45%	9.3	7.7

*: $p<0.05$ compared with other two groups

Table III: Mean thoracal kyphosis angles

	Preoperative	Postoperative
AF	27	32.7
PHF	38.5	38.6
PPF	54	35

O40

Behaviour of Lumbar Region After Thoracic Fusion in Lenke Type 1 Curves: Effects of Three Different Types of Instrumentation

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INTRODUCTION: The purpose of this study is to analyze the lumbar region after thoracic anterior single rod instrumentation (AF), posterior hybrid (PHF) (hook- pedicle screw combination) and posterior pedicle screw (PPF) instrumention in Lenke type 1 curves.

METHODS: A retrospective analysis of 39 patients of AIS of Lenke type 1 curve with a mean follow-up of 54 months (24-91 months). Mean age was 14 (10-18). There were 23 females and 16 males. Parameters included lumbar modifiers, preoperative, post operative and at the latest follow-up coronal curve magnitudes, apical vertebral translation (AVT) and rotation (AVR) of the main curve and preoperative, post operative and at the latest follow-up scoliosis and lordosis angles of the lumbar region. Student's t test was used for statistical analysis.

RESULTS: Correction amounts, lumbar modifiers, preoperarative, post operative and follow-up lumbal coronal and sagittal angle measurements are shown in the Tables I - IV. Although AF provided better coronal correction in the main curve and better lumbar lordosis, PF provided better AVT correction and spontaneous lumbar scoliosis correction.

CONCLUSION: AVT correction of main curve is more effective for spontaneous lumbar scoliosis correction in Lenke type 1 curves

Table I: Correction amounts

	Number of cases	Preop Cobb	Correction	AVT correction	AVR correction
AF	15	54.4° (40-74)	73% (*)	58%	50%
PHF	16	60.8° (45-80)	65%	48%	30% (*)
PPF	8	68.7° (45-80)	65%	63% (*)	45%

*: p<0.05 compared with other two groups

Table II: Lumbar curve modifier types

	A	B	C
AF	8	5	2
PHF	7	6	3
PPF	6	2	-

Table III: Spontaneous lumbar scoliosis correction

	Preop Cobb	Postop Cobb	Mean curve correction	Follow-up Cobb	Final correction
AF	21.1° (12-40)	10.6° (0-18)	52%	10.3° (0-18)	55%
PHF	23.5° (5-30)	11.9° (0-20)	51%	10° (0-20)	57%
PPF	21.6° (5-30)	8° (0-12)	62% (*)	5° (0-6)	76% (*)

Table IV: Lumbal lordosis angles

	Preop Cobb	Postop Cobb	Follow-up Cobb
AF	35° (10-57)	38.5° (30-50)	41.9° (30-50) (*)
PHF	36.2° (0-50)	36.2° (16-43)	35.9° (16-45)
PPF	42.5° (0-60)	34° (16-40)	34° (16-40)

*: p<0.05 compared with other two groups

O41

The Effect of Residual Lower end Vertebra Tilt on the Outcome of Surgical Correction in Patients with AIS

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INTRODUCTION: Restoration of coronal and transverse orientation of the end vertebrae to neutral and sagittal orientation to physiologic contours is the main goal in spinal deformity surgery. However, some degree of residual deformity is usually inevitable. There is still debate on whether to save a distal level and accept a residual deformity or to include that segment into fusion mass with a better deformity control. Besides, the possible effect of the magnitude of this residual deformity on the surgical outcome has not been well-established.This study was designed to investigate the effect of the magnitude of the residual tilt of lower end vertebra (LIV) on the radiological parameters.

MATERIAL AND METHODS: 67 AIS patients treated with posterior instrumentation system and followed-up for a minimum of 2 years were reviewed. 28 patients (5 male,23 female) with an average age of 14 years(11-18) and follow-up of 52 months (24-90) having Lenke C modifier formed the subjects of this study. Patients were assigned into 2 groups (I: LIV tilt at the immediate post-op radiogram ≤5 degrees, II: >5 degrees). There was no difference in terms of the extent of the lower instrumentation level among 2 groups. Following parameters were compared on the immediate post-op and latest follow-up radiograms: magnitude of scoliosis curves, T2-T12 kyphosis, T12-S1 lordosis, lordosis below LIV.

RESULTS: Although all measured parameters were found to be statistically not significant among groups in the preoperative and immediate postop period, main thoracic (MT) and thoracolumbar/lumbar (TL) curve magnitudes were found to be significantly increased at the latest follow-up in group II ($p<0.01$).

CONCLUSION: Despite having a reasonable curve correction in the immediate post-operative period, residual LIV tilt >5 degrees may result in worsening of the MT and TL curve magnitude in time. Residual LIV tilt at the immediate postop period may be considered as a risk factor for progression.

O42

Anterior Cervical Discectomy for One- and Two-Level Cervical Disc Disease: The Effect of Anterior Plating

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INTRODUCTION: Over a 5-year period, 60 patients with cervical spondylotic myelopathy were treated surgically with one or two-level anterior cervical discectomy and fusion.

MATERIAL AND METHODS: 36 patients had cervical plates, whereas 24 had fusions without plates. The follow-up period ranged from 16 to 40 months. Clinical and radiographic follow-up data were obtained.

RESULTS:The pseudarthrosis rates were 4% for patients with plating and 12% for patients without plating. There was no statistically significant correlation between pseudarthrosis and gender, age, level of surgery. The plating procedure resulted in preserving overall lordosis. Accelerated degenerative changes at the levels adjacent to fusion were seen in 12% of patients with plating, compared to 9% in patients without plating.According to Odom,s criteria the overall result was excellent to good in 95% of patients with plating compared to 75% in patients without plating.

CONCLUSIONS: The addition of plate fixation for one and two-level anterior cervical discectomy and fusion is a safe procedure and does not result in higher complication ratesThe use of plate fixation successfully maintains cervical spine alignment .Patients treated with cervical plating had overall better results when compared with those of patients treated without cervical plates.

O43

Early Results of Anterior Interbody Cage Fusion and Anterior Cervical Discectomy Without Fusion for Cervical Disc Disease

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INTRODUCTION: Anterior approach has been common treatment for to cervical disc disease if posterior elements no cause myelopathy findings of cervical spinal canal.The goal of this study was comprasion to early results of anterior interbody cage fusion and anterior cervical discectomy without fusion for cervical disc disease.

MATERİAL AND METHODS: 80 patients who operated from cervical disc disease in our clinic,were invesgated between Januray 2001 and December 2003.This study is retrospective analysis.

RESULTS: Operated with patients for cervical disc disease to our clinic evaluated first day and 3 months postoperative results.There were 41 women (51,25%) and 39 men (48,75%).37 anterior cervical discectomy without fusion (46,25%) and 43 anterior interbody cage fusion (53,75%) were application to these patients.Patients ranged age from 29 to 74 years (mean 46,53 years)Start complaints of our patients were 10 (12,5%) only radiculopathy , 63 (78,75%) neck pain and radiculopathy, 7 (8,75%) myelopathy..Postoperative results of 80 patients; results of anterior cervical discectomy without fusion were 33 (89,18%) excellent and good ,4 (10,81%) satisfactory. Results of anterior interbody cage fusion were 42 (97,62%) excellent and good,1 (2,3%) .There was no poor result for all patients. Furthermore there were preoperative motor deficits 27 (72,97%) whereas postoperative, 14 (51,85%), defisits decrase or completly recovery who go anterior cervical discectomy without fusion.There were preoperative motor deficits 37 (86,04%) whereas postoperative, 27 (72,97%),defisits decrase or completly recovery who go anterior cervical discectomy with cage fusion.

CONCLUSIONS: The restricted results show that anterior cage fusion surgery has more successfully outcome than anterior cervical discectomy without fusion.For having accurate and satisfactory results, we need have to long period and large case series.

O44

Transarticular Medial Approach with Partial Facetectomy (TMAPF) For Foraminal Stenosis and Spondylolysthesis

FİGEN ASLAN (Antalya General Hospital, Turkey), ERGİN SAĞDAŞ

INTRODUCTION: Effect of the TMAPF on the foraminal stenosis and spondylolysthesis has not been described previously. This study aims to evaluate the efficacy of TMAPF on patients with foraminal stenosis and spondylolysthesis.

PATIENTS AND METHODS: Between March 2002 and 2004, 21 patients with foraminal stenosis and 13 patients with spondylolysthesis were operated with TMAPF technique. During operation a hole with 0,5-1 cm diameter was opened transarticularly at conjunction between facet and lamina after 5-10% of the inferomedial edge of the superior facet and superomedial edge of the inferior facet were drilled away. Facet capsule left intact. Inferolateral edge of the yellow ligament was released, but ligament was not opened. Face of the inferomedial facet was separated from lateral edge of the root and cleaned. By guidance of the disc space, the portions and osteofits compressing the root from disc space anteriorly, and medial face of the facet posteriorly were cleaned. Inferior and superior root conjunctions were exposed and interapophyseal space was released. We did not use any instrumentation system. The patients were evaluated with respect to the leg pain, paresthesia, weakness, and Oswestry pain scores 6 weeks after surgery.

RESULTS: All patients were mobilized within 4-6 hr, discharged within 24-48 hr, sat down within 8-12 days, returned to daily activity and work within 15-25 days. Postoperative Oswestry pain scores (3,4±1,7) were significantly decreased when compared with the preoperative pain scores (38,8±5,01) in patients with foraminal stenosis ($p<0.001$). Preoperative and postoperative pain scores of patients with spondylolysthesis were 41,7±5,5 and 3,7±1,2 respectively ($p<0.001$).

CONCLUSION: TMAPF may be considered as a safe and effective procedure for patients with foraminal stenosis and spondylolysthesis. We believe that this technique may reduce the risk of epidural fibrosis.

O45

Transarticular Medial Approach with Partial Facetectomy for Lumbar Disc Herniation

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INTRODUCTION: This study has aimed to evaluate the results of transarticular medial approach with partial facetectomy (TMAPF) as an alternative surgical approach for lumbar disc herniation. TMAPF has been used for lumbar foraminal stenosis.

MATERIALS AND METHODS: Between March 2002 to 2004, 104 patients with lumbar disc herniation underwent TMAPF. In this procedure, in order to expose facets of inferior articular edge 5-10% of the medial parts of superior and inferior facets were removed by a high-speed drill. The facet capsule was left intact by undercutting the facets and opening a hole as large as a thumb nail in the junction between facets and lamina (Fig.1). After finding the root, disc was removed without opening the yellow ligament (Fig.2). This approach was used in free disc fragments as well. Patients data included; leg and back pain, time to returning back to normal daily activity, Oswestry pain scores, and final outcomes were analysed.

RESULTS: Following the operation none of the patients had leg or back pain. All patients were able to mobilize at _ to 4 hours, returned to daily activities at 5 to 7 days, and returned to their works at 15 to 21 days postoperatively. When compared with preoperative Oswestry pain scores (46 ± 3,3), postoperative score (3,1 ± 0,9) significantly decreased ($p<0,001$). The final outcomes after TMAPF was excellent in 94 (90%), good in 10 (6%) patients. Only one patient had residual disc postoperatively.

CONCLUSION: These findings support the idea of TMAPF, which is very safe and effective by means of treating back pain and sciatica pain due to disc herniation. In the literature, we do not have any demonstration of this approach without opening the yellow ligament used as therapy of choice for the patients with lumbar disc herniation. We believe that this technique may reduce the epidural fibrosis risk.

O46

Prospective Study of Anterior Lumbar Interbody Fusion Augmentation with Posterior Pedicle Screws or Translaminar Facet Screws

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INTRODUCTION: Stand alone anterior lumbar interbody fusion (ALIF) is biomechanically unstable. The addition of posterior fixation such as pedicle screws (PS) or translaminar facet screws (FS) significantly and equally increase the initial stability of the construct as shown in vitro biomechanical studies. However, the difference between PS and FS has not been studied clinically. This prospective study compares the clinical outcomes and radiological results of 360° fusion consisting of ALIF and supplemented either with FS or PS.

MATERIALS AND METHODS: Inclusion criteria were adult patients with axial back pain and one or two level disc degeneration confirmed with MRI and provocative discography. Excluded were patients who needed an extensive decompression, and patients with prior fusion procedures. All patients underwent an ALIF with tricortical graft or femoral ring allograft followed by posterior fusion and instrumentation. Radiographs and functional outcome questionnaires were collected preoperatively and at 1 year and 2 year follow-up. Presently there are 50 patients with minimum 2 year follow-up; 43% male and average age 43 years (18-70). There were 60 levels in 34 patients with supplemental PS fixation group, and 27 levels in 16 patients with supplemental FS fixation group.

RESULTS: The radiographic and clinical results are summarized in the table. Postoperative complications were noted in 4 PS patients (11%; 2 implant failures; 1 infection; and one misplaced screw with L5 root symptoms). Statistically significant improvements ($p<0.05$) in SF36 scores were noted in both treatment groups. In both groups, Roland-Morris scores have improved on average 8 points.

CONCLUSIONS: Despite biomechanical studies documenting that facet screw fixation has similar biomechanical properties with pedicle screws, there is a significantly higher pseudoarthrosis rate with use of FS, possibly due to lack of stability from cyclical loading. Both groups showed improvements in patient-rated functional outcome scores.

O47

Posterior Lumbar Interbody Fusion Versus Posterolateral Fusion with Instrumentation in Treatment of Adult Spondylolisthesis

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INTRODUCTION: Failure of posterolateral fusion with internal fixation (PLFs) has been attributed to the lack of anterior support as well as the persistence of the disc as a source of pain. Posterior lumbar interbody fusion (PLIF), in addition to the wider fusion surface that is placed under compression, eliminates the disadvantages of PLFs. However, PLIF is often accused of causing many complications, especially neurological ones.

METHODS: Forty patients suffering from spondylolisthesis (15 degenerative and 25 lytic) were operated on by either PLIF using tricortical iliac graft or PLFs, and were prospectively evaluated by an independent observer. The JOA score was used for the clinical assessment. Both groups were comparable as regards to the age, sex, smoking, working status, slippage percentage and local kyphotic angle. The follow-up period ranged from 6-30 months (mean 12.1).

RESULTS: The mean recovery rate by JOA score was 92% for PLIF and 84% for PLFs. The average slippage improved from 25% to 5% for PLIF and from 24% to 15% for PLFs. The average local kyphotic angle improved from 0 to 10 degrees for PLIF and from 0 to 3 for PLFs. Radiological fusion rate was 100% for PLIF and 65% for PLFs. Complications were minimal and most were transient. None of our patients had a neurological deterioration.

CONCLUSION: PLIF for adult spondylolisthesis seems to yield better clinical and radiological outcomes than PLFs with comparable morbidity.

O48

FLOATING DISCS: Should They be Included in the Fusion?

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INTRODUCTION: The development of degenerative pathology at the disc in between two noncontiguous fused segments has been termed "floating disc disease". The adjacent segment degeneration has already been studied; however the fate of a floating disc is yet to be researched.

MATERIALS AND METHODS: Retrospectively, patients diagnosed with lumbar degenerative disc disease or low grade spondylolisthesis who failed non-operative treatment and underwent anterior interbody spinal fusion of 2 or more noncontiguous spinal segments were included in this study. Fusion levels were delineated by MRI and provocative discography in correlation with history and physical examination. All surgeries were performed by one spine surgeon. The X-rays of the floating discs were graded using the modified Gore System (grade 0-III) preoperatively and at the last follow-up. Lumbar lordosis, pelvic incidence and segmental lordosis were measured. Groups were compared using the Wilcoxon-Signed rank test.

RESULTS: There were 20 patients (12 male, 8 female) with the mean age of 49.9 years old (range 31-75). The mean follow up was 4.2 years (range 2-11). Twenty seven floating discs were studied (13 one-level, 7 two-level). Five discs (18%) in 4 patients progressively degenerated. Three of the five degenerated discs had decreased segmental lordosis and two segments had no change ($p=0.08$). There was no significant correlation between the floating segment degeneration and lumbar lordosis ($p>0.10$) or pelvic incidence differences ($p>0.10$).

CONCLUSION: The floating discs can degenerate, however at a slow pace. At an average of 4 years of postoperative follow-up, none of the floating discs degenerated more than two radiographic grades and none needed additional surgery. Loss of the segmental lordosis may influence floating disc degeneration. Therefore, our recommendation would be to fuse symptomatic discs and not to include healthy discs even if they are a floating disc.

O49

Early Results of Lumbar Disc Arthroplasty for Symptotamic Disc

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INTRODUCTION: Traditional treatment method for symptomatic lumbar disc disease is conservative nonoperative therapy. In the cases in which the symptoms are nonresponsive to conservative therapy and there is at least 6 weeks in a year of rest requirement; the surgical treatment methods should be considered. There are two options in the surgical treatment; fusion or non-fusion techniques. As the fusion surgeries carry the risk of end fusion degenerative and instability problems, today non-fusion surgeries become more popular. Purpose of this study is to present efficiency and the early results of lumbar disc prosthesis, one of the non-fusion treatment methods used in symptomatic lumbar disc diseases.

MATERIALS AND METHODS: Between April 2003 and July 2004, ten patients have been operated for symptomatic disc disease. Total of 17 disc prosthesis operation has been performed to 10 patients. There was 9 female and 1 male and mean ages of the patients was 43.2 (39-49). Levels of the operation were L2-L3 one, L3-L4 two, L4-L5 six and L5- S1 eight. In five patients one level, in four patients' two levels and in one patient 4 levels disc arthroplasty has been performed.

RESULTS: At mean follow up of 10 months (2-18 months), all patients were symptom free and satisfied from the operation. All the patients were ambulated at the first day after surgery. In one patient, 360 degrees fusion was performed due to end plate fracture. Neither infection nor neurological impairment was seen in the patients.

CONCLUSION: At early follow up, disc arthroplasty has encouraging clinical results. Motion preservation, short hospital stays and low complication rate is the main advantages of the operation. But we think of that, one needs studies with long term follow up for both assessment of adjacent segment degeneration and survival of lumbar disc prosthesis.

O50

The Posterior Endoscopic Discectomy for the Treatment of Lumbar Disc Herniation

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PURPOSE: To evaluate our results of the posterior endoscopic discectomy (PED) for lumbar disc herniation and to discuss the advantages, disadvantages and clinical outcomes of this new technique.

MATERIALS AND METHODS: Between February 2000 and August 2004, 55 patients with a mean age of 43 years (range 24 to 73) underwent PED. The operated disc levels were L5-S1 in 31 patients, L4-L5 in 19 patients and L3-L4 in 5 patients. All surgeries involved only a single level and all disc herniations were located inside the canal.

RESULTS: Mean operative time was 86 min. (41-135 min). All patients experienced substantial relief of their leg pain immediately after the operation, mobilized very early after the recovery from the anesthesia and were discharged home in 24 hours of surgery with only oral NSAID +/- myorelaxants. Three complications were observed in the first 10 PED cases; two cerebrospinal fluid leakages which required open dural repair and early recurrence of the disc herniation at the same level at three weeks after the PED in one patient that was treated by open microdiscectomy. We have not seen any superficial or deep infections and systemic complications in any of our cases.

CONCLUSION: PED has advantages like better illumination, better magnification, and better visualization through the rotation of the 25º lens, minimal bone resection and minimal epidural fibrosis, less postoperative pain, better cosmoses, shorter hospitalization, early mobilization and shorter recovery. On contrary, PED has a longer learning curve (longer than open discectomy, 10-20 cases), the operative time is usually longer than the open procedures and bidimensional vision may cause loss of depth sensation, and longer anesthesia time due to the preparation period of the system.

O51

A Comparison of Three Surgical Techniques: Cages, Pedicular Screws and Cages, Pedicular Screws

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INTRODUCTION: To compare outcomes after posterior lumbar fusion by means of three different techniques.

MATERIAL AND METHODS: A cohort of 45 patients with one-level symptomatic degenerative disc disease or low grade spondylolisthesis who underwent lumbar or lumboscral fusion procedure between 1995 and 1998 was reviewed.

RESULTS: Group 1 – Cages alone group At a mean follow-up of 4 years, 5 patients (33%) presented uncertain fusion signs (reperated by posterior instrumentation); at a mean follow-up of 8 years, only one of the 10 patients without posterior instrumentation showed definite fusion signs. The clinical results 8 years after primary surgery were fair in 6 patients (40%) and poor in 3 (20%). Complications included two cases of incomplete motor and sensory deficit of the nerve root due to intra-operative traction and one dural lesion.

Group 2 - Cages plus posterior synthesis group At a mean follow-up of 6.5 years, all patients (100%) presented definite fusion signs. The clinical results 6.5 years after primary surgery were fair in 2(13%) patients and poor in 2(13%) . Complications included one incomplete motor and sensory deficit of the nerve root due to intra-operative traction and two dural lesions.

Group 3 - Posterior instrumentation without cages group At a mean follow-up of 6.5 years, 14 patients (93%) showed definite fusion signs. The clinical results 6.5 years after primary surgery were fair in 2 cases (13 %) and no poor results were seen.. Complications included one dural lesion.

CONCLUSIONS: The present findings have demonstrated that the use of posterior interbody cages alone is not a safe and effective procedure. The use of pedicle screw instrumentation alone presented similar fusion rates and clinical success but a lower complication rate when compared to the use of pedicle screws supplemented with posterior cages

O52

The Associations Between Pain, Mood, Disability, Quality of Life, Trunk and Extremites Muscle Strength After Lumbar Disc Surgery

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INTRODUCTION: The aim of this study was to assess the relationships of pain, disability, mood, quality of life, trunk and extremities muscle strength, patient satisfaction in the lumbar disc surgery patients.

MATERIAL AND METHODS: Forty patients that had suregry for lumbar disc herniation participated in this study. Back and leg pain on Visual Anologue Scale (VAS), Oswestry Disability Back Pain Questionnaire Index (ODBPQI), Roland-Morris Disability Questionaire (RMDQ), the Medical Outcomes Study 36 -Item Short-Form Survey (SF-36), Beck Depression Questionnaire (BDQ), manual muscle test of trunk and extremities muscle, Patient Satisfaction Questionaire (PSQ) were applied to the lumbar disc surgery patients.

RESULTS: Postoperative duration (20,69+/-2,3 months) was negatively correlated with trunk extension muscle strength (3,06+/-0,12)($P<0.05$). There were contrary associations between VAS (32,07+/-3,99) and the effected leg muscle strength (31,08+/-0,45)($P<0.01$) the subscales scores of SF-36 and BDQ (14,17+/-1,53)($P<0.05$), positive associations between VAS and the scores of ODBPQI (13,3+/-1,39)($P<0.001$), RMDQ (12,25+/-1,06)($P<0.01$). BDQ was correlated with subscale scores of SF-36 (negatively), and the scores of ODBPQI ($P<0.001$), RMDQ ($P<0.01$) (positively). The scores of ODBPQI and RMDQ increased, while subscale scores of SF-36 decreased. There were negatively correlations between PSQ and some subscale scores of SF-36, BDQ($P<0.05$), the scores of ODBPQI ($P<0.01$), RMDQ ($P<0.05$). No patients had participated the physical therapy and rehabilitation program following lumbar disc surgery.

CONCLUSION: The results of the lumbar disc surgery patients may be related to the restrictions of postoperative activity. A well designed rehabilitation program following lumbar disc surgery can be performed safely with proper supervision and patient education,improving muscle strength, mental and physical function and quality of life.

O53

Cervical Fusion Results of Polyetheretherketone (Peek) Cages

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OBJECTIVE: This study evaluates the effect of interbody polyetheretherketon (PEEK) cage fusion in 58 consecutive cases treated for discogenic cervical disorders.

METHODS: Between the years 2002-2003, 58 patients were treated with cervical interbody fusion using PEEK cage. There were 40 male and 18 female patients and the mean age was 42.6 years (range, 22-75 yr). PEEK cages were packed with demineralised bone grafts or synthetic bone grafts. Additional plating was not used in any case. The median duration of follow-up was 12 months (range, 6-24 months). Cervical x-rays were used in the follow-up to assess the fusion, pseudoarthrosis, kyphosis, cage migration, subsidence or breakage.

RESULTS: There was adequate fusion in the whole series and no implant insufficiency was observed except the patient who had a collapse fracture due to bone resorption in the superior corpus. One patient was reoperated due to primary failed decompressive surgery at three months and strong complete fusion was observed during the surgery.

CONCLUSION: Efficient fusion has still been an ongoing problem in cervical surgery. Different techniques and materials have been developed to overcome this problem. The use of cervical PEEK cage seems to be a good alternative that does not require additional anterior plating and bone graft harvesting for achieving cervical fusion

O54

Posterior Lumbar Interbody Fusion with Tricortical Iliac Bone Graft for Treating Adult Spondylolisthehis

MOHAMMAD EL-SHARKAWI (Assiut University Medical, Egypt)

INTRODUCTION: The repeatedly reported noncorrelation between high fusion rate and lower clinical outcome rates following instrumented posterolateral fusion has been partially attributed to the lack of anterior support as well as the persistence of the disc as a source of pain. Posterior lumbar interbody fusion (PLIF), as an alternative, is reportedly associated with many neurological complications.

METHODS: This is a prospective analysis of the first 30 consecutive patients suffering from adult spondylolisthesis (21 lytic and 9 degenerative type) treated with PLIF using at least 2 autogenous tricortical iliac grafts. The JOA was used for the clinical assessment. The mean follow-up period was 13 months.

RESULTS: The mean recovery rate by JOA score was 92%. The average slippage improved from 30% preoperatively to 13% postoperatively. The average local kyphotic angle improved from 0 degrees preoperatively to 10 degrees lordosis postoperatively. Comparison between follow-up x-rays and postoperative x-rays did not show any significant degree of graft collapse, nor change in slippage angle or lumbar lordosis. Radiological fusion was achieved in all cases. None of our patients suffered from graft retropulsion. Complications included superficial wound infection (2), transient donor site pain (2), transient numbness (7), and L5 paralysis (1) that occurred in a case of grade IV following attempt at reduction.

CONCLUSION: PLIF for adult spondylolisthesis seems to give good clinical and radiological outcome with minimal morbidity. The success achieved using tricortical bone graft obviates the need for using the more expensive interbody cages.

O55

Bryan Cervical Prosthesis in Cervical Disc Herniation: Clinical and Radiological Follow-up

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INTRODUCTION: The authors review their series of cervical discectomies with the implant of Bryan cervical prosthesis (Medtronic Sofamor Danek). Clinical and radiological outcome is discussed at 1 year follow-up.

MATERIAL AND METHODS: From May 2003 to January 2005 a series of 47 patients were treated for degenerative cervical disc herniation. Thirty-two patients were female, mean age was 45 years old (range 24-61). Eleven cases required a multiple level operation, two of them at C4-C5 C5-C6, and nine at C5-C6 C6-C7. A total of 58 levels were operated on, including 37 at C5-C6 levels, 14 at C6-C7, 5 at C4-C5 and 1 each at C3-C4 and at C7-D1. In one case we observed only a partial improvement of the radicular symptoms, probably because the patient had bony osteophytes that were incompletely decompressed. At follow-up the clinical symptoms progressively improved. In one case we observed a transient recurrent nerve palsy resolved in less than 2 weeks. Assessment of outcome was obtained with a short clinical examination and interview, with dynamic cervical X-rays and with the Neck Disability Index scale and SF-36. Motion was evaluated by calculating the angle of motion at the operated level, the relative segmental alignement at the operated level and the overall sagittal alignment of the cervical spine.

RESULTS: A significant improvement of the Neck Disability Index score and SF-36 score was observed in all the patients individually and as a group. All the patients would undergo the same operation at 1 year.

None of the cases had a subsidence of prosthesis. A mean 8° (5°- 18°) degrees of motion with respect to flexion-extension was observed. In patients operated at two levels, the lower level granted less motion than the upper one.

The operated level showed radiologically a nonsignificant loss of lordosis (-1,2°) at one year, but the overall sagittal allignment of the cervical spine was preserved.Overall, this technique seems to provide results that at least match those of our cervical discectomies with arthrodesis.

O56

Computerized Tomography Guided Transforaminal Epidural Steroid Injection for Lumbosacral Radicular Pain in Spinal Stenosis

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INTRODUCTION: Spinal and radicular pain due to spinal stenosis continues to be one of the most challenging musculoskelatal problems. Though several conservative modalities has been shown to be effective, there are significant number of patients who do not benefit enough. Epidural steroid injections has been used extensively since it was first described by Robecchi et all in 1952. Controversies discussed in the literature include the effectiveness and the use of radiographic guidance and the route of administration (caudal, translaminar or transforaminal). This study analyzed the efficacy of transforaminal epidural steroid injections under computerized tomography in relieving lumbosakral radicular pain due to spinal stenosis.

MATERIALS AND METHODS:Between May 2003 and March 2004 a total of 41 patients with lumbosacral radicular pain due to spinal stenosis were treated by transforaminal epidural steroid injection under computerized tomography. For the assessment of pain severity, 100-mm visual analogue scale (VAS) was used in pre-injection, 1st day, 1st week, 3rd week, 6th month and the last follow-up. For the statistical analysis of VAS scores in terms of follow-up, Friedman's and Wilcoxan rank orders tests were used.

RESULTS: All the patients reported a serious degree of symptom relief with a mean follow-up of 12.09 months (min:6, max:25 months). The pre-injection median VAS score was 9 (min:6, max:10) and this was significantly higher than all the follow-up median VAS scores ($p<0.05$). The 1st day and 1st week median VAS score was found to be 0 (min:0, mak:10) which increased to 2 (min:0, mak:9) in the 3rd week and 6th month follow-up.

CONCLUSION: Computerized tomography guided, transforaminal epidural steroid injection is a safe and effective conservative treatment alternative for lumbosacral radicular pain due to spinal stenosis with a minimum 6-month follow-up period.

O57

Motion Preservation - Disc Replacement for Lumbar Degenerative Disorders with the ProDisc® Prosthesis

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PURPOSE: Chronic back pain, loss of the disc height and limited range of motion in the affected lumbar segments are basic symptoms of the degenerative disc disease. However, the degenerative changes of the facet joints, posterior segment instability, and the failed back surgery syndrome as well as the adjacent level degeneration after fusion typically accompany this suffer. The aim of this prospective study is, to evaluate the follow-up clinical results after total disc replacement using the ProDisc® device.

MATERIALS AND METHODS: A total of 755 ProDisc® devices were implanted in 550 pts (282 female and 268 male, the average age is 45 years). The prosthetic disc replacement was performed at the following levels: L1/L2: 6 cases, L2/L3: 27 cases, L3/L4: 91 cases, L4/L5: 259 cases, L5/S1: 349 cases, L5/L6: 21 cases, L6/S1: 1 case.

There were 391 single-, 116 double-, 41 triple-level treated pts, one 4-level- and one 5-level treated pt. 253 pts have been controlled in time frames between 6 (339 pts) and 24 mos. (132 pts) after surgery. The longest time-period after surgery is more than 5 yrs. (3 pts). Medical assessment based on the standard CRFs and the self-administered assessment completed by the pts (Oswestry Questionnaire and the SF-36 Health survey) were used for outcome evaluation.

RESULTS: The evaluation showed that the pain intensity was significantly reduced: the VAS preoperatively was 7.3 and 24 mos. after surgery 4.1. The number of pts complaining about continuous back pain dramatically declined from 87% to 33% two years postoperatively. 46% of the pts reported to be completely satisfied and 42% to be satisfied with the procedure two years after surgery.

CONCLUSION: The clinical results in our series have demonstrated that total lumbar disc replacement with a ProDisc® Prosthesis is a good treatment option for degenerative disc disease. We will continue our investigation in this group of patients to gather long term results.

O58

Cauda Equina Syndrome: Early Surgery Improves Outcome

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INTRODUCTION: Cauda Equina syndrome is characterized by asymmetrical paralysis, sensory loss and areflexia including loss of bowel and bladder control. It happens as a result of injury to the nerve roots arising from the conus medullaris and is commonly seen with acute disc herniation. It has been a matter of considerable debate whether surgical interventions performed as an emergency alters the out come at all! We prospectively carried out a study to address this question.

MATERIAL AND METHODS: 60 consecutive cases that presented with CES to our hospital between Jan 2000 to July 2004, secondary to disc prolapse were included. Presentation, details of surgical intervention and outcome at discharge and at minimum of 6 months was looked at.

RESULTS: Majority of patients had L4/5 disc prolapse. All patients had improvement in their symptoms though three patients continued to have foot drop. All except two patients showed improvement in sphincter control. Patients with residual symptoms had acute onset of impairment and had duration of symptoms of over 3 months before surgery. Timing of surgery was statistically significant prognostic factor.

CONCLUSIONS: Early surgery meant early recovery in our patients, but delayed surgery may also provide satisfactory outcome.

O59

Radiographic Predictors of Outcome after Posterolateral Fusion and Instrumentation in the Treatment of Degenerative Lumbar Disorders

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INTRODUCTION: A fusion to L5 carries the potential for accelerated subsequent advanced L5-S1 disc degeneration and radiculopathy. On the other hand, fusion to L5 offers the theoretical benefits of preserved lumbosacral motion, smaller surgery, lesser complications and decreased likelihood of pseudoarthrosis.

MATERIAL AND METHODS: In this study, we compared group 1 (L5 fused) and group 2 (S1 fused) who had been operated for degenerative lumbar disorders. Clinical records and radiographic studies for consecutive degenerative lumbar disorders that underwent posterolateral fusion and instrumentation from thoracic or lumbar spine to either L5 or the sacrum were reviewed. Group 1 consisted of 17 patients and group 2 consisted of 13 patients. The average age of the 28 female and 2 male patients was 63,3 (34-80). The average follow-up of the patients was 26.8 months (13- 54 months).

RESULTS: Group 1 and group 2 were nearly identical in terms of age, sex, number of levels fused and the radiographic follow-up ($p=0,557$, $p=0,492$, $p=0,449$ respectively). Only one patient in both groups were considered fair. Two group comparisons revealed significant differences for screw loosening ($p=0,027$). In group 1(L5), one patient had lysis around distal screw. In group 2, 6 patients had distal lysis (in 3 patients, the lysis disappeared in 2 year follow-up) and 1 patient had lysis around proximal screws. Although 12 patients (70%) in group1 and 3 patients (23%) in group 2 had inter-transverse process fusion, stable fusion was observed in all patients of the two groups. There was no significant difference in terms of complications between groups ($p>0.05$).

CONCLUSION: In this study, posterolateral fusion and instrumentation produced satisfactory fusion rate and clinical results in the treatment of lumbar degenerative disorders. After 26.8 months of mean follow-up, the lumbar fusions to the sacrum had a higher frequency of distal lysis around screws but later with fusion, the disappearance of lysis was noticed.

O60

Prevalence of Sacroiliac Joint Dysfunction in Nonspesific Chronic Low Back Pain

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INTRODUCTION:The sacroiliac joint(SIJ) has been implicated as a possible cause of low back pain by some authors.While some author advocates for the SIJ being a major cause of low back pain(LBP),others suggest SIJ pain is uncommon source of LBP.Debate has continued over the existence of SIJ dysfunction. The aim of this study was to determine the prevalence of SIJ pain in patients with nonspecific chronic LBP

METHODS: 130 males,232 females,a total of 362 patients suffering from chronic LBP and sciatica were studied.their mean age was 40.1.Patients who had disc disease with neurological signs or disc protrusions,spondylolithesis,sacroiliitis and,previous surgery and pregnancy were excluded. Clinical examination and tests for SIJ pain were used for diagnosis of SIJ dysfunction.Pelvic asymmetry and hamstring muscle thightness were detected.pain localization and intensity level were assessed.

RESULTS: 60.22 % of the patients(218 of 362) have showed positive signs for SIJ dysfunction.76 patients have been involved bilterally.98% of the patients with SIJ pain had lower lumbar and hip pain,95% of them lower lumbar and buttock pain,whereas 15% had groin pain.Their pain intensity level was 7.79 cm in activity and 4.85 cm in rest according to visual anolog scale.85% of them had accentuated lordosis with hamstring thightness and pelvic asymmetry.There was no degenerative changes in their SIJ in X-rays.

CONCLUSİON: This study revealed the SIJ may have a big importance in source of LBP and must be taken consideration in teatment regimens.The accuracy of some clinical tests for SIJ have to be supported by diagnostic or provocative analgesic injections with further studies.

O61

Anterior Instrumentation in Tuberculosis Spondylitis The Results of Minimum 5 years Follow-up

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Information on the use of anterior instrumentation along with radical debridement and fusion is scarce. This study reports on the surgical results of 59 patients with Pott's disease that had anterior radical debridement and anterior fusion and anterior instrumentation with minimum 5 years follow – up. (23 patients with anterior titanium plate – screw system and 36 patients with double rod - screw system). Average age at the time of operation was 46.3 ± 13.5 years. Average follow-up was 84.6 ± 11.3 months. Local kyphosis was measured as the angle between the upper and lower end plates of the collapsed vertebrae preoperatively, postoperatively and at the last follow-up visit. Vertebral collapse, destruction, cold abscess, and canal compromise were assessed in MR images. It was observed that, the addition of anterior instrumentation increased the rate of correction of the kyphotic deformity (78.5 ± 20.5 %), and was effective in maintaining it with an average loss of 1.5° ± 1.9°. Of the 24 (44.1 %) patients with neurological symptoms, 20 (83.3 %) had full and 4 (16.7 %) partial recoveries. There were very few intraoperative and postoperative (major vessel complication: 1.7 %, secondary non- - specific infection: 1.7 %) complications. Disease reactivation was not seen with the employment of an aggressive chemotherapy regimen. It was concluded that anterior instrumentation is a safe and effective method in the treatment of tuberculosis spondylitis. There were no significant differences between the two instrumentation systems in terms of sagittal alignment reconstruction and fusion rate. In rod-screw system, the disadvantage of scoliosis deformity creation through frontal plane in plate performing did not occur and it is thought to have the advantage of long instrumentation in multiple level deformities.

O62

An Implant-Related Infection Model in Rat Spine

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OBJECTIVE: The rate of postoperative infections is approximately 1% in spine surgery. However, infection rates significantly increase and it was reported between 2.1% and 8.5% postoperatively when metal implants are used. This study aim to set up an infection model in rat spine with and without a metal implantation, and use this model for treatment and prophylaxis of spinal infections.

MATERIAL AND METHOD: Fourty white male Sprague Dawley rats (6 months-old-age and weighing 300-350 grams) were divided in 4 groups. After intraperitoneal anesthesia using ketamin hidrocloride a laminectomy from T10 to T12 were performed, and a 3 mm titanium screw is implanted to the lateral of the laminae. In Group 1 (control group), physiologic saline solution is applied. In the other three groups, different concentrations of staphylococcus aureus were implanted (Group 2: 102, Group 3: 103, Group 4: 106) on the laminectomy site. All animals were sacrificed after 2 weeks, then blood cultures, and cultures from fascia, muscle and bone were obtained. Bacterial number in each tissue was evaluated as CFU/gm tissue. Specimens of two animals from each group were subjected to histological examination.

RESULTS: Although blood cultures obtained by intraatrial punction after 2 weeks were negative in all groups, a significant osseous infection was confirmed in Groups 2, 3 and 4. Bacterial cultures were negative in all specimens of Group 1. Comparison of bacterial counts in bone at the laminectomy site showed no significant difference between Group 3 and Group 4 ($p<0.05$), while there was a difference in Group 2. Patholgical changes in Group 4 was also more prominent than Group 2 and 3.

CONCLUSIONS: This study shows that inoculation of staphylococcus aureus in 106 concentration at the laminectomy site after implantation of a titanium screw in white rats is a reproducible model for spinal infection. Further studies for treatment and prophylaxis of postoperative infection can be performed on

O63

Brucellar Spondylodiscitis of the Spine

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OBJECTIVE: Brucellosis, an important health problem in certain parts of the world, is caused by certain bacterial species of Brucella. It is a systemic disease in which a variety of tissues and organs can be affected; in particular, involvement of reticuloendothelial and musculoskeletal systems is common. The prevalence of vertebra involvement in brucellosis was found to be 7.5%. This study reviews the results of surgical management of this uncommon infection.

METHOD: Twenty three patients with brucellar spondylodiscitis were treated during a period from 1993 through 2003 were reviewed. There were 17 males and 6 females. Their ages ranged from 9 to 75 years, with an average of 49. Duration of symptoms was in average 10.5 weeks (1-25 weeks). Pain was the predominant symptom in all of the patients. Nineteen patients were neurologically normal, but had axial pain and difficulty in movements, while four patients had different levels of paresis. Five patients were surgically treated (2 cervical, 1 thoracic, 2 lumbar). Of those five patients 2 had paraparesis, one had angulation deformity, two had brucellar spinal epidural abscess in cervical region. One patient had positive culture by CT guided needle biopsy.

RESULTS: Serological tests were positive in all patients. ESR was 67,2±35 (between 21 and 116). Localization of spondylodiscitis was cervical in 4, thoracic in 7, lumbar in 12 patients. The patients were followed up for 5 weeks to 2 years, with an average of 31 weeks. Among four patients with neurological involvemenet, one patient did not change, and three had full recovery.

CONCLUSION: The principal treatment of brucellosis of the spine is conservative, namely, immobilization and antimicrobial therapy. Surgical intervention is reserved for biopsy, severe neurological impairment, or spinal instability. In chronic brucellosis, particularly in elderly patients who present with back pain or tenderness vertebral involvement should be remembered.

O64

Using Perceptions of Pain Severity in a General Population to Normalize VAS Pain Reports

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INTRODUCTION: Pain is frequently measured by using a visual analog scale (VAS) for different purposes in medical practice including spine surgery. Several studies showed that this method is simple and useful in examining changes in pain level over short time intervals in the same subject. However it is not clear if these ratings are also useful in analyzing differences across subjects. This ambiguity influences the reliability of the results and interpretations of both the clinical outcomes and research studies, especially during the follow-up of a cohort and the comparison of different samples. The purpose of this study is to create a method for normalizing VAS pain reporting on a common metric in order to control for the variation between different populations due to the differences in perception or evaluation of pain.

METHOD: (Stage 1) A list of 226 pains was gathered from a convenience sample of lay persons on the street and patients waiting at medical and orthopedic clinics (n=313). Age ranged between 45 and 75. (Stage 2) These pains were ranked by performing Q sort by level of severity by health professionals (n=75) and 19 pains with the most stable rankings were selected. (Stage 3) These 19 pains were rated by a sample of community-dwelling adults (n=1622) and a method of VAS standardization based on six selected pains was developed.

RESULTS: Individual variations in pain ratings were found to be independent of respondent's age and gender, but were correlated with having experienced the type of pain and self-reported health status. A new scoring method that takes these correlations into account is proposed.

CONCLUSIONS: It is possible to standardize VAS pain ratings to compare pain between different populations.

O65

A New Titanium Expandable Prosthesis for Vertebral Defect Replacement

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OBJECTIVES: This study investigates the use of a new titanium expandable cage for vertebral defect replacement in the thoracic and thoracolumbar spinal pathologies.

METHODS: Between 1998 and 2002, 218 patients underwent reconstructive spinal surgery for pathologies affecting the anterior column of the spine; tumours (89 patients), trauma (59 patients), infections (48 patients), and collapsed osteoporotic vertebrae (22 patients). The posterior surgery entailed short or long segment screw-rod fixation. The excision of the affected vertebral body has been done through either two-portal thoracoscopic approach (128 patients) or standard open approach (90) patients). The intraoperative difficulties, the preoperative local kyphosis, the degree of correction achieved, and the degree of re-kyphosis have been studied carefully.

RESULTS: 130 patients were males and 88 patients were females. The average age at surgery was 43.7 years (range 22 to 87 years). The average follow-up period was 24 months (range 12- 48 months). The affected spinal level was thoracic in 153 patients and the lumbar spine in 65 patients. The average operative time of the anterior surgery was 120 minutes in thoracoscopic approach, and 110 minutes in open thoracotomy or lumbotomy approaches. Only one prosthesis dislodged, for which immediate revision surgery was done immediately postoperatively to re-place the cage. Two prostheses (0.8%) showed migration of more than 2 mm at the time of follow-up. However, migration stopped spontaneously after occurrence of solid fusion. Fusion rate was 89%.

CONCLUSIONS: The use of this distractable cage successfully combined the goals of solid fusion and long term anterior column stability with the restoration of vertebral height and normal spinal biomechanics. It could be easily and safely placed in different pathologies through thoracoscopic or open approaches. There is no need to distract the adjacent vertebral bodies before its insertion that safes time.

O66

Pain Management: Ct Guided Percutaneous Transforaminal and Translaminar Steroid Injections

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We present a new and accurate method for delivering particulate steroids and local anesthetics for palliative pain control in patients with herniated and/or extruded disc material, free fragments and spinal stenosis. This technique is especially effective in individuals with radicular complaints in the lower extremities and is more accurate and effective than traditional fluroscopically guided epidural blocks.

Patients are usually treated without the need for conscious sedation. They are prepped and draped in usual sterile fashion in the prone position following obtaining pre-procedure axial ct images. MRI exams have been previewed along with appropriate clinical history and physical exam to determine best image guided approach and level for injection. The radiation exposure is dramatically reduced by utilizing the minimum milliamperage/axial image and number of slices are reduced to the minimum (ten-twenty/case). The entire procedure normally takes about twenty minutes. A two needle technique with a 10 cm or occasionally 15 cm 21 gauge spinal needle is first introduced into the lateral neuroforamen under ct guidance from a posterior oblique approach. Subsequently a curved and steerable 25 gauge needle with "memory retention of the curve" is directed into the medial aspect of the foramen and epidural space. A small amount (1-2 cc) of non-ionic contrast is the introduced to document "spread" into the epidural space surrounding the disc material and/or thecal sac. If necessary a ct guided translaminar epidural may also be performed to obtain additional coverage (useful in large extrusions and/or free fragments extending cephalad or caudal to the disc space). Lateral discs are particularly amenable to this procedure.

The advantages of this more sophisticated and accurate technique for pain management (versus standard fluoroscopically guided translaminar approach) in a variety of settings will be demonstrated along with clinical followup.

O67

The Management of Cervicomedullary Compression in Patients with Congenital and Acquired Osseous-ligamentous Pathologies; Analysis of 26 Patients

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OBJECTIVE: Congenital and acquired osseous-ligamentous abnormalities of craniovertebral junction may cause mechanical compromise, either from direct neural compression and/or from a secondary vascular impairment (arterial or venous), leading to the signs and symptoms of cervicomedullary compression.

METHODS:Between January 1995 to december 2004, 26 cases were managed at our Department. Three of these cases were RA, traumatic (2), congenital basillar impression (5 , in 2 case a posteriorly oriented or retroflexed odontoid), infection (10 ; 9 cases were CVJ pott disease), os odonteideum (3), condyles tertius (1) and tumor (2). Six had a syringomiyelia. The magnetic resonance images and clinical histories of 26 pediatric and young adult patients (15 female, 11 male;mean age 43.2 with CCA were analyzed for subjective grade of VBSC, neurovascular compression , clinical status, treatment, and outcome. Symptoms and signs included headache (72%), ataxia (38%), lower cranial nerve dysfunction (54%), quadriparesis (44%), hyperreflexia (76%), hoffman positivity (72), achilles clonus (72%) nystagmus (33%), dysphagia (22%). The mean follow-up time was 44 months(range 3-85 months). Twelve (46.2 %) had undergone posterior fossa decompression, seven (26.6 %) had ventral decompression.

The pre- and postoperative radiology was compared to assess the adequacy of decompression and stability. The major morbidity included pharyngeal wound sepsis leading to dehiscence (5.2%), valopharyngeal insufficiency (2.6%), CSF leak (2.6%) and inadequate decompression (5.2%). Neurological deterioration occurred transiently in 2 (5.2%).

CONCLUSION: The optimal management of cervicomedullary compression is surgery If they have neurovascular compression syndrome. The surgical approaches are transoral surgery and posterior decompression in addition to spinal fixation.

O68

Major Surgical Complications in Spine Surgery: Is Age a Significant Risk Factor?

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INTRODUCTION: Spine surgery in the elderly continues to increase with the aging population. Our goal was to determine if age is a risk factor for major complications in spine surgery. Influences of comorbidities were explored.

METHODS: Adult patients undergoing spine surgery over a four-year period were included in this study. One independent observer reviewed charts. Major risk factors: cardiac disease, cancer, smoking, diabetes, substance abuse, obesity, respiratory problems, previous infections, hypercholesterolemia. Major complications were defined as death, CVA, embolism, pneumonia and deep wound infections.

A total of 1937 patients age 18 to 91 (average: 48 years) were included: (605 age 18 – 39; 1001 age 40-64, 331 age 65+); 41% were male. Diagnosis included deformity (30%), degenerative (49%) and other (21%). Thirty-five percent underwent combined anterior-posterior procedure, 13% anterior alone; 34% posterior alone.

RESULTS: Major complication rate was 2.1% with no deaths. Major complications included 7 CVA (0.4%), 2 embolism (0.1%), 3 deep wound infections (0.2%) and 28 pneumonia (1.4%).Comorbidities increased with age (any major comorbidity: 45.8% age 18 – 39; 62.4% age 40 – 64; 82.2% age 65+; $p<0.05$). Incidence of any major complications increased with age (1.7% age 18 – 39; 1.5% age 40 – 64 and 3.7% age 65+; $p<0.05$); pneumonia incidence also increased with age ($p< 0.05$). Patients with history of respiratory problems or infections had an increased incidence of major complications and pneumonia. When adjusted for the effect of these two comorbidities, patients age was NOT a significant risk factor (multivariate regression, $p>0.05$).

CONCLUSIONS: Overall major complication rate is low. Although complication rate was higher in elderly, comorbidities are more important factor to consider in assessing surgical risks. In patients with similar comorbidity profile, age is not a significant risk factor. Conc

O69

Controllable Factors on Duration of Surgery and Blood Loss in Anterior Spine Surgeries

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INTRODUCTION: The purpose of this retrospective analytic study is to explore which factors influence duration of anterior surgery/blood loss and determine whether they are controllable factors by the surgeon/surgical team or not.

MATERIALS AND METHODS:Mean age of the patients(n=30)underwent anterior surgery by the same surgical team during last 12 month-period was 43.Fifty-three percent were male.20% of the patients suffered from trauma,10% from deformity,40% from degenerative diseases,17% from neoplastic diseases and 13% from infectious diseases.Mean number of corpectomies and discectomies were 1.23 and 0.73. Mean intubation-extubation time was 254min and mean blood loss was 1906ml. Mean blood pressure was measured as 92 preoperatively. The effects of age,sex,number of discectomy and corpectomy levels,primary or revision surgery,diagnosis,type of cage, no of screws,high speed burr use, and mean blood pressure on both duration of surgery and blood loss were studied.

RESULTS: Pearson's Corr Coeff was 0.79($p=0.000$) between duration of surgery and blood loss;0.43($p=0.019$)between number of corpectomy levels and duration of surgery; and 0.54($p=0.002$)between number of corpectomy levels and blood loss. Differences in blood loss between deformity cases(992)and neoplastic cases (3380)($p<0.017$); between trauma cases (1505) and neoplastic cases (3380) ($p=0.032$) were significant. High-speed burr shortened the duration of surgery(220) when compared with the other cases (333) ($p=0.003$). The effect of high-speed burrs on blood loss(1480vs2900) was also significant ($p=0.03$). When compared the differences in blood loss between the use of expansible cages(1356)instead of regular cages and the use of regular cages (2398), a statistical trend towards significance was observed ($p=0.09$) despite higher mean number of corpectomies for expansible cages (1,50vs1,33).

CONCLUSION:Two controllable factors for decreasing blood loss in anterior spine surgeries are the use of high-speed burrs and expansible cages instead of regular cages.

O70

Controllable Factors on Duration of Surgery and Blood Loss in Posterior Spine Surgeries

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INTRODUCTION:The purpose of this retrospective analytic study is to explore which factors influence duration of posterior surgery/the blood loss and determine whether they are controllable or not.

METHODS:Mean age of the patients(n=56)underwent posterior surgery by the same surgical team during last 12 month-period was 34.46% were male.41% suffered from trauma,9% from deformity,34% from degenerative diseases,7% from neoplastic diseases and 9% from infectious diseases.Mean number of screws and hooks used in the fixation system were 8 and 1 respectively.Mean intubation-extubation time was 293min and mean blood loss was 2151ml.Mean blood pressure was measured as 89mmHg preoperatively.

RESULTS:Pearson's Corr Coeff was 0.85(p=0.000)between duration of surgery and blood loss;0.47(p=0.000)between number of screws and duration of surgery;and 0.50(p=0.000)between number of screws and blood loss.Differences in duration of surgery between deformity and trauma cases(p<0.001);deformity and neoplastic cases(p=0.05);degenerative and trauma cases(p=0.038);degenerative and neoplastic cases (p=0.033)were significant.Differences in blood loss between deformity and trauma cases(p<0.01);degenerative and trauma cases(p=0.007)were also significant.Use of high-speed burrs shortened duration of surgery(254)and decreased blood loss(1676)significantly when compared with other cases(351 and 2884)(p=0.017,p=0.022).Differences in both duration of surgery and blood loss between the use of allografts/synthetic bone grafts instead of iliac autograft(258 and 1724) and the use of iliac autograft(371 and 3129) were significant (p=0.010,p=0.011).

CONCLUSION:Controllable factors for shortening duration of surgery/decreasing blood loss for posterior spine surgeries are the number of screws,the use of high-speed burrs and the use of allografts/synthetic bone grafts.

O71

Comparative Study of Propofol and Midazolam Effects on Immune Function and Wake-up Test in Patients with Idiopathic Scoliosis

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INTRODUCTION: Propofol and midazolam are two most commonly used anesthetic agents in scoliosis surgery. These agents were suggested to contribute to postoperative immunosuppression and might increase the risk of nosocomial and wound infection. The purpose of this study is to investigate any possible immunosuprressive effects of both anesthetics and to compare their efficacy for wake-up test.

MATERIALS AND METHODS: 30 patients with idiopathic scoliosis were prospectively randomized into two groups. Group P (n=15) operated by using propofol anesthesia and Group M (n=15) operated by using midazolam anesthesia. Preoperative and postoperative 24th hour blood samples were analyzed for whole blood count, blood culture, immune markers (ASO, CRP, RF, C3-C4, Ig A, M and G) and neutrophil chemotaxis index (NCI). All patients had the same type of antibiotic prophylaxis and the same number of peripheral and central catheters. Patients were asked whether they remember the wake-up test or not. All patients were treated either by posterior or combined anterior and posterior surgeries.

RESULTS: Both groups were similar according to age, gender, weight, classification of scoliosis, type of surgery, levels instrumented, duration of surgery and anesthesia and amount of blood transfusion ($p>0.05$). There was no significant difference between the pre and postoperative values of immunological markers both in Group P and Group M ($p>0.05$). Preoperative NCI was found to be similar in both groups (Group P: 3.82 ± 0.89, Group M: 3.11 ± 1.05, $p>0.05$) and it depressed to 3.61 ± 1.38 (-2.42%) at postoperative 24th hour in Group P. In contrast to this, NCI increased to 3.28 ± 0.81 (13%) in Group M. However the difference between the two groups was insignificant ($p=0.724$). Two patients (13%) from Group P had postoperative infections including one early nosocomial infection and one late deep wound infection, while there was no infection in Group M. There was no significant difference between the wake-up time while awareness of wake up was significantly ($p=0.002$) high in group P

CONCLUSION: This study could not reveal a significant difference in terms of the majority of immunological parameters between the two groups. However, monocyte count was significantly higher in propofol group and two patients in this group had postoperative infections. On the other hand, midazolam was found to have a better amnesia effect for wake-up test.

O72

Os Odontoideum: A Review of 10 Patients

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INTRODUCTION: There is a few reports of os odontoideum in the literature. This study reviews the results of surgical management of this rare pathology.

METHODS: Ten patients with os odontoideum treated during the period 1995 through 2004 were reviewed. There were 6 males and 4 females. Their ages ranged from 15 to 73 years, with an average of 45. Five patients were neurologically normal, but had neck pain and difficulty in neck movements, while five patients had different levels of tetraparesis. Three patients described symptom development after a trauma, while five patients had a history of trauma 4 to 25 years (mean 14,4 years) before beginning of their symptoms.

All patients except one who did not accept surgery were surgically treated. Of those 9 patients 4 had occipitocervical fixation, 5 had posterior atlantoaxial fusions. Four patients with unreduced dislocations had additional transoral dens resections.

RESULTS: The preoperative reformatted CT scans of 7 patients were evaluated and all showed interdigitation and narrowing of the atlanto-axial joint line or the so-called jigsaw signs were positive. The patients were followed up for 2 months to 9 years, with an average of 3 years. All patients except one with failed occipitocervical fixation achieved solid arthrodesis. Among five patients with spastic tetraparesis, 3 did not change, and 2 had partial improvement after surgery.

Reduction of atlantoaxial dislocation is a prerequisite for posterior fixation alone. In case of nonreduced dislocations, transoral dens resection and occipitocervical fixation would be necessary for decompression.

CONCLUSIONS: Posterior atlantoaxial or occipitocervical fusion is the procedure of choice in most cases with os odontoideum. If, however atlantoaxial dislocation does not fully reduce in extension, transoral decompression with additional posterior fixation is necessary.

O73

Early Results of New Techniques of Minimal Invasive Methods: Percutaneous Instrumentation and Percutaneous Interbody Fusion

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INTRODUCTION: Purpose of this study is to introduce and to present early results of new techniques of minimal invasive methods: Percutaneous instrumentation and percutaneous interbody fusion.

METHODS: These new techniques are applied 8 cases. There were 4 males and 4 females. Mean age was 45.4 years (17-70 years). Etiologies were as follows: Degenerative disorder; 2 cases, thoracolumbar trauma; 2 cases, Pott's disease; 4 cases. Sextant and B-Twin Expandable Spinal Systems were used. All operations were done under general anesthesia. In trauma , kyphoplasty with injection of bioactive cement was followed by percutaneous pedicle screw fixation on one level above and below the fracture. Instruments were removed six months later. Other cases were managed with single level percutaneus diskektomy, grafting (allograft spongious chips), bilateral expandable cage implantation and posterior percutaneous pedicle screw fixation. Plastic corsets were used for 4 months after the procedure.

RESULTS: Mean operation time was 80 minutes (65-125 minutes). Hospital stay was 1 day. There were no early and late complications. Mean follow-up was 8 months (6- 17 months) . Trauma cases were also followed for 10 and 4 months after removal of the implants. No loss of correction was observed in these cases. Solid fusion was obtained in all other cases.

CONCLUSION: Percutaneous instrumentation and percutaneous interbody fusion may provide successfull results with short hospital stay and less morbidity in selective cases.

O74

Posterolateral Approach For Posterior Stabilization, Fusion And Tronsforaminal Interbody Fusion in Lumbar Spine

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INTRODUCTION: In classic approach fibrosis and atrophy was shown in paravertebral muscles due to retraction of erector spine muscles to reach posterior elements. In this paper, modified Wiltse approach was used in cases for spinal fusion and transforaminal interbody fusion (TLIF) that wide decompression is not necessary.

MATERIALS AND METHODS: The paraspinal approach was performed in 16 patients. Nine of the patients have degenerative spine, 3 patients have vertebra fracture, and 2 patients have spondylolisthesis and one patient have vertebra metastasis. In 10 patients, anterior – posterior procedures were performed. Transforaminal interbody fusion or diskektomies were performed in 3 patients and posterior stabilization was performed without decompression in 3 patients.

RESULTS: The mean duration of the posterior procedures with this approach was 72 min. The mean blood loss for the posterior procedures was 405 ml. The patient satisfaction was determined with VAS scores preoperative, during discharge and at postoperative 2 months.

CONCLUSION: In our study, we performed the paraspinal approach with single midline incision and also with longer incisions in all the cases as necessary, compared with previous studies. In our experience, this approach was used between Th12 and S1 levels. The mean blood loss was 405 ml and the mean duration of surgery was 72 minutes. In two patients that TLIF at the L4-L5 and foraminotomy at the L4 level was performed, the time for surgery was 135 minutes and 180 minutes and blood loss was 580 ml and 750 ml respectively. We believe that these two procedures increased the mean surgery time and the mean blood loss in this study. The paraspinal approach can be used in patients who need posterior instrumentation, minimal spinal decompression with foraminotomy, diskektomy and multilevel fusion. The area of fusion and instrumentation can be reached easily and directly without much blood loss and with the decreased time for surgery.

O75

Turkey in Spinal Surgery

SAİT NADERİ (Dokuz Eylül University, Turkey), ALİ ARSLANTAŞ

OBJECTIVE: To designate the place of Turkish spine surgery all over the world and to look over the various journals of spinal surgery to expose the activity of scientific branches regarding mostly Neurosurgery and Orthopedic Surgery.

MATERIALS AND METHODS: In this study some spinal journals including Journal of Neurosurgery (Spine), European Spine Journal, Spine, Spinal Cord, and The Spine Journal were searched on the Pub Med database between the year of 2000-2004, and the number of articles of the countries and scientific branches (i.e. neurosurgery, orthopedic surgery, physical therapy) are documented and classified to reveal the contribution proportion of the countries and these brances.

RESULTS: Turkey has a considerable number of articles after United States and Japan at the "Journal of Neurosurgery (Spine)". In 2000, with significant support of neurosurgeons, Turkey was the second most article sending country with the number of 10. At the following years, Turkey was at the 6th, 4th, 3rd and again 4th place until 2004.

We observed that Turkey was at the 11th place in the "Spine" journal in 2000, 2001 and 2002. But in 2003, with the number of 13 articles, Turkey was at the 6 th place and, in 2004 at the 5th place with 22 articles. The reason of these increasing numbers of scientific papers at the last two years is attributed to important support of neurosurgeons and orthopedic surgeons.

In "Spinal Cord" journal, Turkey was at the 4th, 3rd, 5th, 6th and 5th place between 2000-2004. The majority of the articles were belong to Neurosurgery and Physical Therapy disciplines.

And finally in "European Spine Journal" with the support of neurosurgeons and orthopedic surgeons, we observed that Turkey has increased the number of articles from 5 to 9, until the year of 2004.

COMMENT: The scientists in Turkey, especially the ones interesting in spinal surgery have to make effort to increase the number of these scientific articles.

O76

Percutaneous Transpedicular Screw Fixation (TPSF) of the Thoracic and Lumbar Spine: Introduction of a New Technique

MOHAMED EL-MESHTAWY (Assiut University, Egypt)

This is a prospective study aiming to evaluate the technical aspects and safety of percutaneous application of non-canulated transpedicular screws in the thoracic and lumbar spine. This study included 50 patients with thoracolumbar fractures 38 males and 12 females with mean age 34 years (16-64). All of them had had thoracolumbar spinal fractures and all of them were neurologically free preoperatively. The operative interference was done in the Trauma Unit-Assiut University Hospital. The posterior fixation stage was through the percutaneous approach. One segment fixation was done in 42 patients, two segments in 8 patients. The total number of screws was 217 (5 screws in one patient). The screws and all instruments used were non-canulated. Every screw is inserted under fluoroscopic control through a key-hole incision (1- 1.5 cm). The rods are applied sub-muscular and. Every hole is closed with one stitch. Preoperative and postoperative CT analysis of the pedicular dimensions and violation of the screws were recorded. 11 patients underwent fixation in the thoracic spine (from T5 to T12) and 39 patients in the lumbar spine (from L1 to L5). The mean operative time was 50 minutes (35- 110). The mean operative blood loss was 60 ml (40- 100). No suction drain was applied. One day analgesia was required in most of our patients. No preoperative or postoperative antibiotics were used. There was no neurological deterioration in any of our cases. Only two screws violated the medial wall of the pedicle (0.9 %), and 6 screws violated the lateral wall of the pedicle (2.8 %). The pre-operative local kyphotic angle was 9° in average that has been improved to 2° postoperatively. As a Conclusion, it is a new report about using the usual non-canulated transpedicular screws percutaneously for thoracolumbar spinal fractures. The percutaneous TPSF using the non-canulated screws is a safe less expensive, and real minimal invasive method.

O77

Spinal Shortening for Thoracolumbar Burst Fractures

MOHAMMAD EL-SHARKAWI (Assiut University, Egypt)

INTRODUCTION: Posterior distraction and fixation for unstable thoracolumbar burst fractures further destabilizes the spine by creating a defect in the anterior load-sharing column resulting in late collapse and metal failure. Anterior surgery to reconstruct the anterior column with tricortical bone graft is difficult, with lengthy patient recovery and relatively high morbidity, especially from the graft donor site. Posterior spinal shortening and fixation is a new surgical technique that combines the simplicity of posterior surgery and the biomechanical advantage of anterior surgery.

PATIENTS AND METHODS: The technique entails complete laminectomy, discectomy, and spinal shortening by posterior fixation and compression opposing the fractured vertebra to the adjacent one aiming at fusion. No graft is harvested. Twenty-one patients with unstable thoracolumbar burst fractures (18 A3 & 3 C3) were prospectively treated and evaluated at mean of 19.2 months.

RESULTS: All patients with incomplete neurological affection improved at least by one Frankel grade except one. At the latest follow-up, 16 patients (76%) patients reported no or minimal back pain, 14 (67%) returned to their previous job, and 5 (24%) returned to a less strenuous job. Radiologically, the median kyphotic angle improved from 24.1 to (-2.1). Post-operative CT confirmed canal decompression in all patients. Complications were minimal.

CONCLUSION: Posterior spinal shortening and fixation restores sagittal alignment, decompresses the neural canal, and reconstructs the anterior load-sharing column. This new surgical technique seems to yield excellent clinical and radiological outcome with minimal morbidity.

O78

Effect of Adding Interspinous Wiring to the Post. Spinal Implants in the Surgical Treatment of Thoracolumbar Fractures with Ruptured Posterior Ligament Complex

ERHAN SESLİ, TAHİR SADIK SÜĞÜN, AHMET DURAN KARA (Ege University, Turkey), MURAT ÖZTÜRK

INTRODUCTION: Post.Lig.complex of spine may be ruptured depend of the vertebra fractures. Biomech. properties of the spine are decreased by the tears of the posterior ligament of spine. Interspinous wiring(isw) during the surgical treatment of the thoracolumbar vertebra fracture increases the stabilisation effect of spinal implants. The aim this radiologic retrospective study; to analyzed of the effect of adding isw technique to thoracolumbar fractures with ruptured interspinous and supraspinous ligaments

PATIENTS/METHODS: 66 thoracolumbar vertebra fractured patients who had stabilized by post. spinal implants had included to this study. 2 groups patients were identified. Group 1 consisted of 33 thoracolumbar vertebra fractured without any ligamentous lesion patients who were treated by only post.stabilisation systems, while Group 2 consisted of 33 with posterior ligamentous lesion patients who were treated by post.stabilisation systems adding isw. The compared both groups as radiologic measurement methods in pre-op, post-op and follow-up periods statistically. The method of measurements was ratio of interspinous space between lesion level and adjacent level (Label was named –X-) .Than each three period of two groups were compared in all.

RESULTS: Preop X value was mean 1,26 (min:0,72 max:2) In group 1; while, was mean 1,88 (min:1,16 max:4) in group 2 after fracture. In Post-op period; mean 1,17(min:0,58 max:1,85) in group 1 and mean 1,21(min:0,66 max:2) in group 2 . In follow-up mean 1,16(min:0,6 max:2,2) in group 1 and mean 1,25(min:0,66 max:2,5) in group 2. The differences between both groups were meaningful ($P<0,05$) statistically.

CONCLUSION: The adding isw to posterior spinal implantation was fascilitate reduction manuever and balance the distractive forces of spinal implant with effect of hinge; in this manner stabilisation of spinal implant is increased.

O79

Correlation Between Grade of Pain Relieve and Complications of Vertebroplasty in Patients with Osteoporotic, Metastatic Vertebral Fractures

IGORS AKSIKS, VIKTORS VESTERMANIS (P. Stradins Clinical University, Latvia), EDMUNDS KARKLINS, KARLIS KUPCS

INTRODUCTION: The aim of the study was to assess the back pain relieve and possible complications after vertebroplasty (VP) in patients with osteoporotic (OVCF), metastatic vertebral compression fractures (MVCF) and painful haemangiomas (PH).

MATERIAL/METHOD: 111 VP were performed in 62 patients with OVCF, MVCF and PH. All patients were divided in 3 groups. Group A included 34 patients with OVCF, group B - 15 patients with MVCF, group C – 13 patients with PH. In all cases diagnosis was established morphologicaly (simultaneous biopsy of damaged vertebral bodies). The severity of pain before and after PVP was estimated using visual analogue scale (VAS).

RESULTS: Average VAS indices before PVP in group A were 8,6 points, in group B - 9,1 points, in group C – 6,8 points. The effect of pain relieve after VP was divided in 3 groups: good (VAS <3 points), satisfactory (VAS 3-5 points) and poor (VAS >5 points). In group A 33 patients characterized their pain relieve as good, 1 patient characterized his pain as satisfactory. Average VAS value in group A – 2.9 points. In 1 patient after VP a reversible irritation of L5 root was diagnosed. In group B good results were obtained in 6 patients, satisfactory in 13 and poor – in 2 patients. Average VAS value in group B –4,7 points. Significant cement leakage into spinal canal was diagnosed in 2 patients from group B (without neurologic sequences). In group C good results were reached in 10, and satisfactory results – in 3 patients. Average VAS value in group C – 1.8 points No method-associated complications in group C were detected.

CONCLUSIONS:

1. PVP provides good pain relief in all groups of patients.
2. Vertebroplasty in patients with OVCF and PH is most effective and associated with minimal risk of complications.
3. In cases of MVCF VP must be done in carefully selected groups of patients.

O80

Radiographic Measurement of the Sagittal Plane Deformity in Patients with Osteoporotic Spinal Fractures: Evaluation of Intrinsic Error

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EMRE ACAROĞLU, MUHARREM YAZICI, OĞUZ KARAEMINOĞULLARI, AKIN ÇİL,
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INTRODUCTION: Cobb method has been shown to be the most reliable technique with a reasonable measurement error to determine the kyphosis in fresh fractures of young patients. However, measurement errors may be higher for elderly patients as it may be difficult to determine the landmarks due to osteopenia and the degenerative changes.The aim of this study is to investigate the intrinsic error for different techniques used in evaluation of sagittal plane deformity caused by OVCF.

MATERIALS AND METHODS: Lateral X-rays of OVCF patients were randomly selected. Patient group was composed of 28 female and 7 male with a mean age of 62.7 (55-75) years. Kyphotic deformity was measured by using four different techniques, measuring the angle between the superior and the inferior endplates of the fractured vertebral body; the inferior endplate of the vertebral body just above the fracture and the inferior endplate of the FVB; the inferior endplate of the vertebra above and the superior endplate of the vertebra below the FVB; the superior endplate of of the vertebral body below; and the vertebral body heights (VBH) were measured at three different points.

RESULTS: The mean intra-observer agreement intervals of measurement techniques ranged from ±7.1 degrees to ±9.3 degrees for kyphosis angle and from ±4.5mm to ±6.6mm for VBH measurement techniques. The mean interobserver agreement interval for kyphosis angle ranged from ±8.2 degrees to ±11.1 degrees and between ±4.5mm to ±6.5mm for vertebral body height measurements.

CONCLUSION: This study revealed that although the intra and interobserver agreement were similar for all techniques, they are still higher than the generally accepted measurement error of 5 degrees. These high intervals for measurement errors should be taken into account when interpreting the results of correction in sagittal plane deformities of OVCF patients after surgical procedures such as vertebral augmentation techniques.

O81

Penetrating Spine Injuries

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BACKGROUND: Penetrating spine injuries, although not as common as blount trauma, have special problems which should be addressed seperately. There are two types of penetrating injuries: gunshot wounds and stab wounds. This report describes the clinical characteristics of a personal series.

CLINICAL MATERIAL: Between 1994 to 2004 28 cases with penetrating spinal injuries (21 civilian gun shot injury, 7 stab wounds of the spine) were admitted to Ege University Neurosurgery Department. Their demographics (mean age 32,3, range 9-65, 24 male, 4 female) and localization of injuries (cervical 7, thoracic 13, lumbar 8) did not show significant difference between gunshot injuries and stab wounds.

RESULTS: Severity of spinal cord injury was almost same in both groups: ASIA scores were A in 8, C in 7, D in 5 and E in 1 patient with gunshot injuries, while A in 3, B in 1, C in 2 and D in 1 patient with stab wounds.

Other organ injuries presented in gunshot wounds (7 cases), but in none of the stab injuries. CSF fistulae was also a problem in one patient with gunshot injuries, but none of the stab wounds had a CSF fistulae. We performed surgery in 4 patients with gunshot injuries and 2 patients with stab wounds.

CONCLUSION: Surgery does not play a significant role in penetrating spine injuries unless there is an incomplete myelopathy due to a surgically correctable cause, such as hematoma, or CSF fistulae. Stab wounds have a better prognosis and surgery plays a much larger role. Retained foreign objects should better be removed after a stab injury, whereas bullet fragments may be left in place. For prophylaxis against infection, antibiotics should be administered for a few days after penetrating injuries, and this period should be longer in case of CSF fistulae.

O82

The Surgical Treatment of Thoracolumbar Vertebra Fractures by Posterior Instrumentation without Fusion

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INTRODUCTION: Most spine surgeons advocate posterior fusion as the treatment of choice for unstable thoracolumbar vertebra fractures. On the other hand ; posterior spinal fusion procedures have been reported to have various adverse effects including pseudoarthrosis, spinal stenosis, spondylolysis, accelerated degeneration of the adjacent unfused segments and donor area problems. We prefer the technique of open correction and stabilisation by posterior spinal instrumentation without fusion for the surgical treatment of thoracolumbar vertebra fractures since 1990 in our clinic. The aim of this retrospective study was to evaluate the results of our procedure radiologically, and compare to the instrumented posterior fusion modalities in the literature.

PATIENTS AND METHODS: 64 thoracolumbar burst fractures of 57 patients were included to current study. The patients average age was 33.5 (range 15- 62 years) year old on time of surgery. All fractures were classiffied according to Denis' Burst Fracture Classification. The posterior hook ,screw and rod systems were used. No fusion was performed .The patients were followed clinically and radiologically for average 12.4 months (range 3-72 months). The implants were removed for average 13.4 months (range 6-21 months) after surgery. The sagittal plane contour was assessed by measuring the Vertebral Body Angle (VBA), the Sagittal Index (SI), and the Vertebral Kyphosis Angle (VKA) The frontal plane contour was assessed by the Vertebral Scoliosis Angle (VSA).

RESULTS: The results of radiographic measurements were evaluated. There was statistically a significant decreasing of VKA, VBA angles and SI , against no significant decreasing of VSA angles in the post-operative and follow-up period ($p<0,05$)

CONCLUSION: Posterior internal fixation by spinal instrumentation without fusion is preferable treatment modality of the treatment of thoracolumbar vertebra fractures

O83

Missed Thoracic Spinal Fractures in Multiple Trauma Patients

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PURPOSE: To assess the need for repeated x-ray and CT of the thoracic spine for routine clearance of multi-trauma cases in Intensive Care Unit (ICU).

METHODS: Five cases were consulted by Orthopedic Surgeon at mean 3 days (range 1-6) after admission to the ICU.The median age was 31,6 years (range 23-50).The charts and first chest radiographies of cases were reviewed.The neurological assessment was done using the Frankel scale and fractures were classified according to Magerl.

RESULTS: Thoracic spine fractures were not shown initially on chest radiographs.Repeated x-rays and CT of the thoracic spine showed fractures of the vertebrae with great accuracy.The average Injury Severity Score was 35. Other injuries noted at the time of presentation included: Lung contusion (2),lung laceration (1),haemothorax (5),multiple rib fractures (4),maxillofacial trauma (1) and extremity trauma (1).The mean duration of artificial ventilation was 5 days (range 2-5) and of ICU treatment was 10 days (range 2-19).One case died. Missed thoracic fractures were consisted of type A3 in two cases (T7 and T8),type B2 in one case (T9),type B3 in one case (T4) and gunshot injury in one (T9).Neurological lesions were Frankel A in 4 cases and Frankel E in 1 case. Four of 5 cases were operated,3 presenting complete paraplegia and one neurologically normal, only one case made a neurological improvement from Frankel A to E and one case's status has remained normal. One case who had complete paraplegia was treated conservatively and there was no difference his neurological status at follow up.

CONCLUSION: The radiological signs may be minimal or absent during the first assessment of thoracic spinal fractures. Most importantly, cases in whom a full neurological examination is not feasible at the time of injury should be regarded as having a thoracic spinal fracture even in the absence of clear plain film features. This fact has implications for the nursing care of such cases in the ICU. CT is warranted in these cases.

O84

Upper Cervical Spine Injuries: A Review of 101 Patients

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OBJECTIVE: Injuries of the atlantoaxial complex account for roughly one fourth of all cervical spine injuries and are notorious for causing diagnostic and therapeutic problems because of the complexity of structures and trauma mechanisms involved. This is a retrospective analysis of a series of upper cervical spine injuries in a single institute.

CLINICAL MATERIAL: Hundred one patients (22 female, 79 male, mean age 44 years) were admitted during a 12-year period (1993-2004) for injuries of the upper cervical spine. Eighty one were followed for a mean time of 32 months. Twelve isolated C1 fractures, 11 combined C1-C2 fractures, 57 isolated odontoid fractures, 20 hangman fractures, 1 isolated ligamentous instability were diagnosed. Fourty-seven patients were treated conservatively and 54 patients were undergone surgery. Nine ventral odontoid screw fixations, 45 dorsal stabilizations were performed. Stability was evaluated using flexion-extension radiography. Pain levels and neurological outcome were also assessed.

RESULTS: There were no operative mortality. Complications were wound infections (5), CSF fistulae (1), instrument failure (3: one Halifax clamp dislodgement, 2 failure after C1-C2 wiring for odontoid fracture), which then needed dorsal restabilization. Of those 22 patients with neurological deficits, 20 have improved in different levels. One patient with severe tetraplegia (ASIA A) has died before stabilization surgery.

CONCLUSIONS: Patients with type II odontoid fracture, type III hangman's fracture and combined C1/C2 fractures were candidates to surgery. The determinents for surgery were dislocation more than 5 mm, angulation and dislocation during flexion-extension radiographs, canal compromise and lack of decompression and reduction during traction.

O85

Total Spondylectomy for a Cervical Spine Tumor

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OBJECTIVES: Malignant or aggressive benign tumors arising in in the thoracolumbar spine can be resected en bloc. However, this technique is difficult in tumors of the cervical spine, and there are a few previous reports of successful en bloc resection of such tumors. This study documents the surgical technique used for en bloc excision of an aneurysmal bone cyst arising in the midcervical spine.

METHODS: Using a posterior-anterior-posterior approach, a tumor invading C6 and C7 vertebral bodies and soft tissue mass on the left side was removed en bloc, by making troughs in the vertebral body and endplates of C6 and C7 using high speed drill. Left vertebral artery, C6, C7 and C8 roots and brachial plexus were preserved. Anterior and posterior fixations were performed.

RESULTS: En bloc excision of an aneurysmal bone cyst in the cervical spine was achieved using 540 degrees surgery. The surgical margin was intralesional in a small area.

CONCLUSION: The technique used in this case study indicates that en bloc excision of such tumors can be used with a safety margin even in the cervical spine.

O86

Primary Tumors of the Cervical Spine: A Review of 35 Surgically Managed Cases

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OBJECTIVE: This study aims to analyse the surgical management and results of 35 patients of primary bone and soft tissue tumors involving the cervical spine.

MATERIAL: During an 13-years-period, 35 cases with primary tumors of the cervical spine have been operated on: chordoma (8), aneurysmal bone cyst (2), plasmocytoma (3), chondrosarcoma (2), eosinophilic granuloma (2), osteoid osteoma and osteoblastoma (2), osteochondroma (3), hemangioma (2), aggressive fibroma (2), giant cell tumor, schwannoma, malignant peripheric nerve sheat tumor, desmoplastic fibroma, synovial sarcoma, spindle cell sarcoma, angiosarcoma, lipoma, lymphoma (each 1 case). Age distribution was 7-70 years.

RESULTS: The indication, timing and type of the operation were depended on the neurological status, situation of spinal canal, and stability of the spine. Marginal excision or subtotal excision used as method of tumor removal depending on location, size and type of the tumor. Twelve patients had residual tumors or recurrences which required repeat surgeries. A total of 66 surgeries (average 1.88 for per patient) were performed. Posterior (26), anterolateral (24), retropharyngeal anterolateral (9), combined anterior-posterior (4) transmandibular (1), and lateral cervical approach (2) were used. Instrumented fusions were applied to 16 patients. One patient died three weeks after the surgery.

CONCLUSION: Whether benign or malignant, surgery of the primary tumors of the cervical spine should aim to total tumor removal. However, anatomic constraints of the cervical spine make en bloc tumor excision extremely difficult. In our cases, incomplete removals led recurrences and successive operations, especially for chordoma cases. Neverthless, despite recurrences, surgery of primary tumors of the cervical spine results in acceptable mortality-morbidity rates and symptom-free years, even for histologically malignant tumors.

O87

Aneurysmal Bone Cysts of the Spine

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BACKGROUND: Aneurysmal bone cyst is a benign, relatively uncommon lesion, representing 1.4% of primary bone tumors. The vertebral column is involved in 3-20% of cases. This report describes clinical charactheristics and treatment results of 9 patients with aneurysmal bone cyst of the spine.

CLINICAL MATERIAL: Between 1995 to 2004 nine patients with aneurysmal bone cyst of the spine were surgically treated in Ege University Neurosurgery Department. The clinical records, radiographs, histologic sections, and operative reports were analyzed.

There were 5 male and 4 female patients, mean age was 21.7 years (range 7 to 45 years). Localizations were cervical (2), thoracic (2), lumbar (3), and sacral region (2). The two most common clinical features were pain (9 patients) and neurological symptoms resulting from spinal cord or nerve root compression (5 patients). Neurological signs were paraparesis in 2, monoparesis in 3. The mean duration of symptoms was 12.1 months (range 3 months to 3 years).

All patients underwent surgery. Gross total removal in 7, subtotal resection in 2. A total of 12 surgeries (two and three consecutive surgeries in two patients) were performed because of residive tumors. A posterior (5), anterior (2) or combined anterior-posterior (2) approaches were used. The mean follow-up is 93 months (range 1 to 88 months). There were no recurrences.

CONCLUSION: Treatment options for aneurysmal bone cysts are simple curettage with or without bone grafting, complete excision, embolization, radiation therapy, or a combination of these modalities. Complete excision of aneurysmal bone cysts offers the best chance of cure and spinal decompression. In this series complete tumor removal provided cure for this agressive pathology.

O88

Current Treatment of Metastatic Spinal Tumors

MEHMET TATLI (Dicle University, Turkey), ASLAN GÜZEL

INTRUDUCTION: Metastatic spread to the spinal column is a growing problem in patients with cancer. It can cause a number of sequelae including pain, instability, and neurologic deficit. If untreated, progressive myelopathy results with the loss of motor, sensory, and autonomic functions. Except in rare circumstances, treatment is palliative. Traditionally, conventional fractionated external beam radiotherapy has been the choice of treatment . Surgery for metastatic spinal disease was, and generally continues to be, equated with laminectomy by many physicians. Today, the goal of surgery is to achieve circumferential decompression of the neural elements while reconstructing and immediately stabilizing the spinal column.

METHODS: Twenty-three consecutive patients with metastatic spinal tumours that underwent microsurgical treatment were retrospectively studied. All patients underwent magnetic resonance imaging and had histological confirmation of spinal tumours.

RESULTS: There were 15 men and 8 women with a mean age of 50.05 years(range 10 to 68 years). The location of the tumours was thoracic in 17 cases, lumbar in 2 cases, and multilevel in four cases. The mean tumour size was 2,7 cm (range 1,2 to 7cm) and mean duration of symptoms was 4 months. Complete excision was achieved in 12 cases and incomplete removal in 13 cases. Twenty cases recieved conventional external beam radiotherapy and chemotherapy. The mean follow-up period was 14 months (range 15 days to 2 years). Immediate post-operative improvement was noted in 10 (43 percent) patients, 6 (26 percent) improved within three months, 6 (26 percent) had no improvement and a patient died.

CONCLUSION: The number of treatment options for metastatic spinal disease grows, it has become clear that effective implementation of treatment can only be achieved by a multidisciplinary approach. Postoperative outcome is correlated to duration of symptoms and the histological type of primary cancer.

O89

Reconstruction with Chest Tube-PMMA in Metastatic Tumors of the Vertebra

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INTRODUCTION: Metastatic tumours of the spine may cause pain and/or neurologic compromise necessitating decompression and major reconstruction despite the short life expectancy.This study introduces a new and cheaper reconstruction method.

MATERIALS & METHODS: All patients treated for metastatic vertebral tumor by using chest tube reconstruction between 2002 and 2004 were included in the study. Symptoms, findings, affected level, neurological status (Frankel grade) of each patient were noted. After resection of the tumor chest tube of adequate length was prepared based on the distance between the end-plates, was filled with PMMA and placed vertically at the resected area.Operative and postoperative complications, need of reeoperation, implant failure, and neurological status at the latest f/u were investigated.

RESULTS:12 patients(9male,3female) were included in the study. Mean age was 53.3 years(28-73). Indication for surgical intervention was myelopathy in 10 patients and radiculopathy in two of them. PreoperativeFrankel grades were A in 2, B in 7, D in 2, and E in 1 patient.Primary tumours were multiple myeloma(4), lung(3), gastrointestinal(2), kidney(1), breast carcinoma(1) and malignant mesenchymal tumor(1).The lesion was at the thoracic level in 11, and lumbar level in 2 patients.One level-resection was performed in 6 while two levels-resection was done for the remaining 6 patients. Anterior instrumentation was done for all patients.

Nine of the patients died after a mean follow-up of 8.2 months(1wk–19mnths). 3 patients who were alive at the time of evaluation had a f/u of 19.3months(10-24). Postoperatively 8 patients were free of spinal pain while 4 had considerable improvement. Improvement of three-grades in Frankel classification was observed in 2, two–grades in 6 and one-grade in 4 patients. No implant failure has occurred.

CONCLUSION:Reconstruction with chest tube-PMMA is nonexpensive and easily applicable, is as safe and effective as the previous methods.

P01

Created Burst Fracture Model For Biomechanical Studies

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INTRODUCTION: The investigators have managed many biomechanical experimental studies in this field in order to discover which treatment modality is the best.

The aim of this study is to create a burst fracture model using a new apparatus followed by to prove its activity in order to use in biomechanical studies.

MATERIALS AND METHODS: Eleven thoracolumbar spinal specimens from eleven calves were retrieved from an abattoir. Our design apparatus was used in order to create experimental burst fractures. This apparatus consists of two cylindrical steel bars with closed top , and two steel pistons with closed bottom. The steel bars are able to move through the steel pistons. Axial compression force was applied on each specimen through the apparatus average 17250 Newton (N) (range 16000-18500 N) in load by hydraulic material-testing machine.

RESULTS: Fracture was confirmed on each specimen according to both macroscopically as hearing a "clic" sound and as reaching of the maximum load of test machine.

All specimens were then evaluated with anteroposterior and lateral plain radiographs, and computed tomography (CT) scans. Plain radiographs showed widening of the interpedicular distance, flattening of the body height, and presence of segmental kyphosis. CT scan showed failure of anterior and middle column, and retropulsed bone fragment in the spinal canal. In addition posterior column was disrupted on some specimens which was indicated unstable burst fractures.

CONCLUSION: There has been a number of burst fracture model in literature. One of them was dropping a mass from the height onto the vertebra specimen. Others were that sudden compression on which specimen was mounted in the test machine, or the corpectomy models. Our model was created in which specimen was subjected gradual compression using hydraulic material-testing machine. We use presented burst fracture model in the biomechanical studies as an alternative method.

P02

The Agreement Between Radiographic and Surgical Measurements of Intervertebral Disc Height: A Cadaveric Study

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Whether in the cervical or the lumbar region, measurement of disc height has various clinical implications, including monitoring degenerative changes or intervertebral disc surgery with or without fusion. This study aimed to evaluate the agreement between radiographic and post-discectomy surgical measurements of human intervertebral discs' height C2-C3 thru L5-S1.

Eleven cadaver spines (10 males and 1 female, 243 disc levels) were used for this study. The death age for cadavers was ranged from 44 to 62 years (mean, 52 years). The heights of all intervertebral discs of each spine were measured by both radiographic and direct "surgical" methods. For radiographic measurements, the method described by Frobin et al. was used, which was originally proposed for lumbar levels (Fig. 1 and 2). For direct measurement, discectomies were performed anteriorly, and the size of the biggest spacer which could be inserted into the space without excess distraction was recorded as the height of that intervertebral disc. Both radiologic and direct measurements were performed by two researchers to assess interobserver agreement.

For each region the interexaminer agreement determined by the Bland-Altman method for both radiological and direct measurements was good. Mean values and standard deviations for radiological and direct measurements of disc heights were, recpectively, 4.65 ± 0.59 mm and 4.45 ± 0.58 mm for cervical, 5.06 ± 0.74 mm and 4.90 ± 0.71 mm for thoracic, 11.29 ± 2.47 mm and 10.90 ± 1.77 mm for lumbar regions. Although the radiographic measurements of the cervical and thoracic levels gave 0.2 mm higher values than those of direct measurements on average, the agreement between radiographic and direct measurements was found to be satisfactory. Thus, we conclude that, using preoperative lateral X-rays and the method described by Frobin et al., it is possible to estimate the post-discectomy surgical height of intervertebral discs correctly, for all the spine regions.

P03

Efficiency of Fresh Frozen Allograft and Autograft Combination in Posterolateral Spine Fusion: An Experimental Study

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INTRODUCTION: Autografts (AU) are the most effective graft material used for spinal fusion. In clinical practice, when multi-level fusion is required, autografts could remain inadequate in means of quantity. Mixing the allograft and autograft is a reasonable solution to increase graft volume. On the other hand, alone allograft applications had good fusion rates in the literature. In this study, the question that we were willing to find an explanation is whether adding AU to fresh frozen allograft (FFA) supplies any advantages to achieve solid fusion over the alone FFA in posterolateral fusion model of rabbit.

MATERIAL AND METHODS: In the study, twenty-four New Zealand albino rabbits were used. Three groups were constituted as autograft alone, fresh frozen allograft alone, and the combination of AU and FFA. Allografts were prepared at sterile conditions and preserved at -22ºC. The rabbit model for posterolateral fusion had been described by Boden was used. In the hybrid group, equal amount of AU and FFA were mixed. At the end of 6th week, all rabbits were sacrificed. Spine fusion masses were evaluated by means of manual palpation, radiography, biomechanics, and histology.

RESULTS: At the end of the study, it was recorded that autografts were superior to other materials in terms of spinal fusion formation as usual. There was no statistically significant difference between FFA and FFA-AU combination in radiologic, macroscopic and biomechanic parameters. In histologic examination, alone FFA application was superior than hybrid graft ($p<0.05$).

CONCLUSION: In the current study, we observed that FFA-AU combination has no major advantage over alone FFA application. Possible factor for an explanation to this finding is inherent antigenic properties of the FFA. We hypothesized that antigenity of FFA serves negative environment to AU and could lead the loss of autogenic advantages.

P04

The Variation of Sacral Hiatus and Caudal Epidural Block: A Morphometric Study

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STUDY DESIGN: An morphometric study of the sacral hiatus using isolated sacra.

OBJECTIVES: The purpose of the present study was to clarify the anatomic variations of the sacral hiatus using the bony landmarks of the sacrum for improving the reliability of CEB.

BACKGROUND DATA: The sacral hiatus is the most important bony landmark for CEB since the apex of the sacral hiatus shows the existence of a sacral canal. Sometimes experienced clinicians difficulties to palpate the sacral hiatus and other bony landmarks. Therefore, it is important to clarify the anatomic variations of the sacral hiatus without soft tissue.

METHODS: The sacra in this study are from Kahramanmaras Sutcu İmam Medical University, Cukurova Medical University, Gaziantep Medical University and Ankara University School of Medicine. A total of 96 isolated sacra were used in this study. The bony landmarks were sacral hiatus and sacral cornua. Morphologic types of the sacral hiatus were classified using these landmarks.

RESULTS: Anatomic abnormalities of the sacral hiatus were absent hiatus (6 sacrum: 6.25%) (Picture 2), absent sacral cornu (5 sacrum: %5.2), bony septum (6 sacrum: 6.25%), and complete agenesis (Picture 3) which means that sacrum has no posterior wall (2 sacrum: 2.08%).

CONCLUSIONS: The sacral hiatus has got anatomic variations. Understanding of these variations may improve the reliability of CEB. The CEB failure occurs even if the fluoroscopic view is used. The present study showed that CEB failure might occur in % 6.25 of patients (since absent hiatus) and difficult in % 11.45 (bone septum 6.25 and % 5.2 absent sacral cornu) of patients because of anatomic abnormalities. However, the risk of dural puncture may induce in complete agenesis which means that sacrum has no posterior wall (2 sacrum: 2.08%). İn conclusion; we should pay attention to anatomic variations of sacral hiatus when performing CEB.

P05

In Vitro Investigation of Heat Transfer in Calf Spinal Cord During Polymethylmethacrylate Application for Vertebral Body Reconstruction

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The objective of this experimental study was to investigate the temperature variations within the spinal cord of calf cadavers during polymethlymethacrylate (PMMA) application for vertebral body reconstruction. Cervical spines including the cervical spinal cord of ten fresh cadavers were used. Corpectomy and laminectomy were performed and dura was exposed at the same level for proper placement of thermal sensors. Sensors were placed in multiple holes in the spinal cord at depths of 3, 6, 9 and 12 millimeters, respectively. Whether the thermal sensors were placed in the gray or white matter was determined by computerized tomography. The white and gray matters of the spinal cord exhibited different thermal properties. The white matter was more conductive and absorbed less heat than the gray matter. The heat sensor nearest to PMMA exhibited temperatures of 42 to 44 ºC. The second heat sensor placed at 9 mm depth within the gray matter showed 44 ºC. The third sensor, which was placed at 6 mm depth within the spinal cord recorded the same temperature as the first, i.e., nearest to PMMA sensor. The fourth heat sensor, which was at the farthest location from PMMA demonstrated 37 to 39 ºC. The temperature distribution within the gray matter was inversely proportional to the distance from the heat source. The temperature at the dorsal white matter, which was distant from the heating source, remained nearly constant and was not elevated. Our data suggest that thermal injury to the spinal cord during PMMA application may be expected to be more significant in the gray matter when compared with other neural tissues.

P06

Electron Microscopic Study of The Progeny of Ependymal Stem Cells in the Normal and Injured Spinal Cord

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BACKGROUND: Spinal cord injury (SCI) is a common and often irreversible lesion that can incapacitate patients for life. After SCI, precursor cells in the spinal cord proliferate in response to trauma, and this proliferation can be enhanced by exogenous stimuli such as the administration of specific growth factors. In the present study, we examined electron microscopic detection of the proliferation, distribution and phenotypic fate of these precursor cells in the injured adult rat spinal cord.

METHODS: Adult female Sprague-Dawley rats weighing 250-300 gr. were used. Three groups of rats were used. The first group was spinal cord injured animals with application of a 2.4 gr.clip extradurally around the spinal cord at the T1 level. The second group was spinal cord injured animals with application of a 26 gr clip. The third group included normal, uninjured animals. The rats were sacrificed at 3 days, 3 weeks and 6 weeks after injury. A segment of the spinal cord 0.4 cm. in length encompassing the injury site was removed and prepared for electron microscopy.

RESULTS: 3 days after mild injury (2.4 gr clip), ependymal cells begun to proliferate and migrated from the central canal. They had tendency to surround perivascular spaces. They were close to the axons. The central canal rostral to the lesion site was widely dilated 6 weeks post-op in moderate injured groups (26 gr clip). The layer of ependymal cells lining the dilated canal showed reduction in cell height. Traumatic syringomiyelic cavities were observed in all of the animals. There was an active proliferative response of the ependymal cells to injury. There were large clusters of displaced ependymal cells associated with the dilated central canal. There were extensive cords and rests of ependymal cells remote from the central canal with a tendency to form rosettes and accessory lumina. 6 weeks after trauma, fascicles of 3-8 fibers enclosed within an ependymal cell were a common finding among the ependymal clus

P07

Total Spine MRI Screening in Adolescent Idiopathic Scoliosis (evaluation of Results in 177 Cases)

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INTRODUCTION: Performing routine total spine MRI in adolescent idiopathic scoliosis is a controversial issue. Some authors believe that MRI must be performed in atypical cases, while some other donot agree with this idea. Considering our clinical experiences and present contraversy, we decided to perform routine MRI of spine in all patients with adolescent idiopathic scoliosis and evaluate the results.

PATIENTS AND METHODS: A prospective clinical study was performed. In all patients with adolescent idiopathic scoliosis who were candidates for corrective surgery a total spine MRI was performed.

RESULTS: There were 186 patients. 9 cases with mild neurological findings were excluded. In the remaining 177 patients (132 female, 45 male), average age was 15±2 years(11 to 22years).

Average cobb angle of the major curve was 59±17º (30 to 135º). Convexity was to the right side in 146 cases and to left in 31 cases. In 12 cases (6.8%) there were positive MRI findings(table). In 5 cases (2.8%) neurosurgical intervention was necessary prior to scoliosis surgery.

There were no statistically significant relation between age, sex, presence of pain or curve angle and positive MRI findings ($P>0.05$).

Left convexity had statistically significant relation with positive MRI findings ($P=0.013$).

In males with left convex curves the probability of positive MRI findings was 8.8 times other patients.

CONCLUSION: Considering our research results and other reported articles, it seems that performing total spine MRI screening of all patients presenting as idiopathic scoliosis is necessary for detection of underlying pathologies before surgery, especially in male patients with left convex curves.

P08

The Use of one Cage for Unilateral Transforaminal Posterior Lumbar Interbody Fusion: A Preliminary Report

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INTRODUCTION: Unilateral transforaminal posterior lumbar interbody fusion (TLIF) is a technique that consisted of two mesh cages into the interbody space to support anterior column, in addition pedicle screw instrumentation to provide posterior column stabilization.

The aim of present study was to evaluate three cases who underwent TLIF procedure using one cage instead of two.

MATERIALS AND METHODS: Three cases with spondylolisthesis underwent TLIF procedure between 2003-2004. Average age was 33 years (range 27-38 years). Surgical procedure included laminectomy, left facetectomy, and decompression of affected nerve roots followed by discectomy and placement of a cage. Thereafter, posterior pedicle screw instrumentation was carried out. Autologeus bone grafting was combined in all patients as well.

RESULTS: Average follow-up was 15,3 months (range 10-19 months). Radiographic good fusion was obtained in two patients. Although one patient has had no complete fusion in 10th months postoperatively, fusion process goes well so far.

All patients had neurologic symptoms preoperatively. Two of them had complete neurologic recovery, whereas one patient had partial recovery so far. The patients had moderate low-back pain before surgery. Pain levels improved in all. All cases are house-wifes have been able to do their activities of daily living at the latest follow-up.

CONCLUSION: As generally accepted, TLIF is a procedure in which two cages is inserted into the disc space. In the present study, placement of one cage was attempted for TLIF procedure. The advantages were shorter operative time as well as less implants insertion. The patients fared well since surgery with relief of back pain and neurologic symptoms. Latest radiologic assesment showed that two patients have good fusion, one had a normal process of fusion so far. We consider that our short-term follow-up period is promising for the clinical outcome.

P09

Treatment of Two Cases with L5-S1 Spondyloptosis by Gaines Procedure: 8 Years Follow up

DERYA DİNÇER, MEHMET ARMANGİL (İbni Sina Hospital, Turkey), TARIK YAZAR, KEREM BAŞARIR

INTRODUCTION: Spondyloptosis or grade 5 spondylolisthesis is defined as the forward slippage of the entire L5 vertebral body of S1. Reduction of severe spondilolisthesis continues to be a subject of debate. Reduction and fixation of L5 on to S1 is a treatment option but it has high rate of major complications after reduction. A method described by Gaines including L5 vertebrectomy, reduction and fusion of L4 on to S1 seems logical because it shortens the spinal canal and peripheral nerves can be re aligned avoiding neurological deficits.

This article reports two cases of spondyloptosis treated by Gaines procedure.

MATERIALS AND METHODS: One of the patient was 18 year old girl who was operated in 1995 and the other was 17 year old boy operated in March 2003 by Gaines procedure. Both of them attended our clinic with the complaints of low back pain tightness and weakness in legs, which progressively increased by time.

In the first stage the patient was positioned supine and an anterior transperitoneal midline incision was used. The body of L5 to the bases of pedicles and the upper and lower discs are removed. The second stage was performed by a posterior midline approach. The pedicles and loose neural arc is removed, reduction and fusion of L4 onto S1 is performed by pedicular instrumentation.

RESULTS AND DISCUSSION: At eight years and one year follow up, both patients were active no complaints were recorded. Slip angle has changed greatly from pre to post operation and solid fusion is achievied. Radiographic follow up is given in table I. In conclusion Gaines procedure is a major spinal reconstruction consisting of two stages. In our experience in such cases like this, Gaines procedure is indicated because of high incidence of neurologic deficits by direct reduction of L5 onto sacrum and without reduction it is difficult to achieve solid fusion. This procedure should be performed for severe cases like spondyloptosis and by experienced surgeons.

TABLE

TABLE I (radiologic follow up)

	Preop	Postop 6 m	Postop 1 y	Postop 8 y
Slip angle	42/ 25	0/0	8/0	6
L1-L5 lord	32/50	-	-	-
L1-L4 lord	26/20	32/9	30/9	40
L1-S1 lord	28/26	38/4	40/4	36
L4-S1% sli	100/100	24/25	38/25	40
Sacral Inc	24/32	26/34	24/34	30

values are in degrees and respectively for the patients

P10

Classification of Adolescent Idiopathic Scoliosis (Ais) as a Guide to Surgical Treatment

PANAYOTIS SMYRNIS (KAT Hospital, Greece)

INTRODUCTION: Classification systems for AIS may not clearly discriminate between various patterns of curves. Adding numerous subgroups with rare types or those based on measurable criteria with notable intra and inter-observer variations is possibly increasing confusion. This is an attempt to redefine dividing lines between various common forms of AIS and their respective surgical management.

METHODS: Our investigation is based on 124 consecutive patients 107 F, and 17 M, with I.S. of 40-80 degrees and mean age 16y. Of these, 104 p. were operated, 42 Harrington (H) or Luque (L) instrumentation (1981 -1987) and 62 CDI systems (1988 – 2000). Follow up 2 - 16y. mean 4y. All charts were evaluated retrospectively as to clinical picture, location (apex), size of curves and rotation in coronal and sagittal standing radiographs. Position of L4 L5 (horizontal, left or right tilt) was noted, also curve relation to CSVL (Central Sacral Vertical Line), flexibility on supine films, extent of fusion, postop. correction and balance disturbances.

RESULTS: Three main patterns were distinguished in 124p.

1. Right Thoracic (Rt T) (King type III?, IV, V) curves in 34 p. (27%).
2. Double Rt T- Lt L (Left Lumbar) (King type II and partly III) curves in 63 p. (51%).
3. Left Thoracolumbar (Lt TL) ± Rt T (see King example type I) curves in 20 p. (16%).

A trial application of this system on figures of 359 AIS (40-80°) serially found in literature acknowledged 104 Rt T, 150 Double Rt T - Lt L and 71 TL curves (57 Lt, 14 Rt).

CONCLUSIONS: The present classification based on 124 and 359 from literature covers 91-96% of AIS with 40-80° curves. It relies on morphological signs clinical and radiological. After this standard assignment the Lt L curve in type 2, the T in type 3, the Lt PT (Proximal Thoracic) usually in type 1 or 2 and Sagittal Kyphotic sections if present are further analyzed using measurable criteria for selective fusion.

P11

Management of Scoliosis in Proteus Syndrome: A Case Report

TARIK YAZAR, DERYA DİNÇER, OĞUZ CEBESOY (Ankara University, Turkey), KEREM BAŞARIR

INTRODUCTION: Proteus syndrome is a rare congenital hamartomatous malformation with a wide spectrum of abnormalities including overgrowth of various tissues. more than 100 cases with their clinical and radiologic features have been reported in the literature. althought spinal deformities were present in more than half of cases, surgical correction of these deformities, especially scoliosis surgery has rarely been documented. this is the third case in the literature to the best of our knowledge. the purpose of this study was report a new case of proteus syndrome with scoliosis and result of the surgical correction procedure.

CASE REPORT: 12 years old girl admitted with chief complaint of back asymetry. she had scoliosis with thorocolumbar curve with a cobb angle of 44 degrees between T7-L2(king type 3). she was treated with brace initially however curve progressed to 50 degrees within the next 6 months. she underwent posterior instrumentation(coutrel-dubousset) and fusion between T6-L3. the curve was reduced to 22 degrees postoperatively. the spine developed further scoliotic deformity at 20 months follow up. the cobb angle was 46 degrees which was similar to preoperative value.

RESULT: In our patient a disabling deformity was present which was progressed despite conservative treatment with brace. althought adequate correction was achieved initially with posterior instrumentation, postoperative loss of correction was observed at 20 month. We conclude that the spinal deformities seen at proteus syndrome has ahigh risk of progression even after adequate surgery. The overgrowth potential of the tissues in proteus syndrome may be responsible for these failures. althought affected individuals have normal intelligence and life span, surgical correction of spinal deformities in proteus syndrome should only be considered in the presence of lung or other vital organ dysfunction.

P12

Universal Spine System (USS) Instrumentation in Adolescent Idiopathic Scoliosis

DERYA DİNÇER, KEREM BAŞARIR (Ankara University, Turkey), MEHMET ARMANGİL, TARIK YAZAR

INTRODUCTION: Adolescent idiopathic scoliosis (AIS) is the most common type of structural scoliosis. Cotrell-Dubousset (CD) instrumentation was the first system that provides bilateral segmental fixation of spine. USS instrumentation was introduced as a result of further development in posterior instrumentation systems The purpose of this study is to evaluate radiological results of USS instrumentation for adolescent idiopathic scoliosis.

MATERIALS AND METHODS: Between 2003 and 2004, 11 patients with adolescent idiopathic scoliosis were surgically treated with Universal Spine System and posterior fusion. Standard standing posteroanterior and lateral radiographs were evaluated. The magnitudes of the curves were measured according to Cobb in both preoperative and postoperative radiographs.

RESULTS: Before surgery, the mean Cobb angle of the curve was 49.6º (range, 30º-80º). After surgery the mean angle was 19.9º (range,10º-35º). The mean final correction of the curve was 23.3 (range,10º-30º) after an average of 11.8 months follow up. The correction obtained with surgery was maintained at 1 year follow up.

DISCUSSION: The main goals in the treatment of AIS are the correction of the deformity, providing the long term biologic fixation for maintenance. USS provided similar radiologic correction of the deformity when compared to previous reports. There was no significant loss of correction noted. The correction of the deformity is not related only to instrumentation used but the rigidity and magnitude of the curve and newly designed instrumentation devices usually provide technical ease in application more than better correction of the curve.

CONCLUSION: The evaluation of newly designed instrumentation systems can only be made with comparing the results with published series of old instrumentation devices in terms of correction and maintenance of correction. The short term radiologic outcomes of USS for AIS were similar to older instrumentation systems.

P13

Cotrel-dubousset Instrumentation for Adolescant Idiopathic Scoliosis; 6 Years Follow up

TARIK YAZAR, DERYA DİNÇER, OĞUZ CEBESOY (Ankara University, Turkey), KEREM BAŞARIR, ENGİN KARADENİZ

INTRODUCTION: coronal and saggital plane corrections are the critical to the long-term success of scoliosis surgery.

MATERIAL AND METHOD: 30 patients with adolescant idiopathic scoliosis(ais) who had undergone posterior instrumentation with cotrel-dubousset(cd) system and fusion between 1198-2004 were evaulated. all spine radiography were obtained per 6 month interval after surgery. cobb angle measurement was used for preoperative and postoperative evaulation. the scoliotic curves were classified according to king classification system. 4 of them were king type 1, 14 type 2, 8 type 3 and 4 type 4.

RESULTS: At the final follow up, coronal plane analysis showed that an average postoperative correction was 62 percent for thoracic curves and 64 percent for lumbar curves. slightly higher correction were obtained in king type3. thoracic hypokyphosis mildly increase. the normal saggital curves was maintained in the lumbar spine at last follow up. there were no neurological deficit and no major wound problem occur after postoperative period.

CONCLUSION: The data suggest that from this study; cd instrumentation achieves satisfactory correction of the curves if the apropriate fusion level selected.

P14

Screwing Bone Graft on to The Base of Transverse Process a New Technique in the Treatment of Isthmic Spondylolisthesis

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This study involves results of a new technique, with an average 2.4 (1-4) years of follow up, applied on 27 patients for the treatment of adult isthmic spondylolisthesis with a slippage of up to 50 %.

TECHNIQUE: Lytic area is reached via the posterolateral, intermuscular approach with a double incision. 1/3 superior of the superior facet of the caudal vertebra is removed. This helps the foramen to be seen much wider laterally. Bone tips on the lisis line and the fibrocartilaginous tissue are widely cleaned with kerrison rongeur. Hence, the pressure on the radix at the foraminal level is removed. Transverse process of the slipped vertebra is decorticated so as to involve the lateral of the facet joint as well, and the transverse process of the vertebra below it is decorticated so as to involve the facet joint (sacral ala in S1). Spondilolisthesis reduction screws are placed onto these vertebrae, sticking out 1 cm. Two oval holes, of which the distance is equal to that of the screws, are made on the unicortical block graft of appropriate size, obtained from the iliac bone. The graft is attached to the screws through these holes and placed on the decorticated bones. The connector and the rod are placed on the screws. The same procedure is applied to the other side as well. First, the screws on the caudal are tightened to the connectors, and then the screws on both slipped vertebrae are tightened simultaneously. Thus, not only the reduction is achieved, but also the grafts are placed onto the base of the transverse process, which is the most sufficient area for fusion with a wider surface contact .

According to Lenke and Bridwell's radiographic grading classification, 20 patients were categorised as grade A; 6 were of grade B, and 1 was of grade C. Screw malposition was observed in 3 patients. In one of these patients, radicular damage developed and partial recovery was determined in a one-year follow up. No infection was observed.

P15

Screening of Spinal Deformities Without Ionizing Radiation

TARIK YAZAR (Ankara University, Turkey), KEREM BAŞARIR, DERYA DİNÇER, OĞUZ CEBESOY

Patients exposed to ionizing radiation while obtaining radiograms used for follow up of scoliosis. It has some shortcomings such as increased risk of breast cancer. Orthelius is used a new method of follow up without ionizing radiation based on 3-D modeling of the vertebral column with computer based on data obtained by spinous process palpation. It also avoids the angle changes due to rotation of patient. The reliability of this screening method was analyzed.

30 patients who were admitted with the complaint of back asymmetry were evaluated between October 2003 and March 2004 with Orthelius 800 and x-rays. Subsequent measurements with Orthelius were made by three investigators each for two time and the results were evaluated with reliability analysis.

Of the 30 cases evaluated with Orthelius, 26 had the diagnosis of scoliosis, 4 were normal. Twenty six thoracic and 13 lumbar deformities were diagnosed. The mean Cobb angle measured for thoracic and lumbar curves were 18.3° and 23.2° respectively. The results were SPSS 11.5 with reliability analysis. Alpha values for thoracic curves and lumbar curves were 0.96 and 0.98 respectively indicating high reliability.

In the adolescent patient the most common problem is the progression of the curve and the evaluation of the response to the treatment. Scoliosis patients were undergo a series of direct x-rays with a mean of 25.and exposed to high amount of ionising radiation mean 10.8 cGy which cause increased risk for breast cancer. Orthelius has the advantage of 3-dimentional evaluation without ionizing radiation. with comparable intra and inter observer variability for Cobb angle measured on direct roentgenograms.

Despite high reliability of the method, treatment decision can not be based on solely this method but it can be used for evaluation of the progression and response to treatment with acceptable reliability.It may also be used for school screening.

Fig-1 Measurement with Orthelius

Fig-2 X-ray Cobb

P16

Prior Results of Three Cases, Which were Applied Posterior Fusion and Instrumentation Because of Adolescent Kyphosis

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FOREWORD: Prior results of three cases which were applied posterior fusion and instrumentation because of adolescent kyphosis were evaluated

MATERIAL AND METHOD: Two girls and one boy whose spine were applied posterior fusion and instrumentation in 2000-2001 and after 49.3 months observation these 3 cases were evalueted.Posterior pedicle screws hook combination and two rods are determined each-other with connectors and adjustment was provided for sagittal deformity. In instrumentation cases between Torasic 2-Lumbar 2 (T2-L2), T2-L1, T4-L2 were applied. After the surgery 10 (9-12) days it was mobilized and discharged.The radiologic indication of the cases was done by cobb method between T4 and T12 vertebra indication is best evalueted in sagittal plan by determining proximal and distal levels. Preoperative levels were compared. The cases were scrutinize the magnetic resonance imaging displaying technique for searching the additive spinal abnormalities and they were reported in order to control and evaluation of postoperative process the existence of fusion and also the proximal or distal operation area. Pain activation of extremity and adaptation of social life and self confidence was observed

RESULTS AND FINDINGS: The thorasic curve between T4-T12 in preoperative sagittal plan cobb angle in average 71.6 (63-76) degree, after pursuance of 49.3 months (38-57) postoperative in average 38.3(23-47)degree was measured. Radiologic improve was average %46.47 (38-63). In many of cases early or late neurological deficit didn't occured.The pain which had occured in preoperative stage dissapeared. The lost of clinic and radiologic correction weren't seen. There weren't incapability result of the instrumentation by fusion. It wasn't needed the usage of corset in postoperative stage.In conclusion with the cosmetic get well of the cases their joining the social life,self confidence and adaptation increase and also postoperative satisfaction were really well, as it was observed.

P17

Congenital Cervical Scoliosis. A Case Report

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KEMAL YÜCESOY (Dokuz Eylül University, Turkey)

Congenital cervical scoliosis is associated with Klippel-Feil syndrome in %50 of the cases. In this study a 15 year-old patient having cervical scoliosis due to developmental bony abnormalities of cervical spine is presented

15 year-old patient was admitted with the complaint of neck bending. Patient's head has been bent to right with limitation of motion. Cervical scoliosis was evident on anteroposterior plain radiography and Cobb angle was measured as? Patient was operated and bilateral C2-C6 lateral mass plate-transpedicular screw fixation was performed Congenital cervical scoliosis is rarely seen and lateral mass plate-transpedicular screw fixation can be successfully used in the treatment of these cases.

P18

Spinal Deformity After Intradural Tumor Surgery: Report of Three Cases

ERCAN ÖZER, ORHAN KALEMCİ, CEM YURTSEVER,
KEMAL YÜCESOY (Dokuz Eylül University, Turkey)

About 45 % spinal tumors are intradural. Because of spinal deformity risk, limited laminectomy or laminotomy are performed for surgery of these tumors for preservation of normal cervical alingment.

In this study, we present three cases of spinal intradural tumors, one is cervical dumpbell neurinoma, one is a thoracolumbar intradural schowannoma case and the other is a case of intramedullary cervical ependymoma. All patients admitted with complaints of pain at releavant sides. Dumpbell neurinoma was removed by performing two level hemilaminectomy and unilateral facet dislocation was appearent on second year control x-ray. Anterior cervical plating and laeral mass fixation were performed in this case. Thoracolumbar intradural tumor was resected using five level laminotomies. Hyperkyphosis was detected two years after surgery and posterior spinal instrumention was done to correct deformity. Ependymoma operation was carried on through one and half laminectomy, kyphosis was determined on fifth month control radiography. Both anterior and posterior internal fixations were used for correction.

Altough dynamic graphies give detailed information about instability, no problem was determined initial to the tumor resection operations in all these cases. Pain is a an important follow up symptom suggesting deformity.

P19

Thoracic Spinal Stenosis Above Severe Thoracolumbar Kyphosis Causing Neurological Deficit

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INTRODUCTION: The neurological deficit can be seen in severe thoracolumbar kyphosis caused by spinal tuberculosis (early or late onset), fracture and congenital deformities. We describe here a new entity of neurological deficit mechanism due to the thoracic spinal stenosis produced above the severe thoracolumbar kyphosis. Our aim is to highlight the exact reason of neurological deficit in patients with a severe thoracolumbar kyphotic deformity.

CASES: First patient was a 53-year-old man presented with a history of spinal tuberculosis and spastic paraparesia, urinary incontinence. The radiological examinations showed thoracolumbar tuberculosis with a kyphosis measuring more than 90° and compensatory thoracic lordosis with spinal canal stenosis at the lordotic segment. The second patient was a 78-year-old woman presented with a spinal claudication and difficulty in walking. She had a history of two previous operations due to the degenerative disc disease and osteoporotic Th12 vertebra fracture. Physical examination revealed upper and lower motor neuron signs. The last patient was a 34-year-old man presented with a spastic paraparesia. The radiology showed a kyphotic deformity measuring 90°, corresponding thoracic lordosis above the deformity and L1 hemivertebra.

DISCUSSION: We believe in that facet orientation change and direction of them towards spinal canal cause spinal canal stenosis and foraminal stenosis in the transition zone from the severe kyphotic segment to the compensatory lordotic segment above. These changes result in shearing stresses in long period and cause facet hypertrophy and spinal canal narrowing. We would like to remind the surgeons that survey of the spine above the kyphotic segment, especially transition zone from kyphotic segment to the proximal lordotic segment should be done to identify the cause of neurological deficit in patients with severe thoracolumbar or upper lumbar kyphosis of different etiologies.

P20

The Posterior Instrumentation with the Pedicle Screw in The Surgical Treatment of Adolescent Idiopatic Scoliosis (Ais)

ÖMER KARATOPRAK (Göztepe Hospital, Turkey), KORAY UNAY, NADİR SENER

OBJECTIVE: In cases which the treatment is done with only pedicle screw (PS), the results of the correction is better but balance problems and increases in distal lumbar curve can be seen due to excessive correction. In this study the cases which were instrumented with pedicle screw (PS).

MATERIAL AND METHODS: Instrumentation with PS was applied to 17 females and 3 males. There were 1 Type I case, 5 Type II case, 8 Type III case, 1 Type IV case and 5 Type V case according to King classification. The patients were followed with the average time of 14.1 months (range 12-28) and they were evaluated with various parameters as preoperative, early postoperative and 12th month.

RESULTS: The postoperative correction average was calculated as 70.2% (range 58.0-84.6); and the average of the lost of correction at the follow-up was calculated as 3.6 degrees (range 0-8). The average fixation point was 19.5 (range 15-26) and the average of the number of vertebrae included in the fusion was 12.3 (range 10-15). The apical vertebra derotation established as 7.2 degrees (range 5-10) and translation established as 36.0% (range 22-44). The average amount of intraoperative bleeding was 1564.5ml (range 1200-2100), and the average time of the surgery was calculated as 357.7min (300-400). Postoperative frontal balance (distance of the middle of the C7 vertebra corpus at the midsacral line) average was measured as 15.3 mm (range 8-32). The average values at preoperative, postoperative and 12th month, Cobb angle, kyphosis between T4-T12, the lordosis between L1-L5 are shown at the table.

CONCLUSION: Thoracic pedicle screw doesn't have wide acceptance due to the fact that the risk of neurovascular complication is high. However the 3D correction can be established with a higher ratio and more moveable segments can be saved with the instrumentation of PS. Consequently, we think that PS instrumentation will be used more widely as the time passes.

TABLE

The average values at preoperative, postoperative and follow--up

	Preoperative	Postoperative	Follow-up
Cobb angle	61.8(49-82	18.3(9-32)	22.0(12-40
T4-T12 (°)	25.7(14-44	31.7(25-40	31.9(25-40
L1-L5 (°)	-37.9(-20/	-41.2(-30/	-42.1(-34/

P21

An Evaluation of the Results of Surgical Treatment for Congenital Scoliosis

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STUDY DESIGN: Congenital scoliosis (CS) is the most common pathology of spine. The deformity pattern can be understood beter by using new scanning methods. A series of 31 consecutive patients with congenital scoliosis is presented.

MATERIALS AND METHODS: 31 patients (21 F, 10 M) with congenital scoliosis were included. Mean age at time of surgery was 14.3 (4-36) years. All patients had undergone a magnetic resonance imaging study for intramedullary pathologies and consultated with releated clinics. Four patients had treated by conservative methods previously and than by operatively. Hemivertebrectomie and posterior fusion had performed to 4 patients (13%), hemiepiphysiodesis to 7 patients (22%), posterior fusion to 14 patients(46%), anterior fusion to 2 patients (6%) and combine anterior and posterior fusion to 4 patients (13%). SSEP monitorisation was made in all operations. The mean follow up was 48.7 months (6 - 109).

RESULTS: Congenital scoliosis was most commonly found in the thoracolumbar region (16=51.62%), middle in thoracic region (10=32.25) and in the lumbar region (5= 16.13%). Rib anomalies were seen in 4 patients (12%), diastematomiyelia was seen in 3(9%), renal anomalies were seen in 2 (6%), hypertrichosis was seen in 2 (6%), mitral valve prolapse was seen in 2 (6%), pectus excavatum was seen in 2 (6%), sacral displasy was seen in 1 (3%) and servical block vertebrae was seen in 1 (3%)patients. Spinal cord disfunction had developed in one patient, her implaments has took out and postoperative neurologic improvement was observed. Infection and skin problems were seen in two patients, treatment was achieved with dressing and antibiotherapy.

DISCUSSION: Determining the form of operative treatment is depend upon the age of patient, the type, area, natural history of the deformity and pattern of curvature. The correction of this deformity brought together the risk of neurologic deficit and the golden standart of the treatment is to halt and correct the curvature before the deformity becomes permanent.

P22

Comparison of the Results of Cotrel-Dubosset and Sublaminar Wire Fixation Methods for the Treatment of Adolescent Idiopathic Scoliosis

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OBJECTIVE: At least 5 - year follow up results of adolescent idiopathic scoliosis, those were treated using Cotrel- Dubosset instrumentation and Luque sublaminar wiring methods were reviewed retrospectively. Results of these two methods were compared.

METHODS: Twenty nine patients were included in the study. Fourteen of patients were treated using Cotrel-Dubosset (CD) and fifteen were treated with Luque sublaminar wiring method. Mean age at the time of surgery was 15.3 years in CD group and 17.7 for sublaminar wire group. Preoperatively primary curves were measured using Cobb method, revealing a mean of 49.9 degrees for CD group and 56.4 degrees for sublaminar wire group. At the end of follow up period, mean Cobb value was 15.6 for CD group and 19.7 for sublaminar group.

RESULTS: Statistical analysis of the results revealed that there is no statistical difference between these two methods at follow up ($p>0.05$). During follow up period, for two patients in CD group pull-out of proximal hook were encountered. In one of these patients revision was performed.

DISCUSSION: From aspects of correction of deformity and maintenance of correction, comparison of CD and sublaminar wiring method showed that there is no difference between these two methods at the end of follow up period.

P23

King Type II and King type III Adolescent Idiopathic Scoliosis; Treatment with Third Generation Spinal Instrumentation and Segmental Sublaminar Wiring

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King type II and King type III Adolescent Idiopathic Scoliosis; Treatment with Third Generation Spinal Instrumentation and Segmental Sublaminar Wiring Scoliosis is a three dimensional deformity. Adolescent idiopathic scoliosis is the most seen type. King type II and king type III scoliosis are the most common types that undergo surgery. In our study, correction was obtained by using sublaminar wires, pediculer screws, hooks and rods.

MATERIALS AND METHODS: In our study 28 patients that had adolescent idiopathic scoliosis were operated with using third generation posterior spinal instrumentation systems and sublaminar wiring between January 1998 and January 2003. The mean follow up period was 46 months (from 24 to 84 months). Patients mean age was 17 years (from 14 to 19 years). King type II deformity was in 17 patients and king type III deformity was in 11 patients. The total number of sublaminar wires that been used was 142. All sublaminar wires were placed at thoracal vertebral region. All patients were braced during the postoperative period as long as the rigid fusion was obtained.

RESULTS: The mean Cobb angle was 63 degrees (from 48 to 93) preoperatively and improved to 30degrees (from 12 to 48) postoperatively. Average correction was %52,4. At the last follow up the mean correction loss was 4degrees (from 2 to 8). Intraoperatively and postoperatively, no neurologic complication was seen.

DISCUSSION: Luque et al. described the segmental sublaminar wiring method in treatment of adolescent idiopathic scoliosis. Sublaminar wiring method has many advantages for correction in adolescent idiopathic scoliosis therefore its beneficial features attract the orthopaedic surgeons.

Appropriate correction could be obtained with third generation spinal instrumentation systems and sublaminar wiring. It is safe and easy method with experience.

P24

Surgical Treatment of Upper Thoracic Scoliosis of a Case of Aarskog Scott Syndrome

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PURPOSE: Aarskog-Scott syndrome (AAS) or faciogenital dysplasia is a genetically heterogeneous developmental disorder. The X-linked form is due to mutations in the FGD1 gene. This rare syndrome is a triad of facial, digital and genital characteristics. Facial features including ocular hypertelorism, a short nose with anteverted nares, long philtrum. Extremity dysmorphism including short broad hands with clinodactyly, and genital anomalies such as shawl form scrotum. Hyperextensibility of the joints, metatarsus adductus, brachydactyly, and genu recurvatum have been described. Vertebra anomalies are such as hypoplastic cervical vertebrae, scoliosis, and spina bifida occulta.

MATER METH: 16 years old boy is refered to our clinic with shoulder asymmetry since one year. He had short stature (145cm), macrocephaly, broad upper lip with long philtrum, ocular hypertelorism, shawl scrotum, brachydactyly, and T3-T11 thoracic scoliosis with right thoracal hump. Cobb angle was 52 degree. Posterior thoracic approach with transpedicular instrumentation, correction, and fusion was performed between T1-L1 vertebrae. Cobb angle measured 18 degree after surgical correction and thoracal hump disappeared. Patient mobilized on second day postoperatively and shoulder asymmetry resolved.

DISC CONCL: AAS syndrome is an uncommun genetic disorder with commun skletal deformities. Scoliotic deformities don't have any specific pattern. Surgical correction of the deformity can be difficult because of the premature fusion and hypoplastic vertebrae at these levels.

P25

The Prevalance of Scoliosos Probability in School-Age Children

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OBJECTIVE: To determine the poor posture in the scool-age children is very important to prevent the development of both the bad appearance and the sceleton-muscle and internal disorders in the future. So, because of the conservative treatment opportunity of these disorders in the early phase, the surgical intervention incidence would be reduced.

MATERIALS AND METHODS: We selected 228 students for this study between the age of 7-18 (mean 11.57+/-2.78). 116 of these 228 students were male (%50.9) and, 112 students were female (%49.1). The students were evaluated for poor-posture, back pain, fatigue and familial story. The presence of structural scoliosis were searched via 'standing forward-bending test' of American Pediatric Academy.

RESULTS: The prevalance rate of the scoliosis possibility was determined as %4.8. There was no correlation between the scoliosis possibility and sex (X2: 0.974, SD:1, p: 0.324). But we found a significant increase in the development of scoliosis with the rising age (X2: 9.295, SD: 2 p: 0.01). And also the scoliosis possibility was much more frequent in the students with poor-posture (X2: 5.968 SD:1 p: 0.015).

INTERPRETATION: The scoliosis prevalance is between %1.7-4.1 in the literature. In our study we revealed the scoliosis prevalance as %4.8. As a result we want to emphasize the importance in detecting this mostly conservatively treatable disorder in the school-age children would be helpful to prevent the scoliosis related disorders in their future life.

P26

Results of Surgical Treatment For Kyphotic Deformity of The Spine Secondary to Trauma or Scheuermann's Disease

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INTRODUCTION: Sagittal plane deformities, especially kyphosis, is not only a cosmetic problem but may also result with back and low back pain and neurologic impairment in time . The treatment strategy differs with severeness, progression and etiology of deformity.

MATERIALS AND METHODS: This is a retrospective study of 30 patients who underwent surgical treatment for kyphosis secondary to trauma (12 patients) or Scheuermann's disease (18 patients) between 1992 and 2003. The mean follow up was 47.7 months (range, 26-114) and 49 months (24-133) respectively. Radiological evaluation of Scheuerman kyphosis included assessment of thoracic kyphosis angle (TKA), lumbar lordosis angle (LLA), scoliosis angle (SA) and sagittal vertical axis (SVA); radiological evaluation of post-traumatic kyphosis included the determination of local kyphosis angle (LKA) and SA, if present. A posterior approach was performed in 13 cases and a combined anterior and posterior approach was performed in 5 cases of SD whereas patients with post-traumatic kyphosis were treated using an anterior approach in one case, posterior approach in three cases and a combined anterior and posterior approach in 8 cases.

RESULTS: The mean TKA in Scheuermann cases was 72° (65°-94°) preoperatively and 39° (22°-58°) postoperatively. The mean loss of correction was determined as 5.5°. No positive sagittal balance was present during follow-up. The mean TKA in post-traumatic cases was 50° (25°-62°) pre-operatively and 18° (range -15° and 28°) postoperatively. At the last visit, the mean loss of correction was determined as 20. Proximal junctional kyphosis developed in two cases with Scheuermann kyphosis (17° and 13°) and in one case with post-trauma kyphosis (170) case.

CONCLUSION: These findings show that good results can be achieved in the treatment of kyphosis decondary to trauma or Scheuermann's disease, with appropriate selection of the surgical approach.

P27

Complete Reduction of Spondyloptosis Complicated with Pseudoarthrosis: A Case Report

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INTRODUCTION:Spondyloptosis is defined as severe spondylolisthesis of L5 vertebra permitting vertical descent of the entire vertebral body of L5 below the end plate of S1. In this study, a case of surgically treated spondyloptosis was described and the treatment alternatives were discussed.

CASE REPORT: A 17 year-old male was admitted with a history of severe back pain in a 2-year duration accompanied with numbness and weakness in the lower extremities. Physical examination revealed positive straight-leg raising tests at thirty degrees with hamstring muscle tightness. Quadriceps motor power was 3/5 for both limbs. Lumbosacral radiographs demonstrated spondyloptosis between L5 and S1. MRI examination revealed L5 root compression on both sides. During surgery initially L5 laminectomy and foraminotomy, L4 inferior hemi-laminectomy and partial resection from S1 body were performed. After screw placement at L4, S1 and S2, reduction was achieved with distraction between L2 and S2, and then screws were placed on L5 as well with bone grafting. Implant failure and loss of reduction occurred at the 6th-month follow-up, which was treated with revision of instrumentation and fusion from L3 to S2. At final follow-up 6-months after the secondary procedure clinical and radiolographic fusion was observed.

DISCUSSION: The stabilization of the listhetic vertebra and decompression of neural structures is the most widely accepted treatment choice for spondyloptosis. Though some authors favor spondylectomy and the progressive reduction of the dislocated segment, one stage reduction and instrumentation with fusion was successful in this case. Despite complete reduction, pseudoarthrosis and implant failure occurred. Complete reduction can be achieved by pedicle screw instrumentation systems with meticulous care to the nerve roots but combined anterior and posterior fusion may have prevented pseudoarthrosis. A "360 degree fusion" should be considered in spondyloptotic patients.

P28

Does Vertical Thoracic Expansion Improve Respiratory Function Tests in Patients with Scoliosis?

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INTRODUCTION: Scoliosis is a deformity of the spine which can have serious effects on the cardiovascular system. The respiratory complications in untreated or ineffectively treated patients can lead to life threatening or disabling results. A new treatment method addressing the thorax in scoliosis surgery has recently been developed. Vertical expandable prosthetic titanium rib (VEPTR) application is used to rexpand the thorax in scoliosis patients. our aim was to obseve the short term effects of VEPTR application on the pulmonary functions of scoliosis patients.

MATERİAL AND METHODS: Three scoliosis patients were operated using VEPTR. one was a congenital thoracal scoliosis of 68 degrees with unilateral bar at T7-8-9 and contralateral hemivertebrae the other was a thoracal juvenile scoliosis of 55 degrees who had undergone repeated fusion operations and the final one was an adolescent scoliosis of 65 degrees. All patients had respiratory function tests preoperatively and at 3,6 and 12 weeks follow-up. They were asked to evaluate their activities of sports and daily living and sleep comfort comparing the preoperative and postoperative situations.

RESULTS: The respiratory function tests did not reveal any improvement with preoperative values regarding forced expiratory volume and vital capacity but the oxygen saturation had improwed from a mean of 90% (85-95%) to 96% (90-98%). They also reported significant improvements in sports and daily living activities and sleep comfort. The deformity was not corrected in the previously operated patient with a fused spine. The other two patient had a correction of 25 degrees. The mean operating time was 65 minutes.

CONCLUSION: VEPTR is an easy and effective surgery and can provide subjective improvement of pulmonary functions in the short term. Long term and objective benefits should be studied. the major drawback of this method is the high cost of the implant.

P29

Comparison of Pedicular Screws with Hook only Posterior Instrumentation in the Treatment of Schuermann Kyphosis

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Edicular screws have been used in lower thoracic and lumbar segments. Use of pedicular screws in the upper thorasic spine is new in use. This change is the expectancy of better deformity correction and better fixation at the segmental level.

Between Dec 2000 and dec 2004 a total of 51 patients with Schuerman Kyphosis were operated. 24 of the Thoracic Kyphosis were corrected with pedicular screws,14 were corrected with pure hooks while 13 had screw fixation at the T12-L1 level and hooks at the upper segments. In the Pure Pedicular screws group a total of 234 screws were inserted between T2-T12. The maximum instrumented level was T8 (in 48 screws) and the least was T2 (only 8 screws). Pure Hook group had hooks between

T2 and L1 with the use of different pedicular hooks, transvers hooks, lumbar and thoracic laminar hooks Hooks were formed into claws in all cases. Pre and post operative and last follow up xrays in two planes were taken on all patients and early CT of the spine was used to asses the placement of screwsNone of the patients had nörologic complications. Early examination revealed that 34 screws outside the pedicles that did not cause deterioration of correction. The amount of correction was 51% in the pure screw group, 44 % in the pure hook group and 46 % in the combined group. Late follow up after 1 year showed 1.5 Degree of corrcetion loss in pure pedicular screw group 4 degrees in pure screw group and 3.5 degress in the combined group. 2 patients in the pure hook group had dislodgement of the claws without any loss of correction and one patient had screw pull out at the L1 Level in the combined group.

According to our results after a learning curve treatment of Adolesent Schuerman kyphosis with pedicular screws offers better correction ease of rod placement with less loss of correction.

P30

A Microinvasive Intermuscular Approach to Lateral at Thel5-S1 Level Disc Herniation

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MUSTAFA AKÇETİN

OBJECTIVE: Far-lateral at theL5-S1 level disc herniations are rare entitiy in the all lumbar disc herniation.. To preserve the facet joint, a approach was performed. We describe a minimal invasive intermuscular approach (MIIMA) for decompression of the far-lateral at the L5-S1 level disc herniation.

MATERIAL AND METHODS: An imaging study revealing a L5-S1 far-lateral disc herniations (FLLDH) consistent with the patient's clinical presentation. In our deparment, between 2000 and 2004, a total of 580 patients underwent discectomy for lumbar disc herniation; 24 had a foraminal or extraforaminal herniation (4.1%). 14 patients had at the L4-L5 level FLDH, the 10 cases of foraminal and extraforaminal disc herniation at theL5-S1 level (2.1%). One patient has FLLDHs both at L5-S1 and L4-L5 levels. Mean patient age was 52 years. The male:female ratio was approximately 3:7. All patients failed at least 6 weeks of conservative therapy. Mean duration of symptoms until time of surgery was 7.2 months. Using this MIIMA technique, the authors removed herniated disc the exiting (L-5) nerve root. Clinical outcome was measured using the Prolo scale. All the patients were discharged within 24 hours. Satisfactory (excellent or good) results were demonstrated in 7 patients. There was no recurrence during the follow-up period, that ranged from 10 to 60 months.

CONCLUSION: The MIIMA procedure provides a simple alternative for treating lumbar foraminal or lateral exit zone herniated disc in selected cases. This approach is effective, allowing for the preservation of the L5-S1 facet joint, this approach in saving the facet joint and preventing postoperative instability and offering a direct view of the L5-S1 neuroforamen.

KEYWORDS: Magnetic resonance imaging, far-lateral lumbar disc herniation, Lateral decompression, Surgical treatment, Microinvasiveintermuccular approach.

P31

Lumbar Disc Herniation and Alkaptonuria

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INTRODUCTION: Alkaptonuria is a rare metabolic disorder caused by deficiency of the enzyme homogentisic acid oxidase, resulting in accumulation of homogentisic acid in various body tissue such as hyaline cartilage of major peripheral joints and the intervertebral discs.

MATERIAL AND METHOD: This report describes a case 61-year-old woman presented with a chief compliant of back pain for 4 year and a 2-month history of pain and numbness in the left leg. Neurologic examination revealed left L5 nerve root involvement.

RESULT: An L4-5 discectomy was performed and the nucleus pulposus was black. Histopathologic examination macroscopically showed black cartilage pieces and microscopically degenerated and pigmented cartilaginous tissue. Alkaptonuria was diagnosed after discectomy procedure. The symptoms of the patients disappeared after surgery, and no symptoms were demonstrated on follow-up period.

COMMENT: Althought intervertebral disc degeneration is frequently found in cases of alkaptonuria, lumbar disc herniation as a presenting feature of alkaptonuria is not common.

P32

Disc Preserving Technique in the Unilateral Cervical Disc Pathologies: Transuncal Microforaminotomy

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OBJECTIVE: We presented a clinical series of patients with unilateral radiculopathy treated with the transuncal micro foraminotomy procedure. To establish procedural techniques and clinical and radiologic outcomes for the anterior cervical micro foraminotomy procedure. Cervical radiculopathy is typically caused by unilateral disc herniation or uncovertebral osteophytes that compress the ventral aspect of the nerve. Direct removal of a cervical lesion causing radicular symptoms without concomitant fusion seems to be an ideal treatment in selected patients. The indications for an anterior cervical neural foraminotomy are limited to unilateral radicular symptoms at one or two levels, with minimal neck pain.

MATERIAL AND METHODS: Six patients were treated with the anterior cervical micro foraminotomy procedure during a 5-year period with follow-up from 4 to 55 months. There were 4 men and 2 women (age range, 33-55 years). Five patients had symptomatic unilateral extruded soft disc herniation, and one had uncovertebral osteophytes confirmed by magnetic resonance imaging. Six patients had a single anterior cervical micro foraminotomy.

RESULTS: Six patients (100%) had improved or resolved radicular symptoms. No morbidity or mortality.

CONCLUSIONS: Patients treated with the anterior cervical micro foraminotomy procedure have equivalent or better outcomes than those who undergo current cervical procedures. It appears to be a good alternative procedure for carefully selected patients with unilateral cervical radiculopathy and avoids a fusion of the disc space. This procedure is effective and disc protect procedure

P33

Bilateral Decompression of Lumbar Degenerative Stenosis Involving a Microinvasive Unilateral Approach

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OBJECT: Degenerative central lumbar stenosis has traditionally been considered to be a result of bony narrowing of the spinal canal. The authors studied a consecutive prospective series of patients with spinal stenosis in whom surgery was performed by a single surgeon who used a bilateral decompression of lumbar degenerative stenosis involving a microinvasive unilateral approach.

METHODS: Ten consecutive patients with spinal stenosis underwent bilateral decompression; surgery was performed via a unilateral approach. Preoperative and postoperative MR imaging was also performed. Ten levels were surgically decompressed. The mean operative time was 45 minutes and the mean blood loss was 45 ml per level. Preoperatively stenosis was severe or absolute stenosis at 10 levels. Mean improvement rates for leg muscle strength and intermittent claudication were 70.0% and 98.9%, respectively.

CONCLUSIONS: Bilateral decompression of lumbar degenerative stenosis involving a microinvasive unilateral approach without instrumentation-assisted fusion can be successfully performed in patients with acquired spinal stenosis; the procedure can be undertaken on an outpatient basis, such a safe, effective and minimally invasive surgical method, with reasonable operative times, minimal blood loss, and no morbidity rates.

P34

Lumbar Spinal Stenosis: The Analysis of the Prognostic Factors in Adult and Elder Age Groups

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INTRODUCTION: In this study 99 lumbar spinal stenosis cases of two different age groups operated in our clinic between 2001-2004 are aimed to be analysed in terms of clinical, radiological and surgical treatment techniques.

MATERIAL AND METHOD: All cases were diagnosed regarding history, clinical and radiological examination. In order to compare all the symptomps; chi square importance test; to compare the duration, t-test and to evaluate the risk factors logistic regession analysis were used.

RESULTS: Average age was 58,30±11,90. 36,4% (36) were female and 63,6% (63) were male. The most frequent symptom for those above 65 was pain (96,9%) and neurological claudication (90,6%). The most frequent neurological symptoms were; 62,5 % reflex changes, 53% laseque (+) and 50% motor deficit. The anterior-posterior diameter was below 11,5 mm in 71,9% of the cases. Partial recovery was observed in the early period of 62,5% of the cases. 68,8% of the cases were applied laminectomy; 87,5% of which were in total and 12,5% of which were in partial application. The most frequent symptoms below 65 were pain (100%) and neurological claudication (92,5%). The most frequent neurological symptoms were 71,1% lasque and (+) 56,7% sensory loss. Anterior-posterior diameter was below 11,5 mm in 56,7% of the cases. In the early period, partial recovery was observed in 71,6% of the cases. Laminectomy was made to 55,2% of the cases; 56,7% of the cases were performed totally and 43,3% were performed partially.

CONCLUSION: There is a statistically meaningful difference in the comparison of total or partial application of laminectomy in these two age groups (p: 0,002). Anterior-posterior diameter is below 11,5 cm in 83,4% of the laminectomy applied cases. There is a statistically meaningful difference (p: 0,001). In logistic regession analysis, gender (females 2,75 times) (95% CI,1,05-7,22) and motor loss (2,68 times), (95% CI 1,09-6,63) increases lumbar spinal stenosis

P35

Correlation Between Pain And Postural Abnormalities in Cervical Disc Diseases

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AIM: Despite antalgic posture in patients with cervical disc disease had been stated in the literature, there are very few studies about postural abnormalities in cervical disc diseases and its relationship on pain.

This study was carried out to determine whether there is a relationship between pain and postural abnormalities in patients with cervical disc diseases.

MATERIAL AND METHOD: 17 female, 9 male, a total 26 patients with cervical disc disease aged between 26-75 years (with a mean age 52.46± 12.28) were included in the study. Postural abnormalities seen in the patients were recorded. Resting and activity pain level were evaluated according to the visual anolog scale. Pearson correlation test was used to analyze the relationship between postural abnormalities and pain intensity level.

RESULTS: The mean resting pain intensity level was 4.15± 2.62 cm and the activity pain was 7.09 ±2.46 cm. 84.61 % forward head, 69.23% flattened lordosis, 53.84 % thorocal kyphosis, and 50% tightness in the pectoral muscles were observed in the patients. It was found that there are correlations between resting pain and flattened lordosis (r: 0.41, $p<0.05$); pectoral muscle tightness and forward head (r: 0.040, $p<0.05$). There were no correlation between the other parameters.

CONCLUSION: To examining postural abnormalities in patients may help to determine the mechanical disadvantages in cervical disc disease and give an important contribution to plan the most appropriate rehabilitation program.

P36

Nucleoplasty for Treating Back and Radicular Pain- One Year Follow-up

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Nucleoplasty is a percutaneous procedure in the treatment of both discogenic low back pain and radiculopathy due to contained disc herniation. It involves the percutaneous removal of disc material by using a low temperature resister probe to disintegrate and evacuate disc material followed by thermal tretment of adjacent residual disc material.

This study evaluates the efficiacy of nucleoplasty in patients with low back or radicular pain.

MATERIAL METOD: 48 patients either low back or radicular pain due to herniated discs which were detected on MRI, were performed percutaneous nucleoplasty using coblation technology after failed conservative therapy. Visual analogue scale (VAS) for pain and Oswestry disability scale (ODS) for functional improvement were used to assess patients after procedure. % 50 improvement at the scales was accepted as success.

RESULTS: The patients were divided in to two groups. Patients who have radicular pain was the first group (n=30) and the low back pain was the second group (n=18). All patients in two groups have contained herniated discs on MRI scans.

74.6 % of patiens in group 1 and 50.6 % of patients in group 2 were improved after one year follow-up.

CONCLUSION: Treating radicular pain is more advantageous than back pain with nucleoplasty technique.

P37

Postlaminectomy Lumbosacral Instability

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Lumbosacral surgery may rarely cause instability. Such a condition is characterized with low back pain with or without radicular pain. This condition is one of the major causes of failed back surgery syndrome and requires a stabilization procedure. The aim of this study is to review the cases who underwent a stabilization surgery for postlaminectomy lumbosacral instability.

MATERIALS AND METHODS: There were 18 cases (13 female, five male) who underwent surgery for postlaminectomy lumbosacral instability, aged between 30 and 74. There was a one-level instability in 16 cases and a two-level instability in two cases. The instable segment was located at L3-4 in four cases, at L4-5 in seven cases, and at L5-S1 in five cases. The instable segments were located at L3-4 and L4-5 in 2 two-level instable cases. The instability occured after laminectomy for lumbar disc herniation in 14 cases, after laminectomy for lumbar spine stenosis in two cases, and following instrumentation at the adjacent level in two cases. The first laminectomy performed six months to 19 years before admission for instability. Low back and leg VAS score showed improvement in all cases, except for one case.

It is concluded that postoperative lumbosacral instability may occure following laminectomy for degenerative lumbosacral disorders. It is one of the reasons of failed back surgery syndrome, and prevention requires a careful preoperative clinical and radiological analysis before the first operation.

P38

Degenerative Spondylolisthesis of Lumbar Spine Associated with Scoliosis

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KEMAL YÜCESOY (Dokuz Eylül University, Turkey)

Degenerative spondylolisthesis of is seen as a result of lumbar spine degeneration and occurs on sagittal plane. Degenerative changes also occur on coronal plane also and can result in scoliosis. In this study we evaluated scoliotic changes in degenerative spondylolisthesis cases.

193 degenerative spondylolisthesis cases were operated and stabilised with pedicle-screw fixation at our clinic during the last six years. Preoperative and postoperative Cobb angles of cases were measured on antero-posterior plain radiographies. 15 patients having Preoperative Cobb angles more than 10 degrees were included in this study.

Mean age of patients (range:56-73 years) was 63.1 years. Preoperative Cobb angles were between 12-32 degrees with a mean of 20.6 degrees. Postoperatively measured Cobb angles of patients were decreased below 10 degrees in all patients (mean:4.7)

Degenerative spondylolisthesis occur in the sagittal plane. Scoliotic change of lumbar spine on the coronal plane should also be considered in the planning of spondylolisthesis stabilisation operation.

P39

Effects of Physical Therapy and Surgical Treatment on Activities of Daily Living İn Patients with Degenerative Spondylolisthesis: Three-Years Outcomes

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Degenerative spondylolisthesis is an important cause of low back pain. Treatment of spondylolisthesis consists of conservative and/or surgical after exact clinical assessment. The goal of our study is to determine effects of physical therapy and surgical treatment on activities of daily living at 3 years of treatment in patients with degenerative spondylolisthesis.

Fifty-nine patients were involved in this study and treated with surgery or physical therapy. We proposed surgery for patients having more clinical symptoms and functional limitation and instability criteria. Twenty-nine patients treated with physical therapy and 29 patients with surgery. Physical therapy program was applied by one physiotherapist for a group of 3-5 patients together during four weeks, exercises continued at home for another two weeks under control. For surgical treatment, posterior spinal instrumentation and fusion were performed with same standard devices. Both groups were applied with visual analogue scale and oswestry disability questionnaire and treadmill exercise test with standard protocol for provocation of low back and lower extremity pain before and after two months of treatment and results of the tests were assessed.

When two groups were compared, predominant symptoms (back or leg pain) were found similar improvement, functional capacity and treadmill walking time were found better in physical therapy group however both groups' functional levels, symptoms and treadmill walking time were found to be significantly improved.

According to results of this study non-surgical treatment was associated with better outcome than surgical treatment at 3 years. When it's considered that significant differences were existed between two groups before treatment, same differences may be present at 3rd year. When decrease of predominant symptoms are considered, results of surgical treatment was found as similar with non-surgical treatment.

P40

Treatment Approach in Tandem (Concurrent) Cervical and Lumbar Spinal Stenosis

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INTRODUCTION: Spondylotic degeneration can give rise to tandem (concurrent) spinal stenosis of lumbar and cervical spine. The primary manifestations include neurological claudication, gait disturbance and a mixture of findings of myelopathy and polyradiculopathy in both the upper and lower extremities. The purpose of this study is to determine existence and management of tandem (concurrent) cervical and lumbar spinal stenosis.

MATERIALS AND METHODS: Between 2001 and 2004, 7 patients were diagnosed with tandem spinal stenosis in a series of 213 patients who underwent surgery for spinal stenosis (a frequency of 3.3%). Our management guidelines include that cervical surgery is performed first if the patients had predominat signs in the upper extremities or in the upper motor neuron region. In the patients who had significant symptoms in the lower extremities and no signs in the upper motor neuron region, lumbar surgery was performed first.

RESULTS: In this series, 3 patients received cervical surgery first and 4 patients lumbar surgery first. The average follow-up was 18.6 months. At the latest examination, all the patients had excellent or good results.

CONCLUSION: With the tandem spinal stenosis, the symptoms of either cervical or lumbar stenosis initially predominate. Often only the primary pathology is treated, then the secondary problem becomes evident. Although tandem spinal stenosis occurred relatively infrequent in this series, its potential presence should not be overlooked. Our results revealed that when correct diagnosis and management for the patients with tandem spinal stenosis was given, the patients had satisfactory outcomes.

P41

Spontaneous Regression af a Lumbar Heniation

SELİM KARABEKİR (Kocatepe University, Turkey), AHMET YILDIZHAN, ELMAS K. ATAR, CANAN BALCI

A case of spontaneous regression of a lumbar herniated disc is presented. The disc regression correlated with clinical improvement and was documented on MRI studies. Although the phenomen of spontaneous disappearance of decrease in size of herniated disc fragments is well known, the exact mechanism underlying this process remains unclear. This poster discusses three possible explanations for disc regressions; retraction into the intervertebral space, dehydration/shrinkage, and resorption due to inflamatory reaction. The fact that neurological symptoms caused by a disc herniation may frequently improve without surgical intervention is well known. Recently, computed tomography and magnetic resonance imaging have been used to document this regretion in different spinal compartments. We present a case of lumbar radiculopathy cauesd by a herniated disc at the L3-L4 level in which clinical improvement was associated with a significant decrease in size of the extruded disc fragment, documented on MRI scans. This 31-year-old man presented in May 1997 with a 2 months history of low back and left leg pain with no obvious cause. MRI of the lumbar spine obtained 2 months after his symptoms began revealed a large extruded disc fragment. The dural sac was compressed and displaced by this fragment. A trail of conservative management failed to relieve patient's pain and so surgery was offered. The patient refused surgery. So he followed with serial neurological examinations with medical treatment. Over the next 6 months his pain gradually improved to the point that he did not require any medication and was essentially pain-free. After 4 years he come back to control exmaination and a second MRI was obtained. The extruded fragment that had beeen located posterior to the L3 vertebral body, no evidence of compression or displacement of the dural sac. The case confirms the validity of nonsurgical management of herniated lumbar discs in the absence of neurological deficits.

P42

The Associations Between Pain, Mood, Disability, Quality of Life, Balance, Hand Grip, Upper Extremities Strengthes and Neck Mobility Following Cervical Disc Surgery

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The aim of this study was to assess the relationships of pain, disability, mood, quality of life, balance, hand grip and upper extremities muscle strengthes, patient satisfaction in the cervical disc surgery patients.

Thirty nine patients who were diagnosed as having cervical disc herniation and had been operated participated in this study. Neck, shoulder and arm pain on Visual Anologue Scale (VAS), Neck Pain Disability Questionaire (NPDS), the Medical Outcomes Study 36 -Item Short-Form Survey (SF-36), Beck Depression Questionaire (BDQ), Hand Grip Strength test (HG) and manual muscle test of upper extremities muscles,the measurements of neck motions and Patient Satisfaction Questionaire (PSQ) were applied to the cervical disc surgery patients.

There were contrary associations between VAS and the dominant and nondominant HG ($P<0.01$), effected and non effected upper extremities muscle strengths ($P<0.01$), neck extension ($P<0.05$), the some subscales scores of SF-36, positive associations between VAS and the scores of BPDS ($P<0.01$). BDQ was correlated with subscale scores of SF-36 (negatively) and BPDS ($P<0.01$), (positively). BPDS scores increased, while some parameters or balances decreased. There were negatively correlations between PSQ and continuous pain ($P<0.01$), VAS ($P<0.05$), BDQ ($P<0.01$).No patients had participated the physical therapy and rehabilitation program following lumbar disc surgery.

In conclution, these results of the cervical disc surgery patients may be related to the resrictions of postoperative activity. Early identification of those patiens with restrictions is essential in order to rehabilitation.

P43

Surface Strain Distribution on Cervical Spine in Lordotic and Straight Posture

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Kyphotic change in the cervical spine was proposed as one of the factors promoting degenerative changes. The knowledge about the effects of a loss in cervical lordosis on the surface strain patterns of the cervical vertebrae would provide a better understanding of the clinical question of whether and how the loss of cervical curvature might accelerate degenerative changes. Thus, this study designed to demonstrate the changes of cortical strains of the vertebrae under axial compressive loads associated with physiologic movements in a straightened cervical spine.

Twelve fresh young adult sheep cervical spines (C2-T1) were obtained for biomechanical testing. Randomly selected six specimens were secured to a curved rod and frozen in natural 45° lordotic posture. Remainder six specimens were frozen into straight posture using a straight rod passing through their spinal canal. While all the specimens were still frozen, attached rods were removed and specimens were mounted into polyester resin (Bondo body filler, Atlanta GA) up to the mid-body on the superior end of C2 and the inferior end of the T1. Two axis (0º, 90º rosettes) strain gauges were mounted to the anterior surface of the vertebral corpus and the bilateral lateral masses of the 4th, 5th, and 6th cervical vertebrae. Each specimen was positioned and fixed into an electromechanical universal materials testing machine and non-destructively tested for compression, flexion, extension, and lateral bending at a rate of 25mm/min for 6 cycles.

Comparing to natural lordotic posture, straight posture resulted in significantly higher strain on the anterior surface for compression and flexion and lower strain on the posterior surface for all the movements. During extension and lateral bending, straight posture resulted in lower strains comparing the lordotic posture on both anterior and posterior surfaces. Destructive compression test resulted in higher strain values on the anterior surface in straight posture.

P44

Unilateral Interbody Cage Applications for Lumbar Degenerative Disc Herniation with Unilateral Facet Hypertrophy

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The aim of the study was to find a solution to unilateral degenerative disc herniation with unilateral facet hypertrophy with a minimal surgical procedure. When a case was admitted with the diagnosis of degenerative disc with facet hypertrophy the surgery planned to discectomy + partial facetectomy + unilateral interbody fusion by the help of one peek cage and DBM bone graft. We have 29 patients, 11 of them male and 18 of them were female in this study. Mean age is 45.3, and males' is 52.2 and the females' is 41.1. 12 patients' levels were L4-L5, 5 were L5-S1, 5 were L4-L5 and L5-S1, 4 were L3-L4 and L4-L5 and 1 is L1-L2 and L4-L5.There's 3 recurrence of L5-S1, 2 of L3-L4, 2 of L4-L5 and one of L4-L5 and L5-S1. Total level that used for interbody fusion was 39 and all of them unilaterally.19 of them only one level, the others two levels which were adjacent with the other. The patients' preoperative mean VAS was 9.31/ 10. There'sn't any complication of dural tear or neural tissue injury at peroperatively. The follow-up of the patients was change between 12 - 28 months, mean follow-up was 17.27 months. All patients direct x-rays took at postoperative 1., 2., 3.,6., 12. and 24. months. And lumbar CT at 12. and 24. months. Radiologic fusion rate was 72%. The patients mean VAS after 1 year was 2.28/10.There'sn't any complication of infection or dislocation of interbody cage. One of the patients' have subsiding at L5-S1 level. Only two of them have pricking feel at operation side. The follow-up of the patients still keep on. As a result of our study, unilateral using of cages for interbody fusion for degenerative discs with facet hypertrophy alone is safe if choice of the patient was good.

P45

Cervical Spondylotic Myelopathy Treated by Obliqe Corpectomy with a Special Emphasis on "Knee Buckling" Symptom: A Prospective Cohort Study

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INTRODUCTION: Anterolateral partial oblique corpectomy (OC) aims to decompress cervical spinal cord without subsequent fusion and saves the patient from graft-, instrument-, and fusion- related complications. Although a promising technique, there are few studies dealing with its efficacy and safety.

PATIENTS and METHODS: In this prospective study, 40 consecutive patients underwent an OC (one to four levels from C3 to C7) for cervical spondylotic myelopathy (CSM), since 1997. The patients ranged in age from 43 to 78 (mean, 55.5) years. The average follow-up period was 36 months (range, 6 to 84 mo). Pre- and postoperative clinical and radiological data were analyzed to assess the results and find possible factors related to outcomes.

RESULTS: Thirty-seven of 40 patients (92.5%) improved at 6-month follow-up, according to Japanese Orthopedic Association Score (JOAS). The improvement was the most prominent in lower extremity dysfunction. There were no signs of postoperative instability or posture change. A fairly constant symptom, knee buckling, which means a sudden weakness in the knees, was observed in 35 patients (87.5%), and resolved postoperatively in 32. Horner's Syndrome developed in 10 patients (25%) and it was permanent in 4 of them (10%). Recovery was positively correlated with preoperative JOAS ($r= 0.37$, $P= 0.018$) and existence of knee buckling symptom ($r= 0.39$, $P= 0.012$).

CONCLUSIONS: OC for treating multilevel CSM achieved good results with a low morbidity rate in our series. Knee buckling symptom can be used as an early and reliable indicator of CSM, and a possible predictor of good neurological recovery after OC, if successful decompression can be achieved.

P46

Sensitivity nd Specificity of Quantitative Measurements Taken From MRI Examinations in Patients With Lower Back Related Pain

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PURPOSE: Magnetic resonance imaging is a study commonly used in the diagnosis of low back related leg pain. However, many have questioned the specificity of this examination. The purpose of this study is to identify quantitative measurements that will enhance the specificity without compromising the sensitivity of this technique.

METHODS: MRI of the lumbar spine was obtained in 30 asymptomatic volunteers and 30 patients with low back related leg pain. The anterior-posterior width and the areas of the spinal canal and of any disc herniations were measured from the axial sequences of the MRIs at the L3-4, L4-5, And L5-S1 levels. Clinical findings were recorded in the symptomatic patients to include the radicular pattern of the leg pain as well as any motor, sensory, or reflex changes. Finally, the symptomatic level was confirmed by relief of symptoms immediately following surgical decompression.

RESULTS: Only 2 out of 30 asymptomatic patients had findings correlating to the L3-4 level, and therefore no statistically meaningful results could be obtained for that level. For the remainder of the patients the most specific and sensitive measurement was the ratio of the anterior-posterior width of the disc hernation and the thecal sac. At the L4-5 level a ratio of the width of the herniated disc and the thecal sac of 30% demonstrated a sensitivity and specificity of 95%. Similarly at the L5-S1 level a ration of 40% demonstrated a sensitivity and specificity of 95%.

CONCLUSION: Quantitative measurements of the MRI of the spinal canal and the herniated disc can be both sensitive and specific for low back related leg pain. In particular, the ratio of the anterior-posterior width of the herniated disc and the spinal canal, a measurement easily obtainable by both the interpreting and the referring physician, provides an excellent specificity and sensitivity in interpreting MRI examination in patients with low back related leg pain.

P47

Multilevel Anterior Cervical Fusion. A Retrospective Study

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PURPOSE: The purpose of the present study was to evaluate the results of three level anterior cervical fusion with the use of tricortical autograft and plate fixation.

MATERIALS AND METHODS: Over a 3 years period 17 patients with cervical spondylosis, radiculopathy and or myelopathy were treated with anterior cervical discectomy and fusion (ACDF). All patients underwent three level anterior fusion from C4-C7 with the use of tricortical autograft and plate fixation. Seven patients were males and 10 females. The average age was 58 years (47-72). Preoperative work-up included clinical examination, dynamic and static X-Rays of the cervical spine and MRI of the cervical spine. Selective nerve root blocks were done in 5 patients. The mean follow-up was 18 months (10-24). Patients were seen at 2 weeks, 1 month, 3 months, 6 months and 6 months intervals thereafter.

RESULTS: No patients were lost to follow-up. There were no intra and postoperative complications, with the exception of dysphagia noted in 3 patients which resolved within the first month. As noted from the radiographic evaluation along with dynamic views (flexion/extension) all but on patients had developed fusion, in all three segments. The one patient developed asymptomatic pseudarthrosis at the C6/C7 segment. 14 patients rated their results as excellent and 3 good with the Ogden score.

CONCLUSIONS: The literature suggests that multilevel ACDF is characterized by a high incidence of pseudarthrosis and reoperation rates, with persistent symptoms. In our series the union rate was 94% with excellent satisfaction in our patient group. It appears that multilevel ACDF with autograft and plate fixation provides satisfactory results in a selected group of patients.

P48

MRI Findings in Failed Back Surgery Syndrome

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INTRODUCTION: Nowadays MRI is establishing itself as the modality of choice for imaging the postoperative spine. Its major advantages are its multi-planar capability, superior soft tissue contrast resolution and excellent tissue characterization. The intravenous administration of gadolinium compounds is an important adjunct to MRI in clarifying the probable cause of the postsurgical syndrome.

MATERIAL AND METHODS: Over all 100 patients, who had been previously operated upon for lumbosacral intervertebral disc disease and who presented with either persistant low back pain, with or without sciatica, or limitation of movement were included into this prospective study.

All patients with complicated postoperative lumbar spine were subjected to full history taking, thorough clinical evaluation, and complete radiological examination including, plain x-rays, dynamic views, oblique views and MRI.

Magnetic Resonance Imaging studies were performed with a 1.5 T super-conducting MRI system.

RESULTS: The causes of FBSS in the 100 patients included were:

1- Recurrent disk herniation in 43 patients (43%).

2- Postoperative scar tissue formation in 41 patients (41%).

3- Secondary spinal canal stenosis in 25 cases (25%).

4- Postoperative infection in 9 cases (9%).

5- Pseudomeningocele in 5 cases (5%).

6- Sublaxation in 4 cases (4%).

7- Arachnoiditis in 3 cases (3%).

8- Malignancy in one case (1%).

9- Fracture in one case (1%).

CONCLUSION: Gadolinium enhanced MRI is needed to reach accurate diagnosis and differentiation of recurrent disc herniation from epidural fibrosis and/or the presence of both. MRI also gives accurate, sensitive and early diagnosis of postoperative discitis and infection and can differentiate it from degenerative disc disease and neoplasm. Moreover, MRI study can diagnose postoperative arachnoiditis, bony stenosis as well as iatrogenic pseudomeningocele.

P49

Factors Affecting Outcome in Cervical Spondylotic Myelopathy

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Cervical spondylotic myelopathy (CSM) is a condition characterized with pyramidal tractus and/or nevre root involvement. The preoperative decision making process and choice of surgical approach are affected by a variety of factors. The aim of this study is to review our results after surgery for CSM in our department. We also investigated the effect of age, duration of the symptoms, spinal canal diameter, cervical curvature, presence or absence of preoperative high signal intensity within the spinal cord as revealed by T2 weighted MRI on the outcome.

There were 43 patients with cervical spondylotic myelopathy, 31 males and 12 females, aged between 45 and 73 (mean 57.1). The main complaints include gait difficulty, numbness, and extremity pain. Preoperative neurological evaluation was performed using Japanese Orthopaedic Association (JOA) scale (modified by Benzel). Mean preoperative JOA score was 11.1. The neurological examination confirmed cervical myelopathy in all cases, radiculomyelopathy in twenty three cases.

Twenty seven cases underwent laminectomy, fifteen patients underwent discectomy or median corpectomy, and one patient underwent a combined approach. Nine patients required an instrumentation procedure. The mean followup was 23.0 months. Postoperative mean JOA score was 14.4.

It was concluded that the choice of surgery is an important component of preoperative decision making process. The application of an appropriate approach results in neurological improvement and good outcome.

P50

Transiliac Anterolateral Enstrumentation of the Fifth Lumbar Vertebra: A New Surgical Approach

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INTRODUCTION: High lying lateral iliac spine (LIS) impedes anterolateral screw placement to the fifth lumbar vertebra. The aim of the present study was to decument the relationship between intercrestal line and vertebral body level, and to describe an anterolateral screw placement to the fifth lumbar vertebra.

MATERIALS AND METHODS: Lumbar X-rays of 100 female and 100 male adult patients were reviewed for the study. Patients admitted to the neurosurgical out patient clinic with low back pain and none was canditates of surgery. The anteroposterior and lateral lumbar X-rays were evaluated. The spinal level marking the intersection of a line joining the iliac crest was determined. The relationship between intercrestal line and the corresponding vertebral body level was recorded. An illustrative case of high lying LIS was also demonstrated.

RESULTS: LIS was found to be at the level of L5 vertebra in 1.5% of the patients. In 68% of the patients, LIS was at the level of L4-L5 disc space. LIS was found to be at the level of L4 vertebra in 30.5% of the patients and was as high as the upper one third of the L4 vertebra in 5% of cases. Analysis of level of LIS in male group showed significant difference comparing to female group ($p<0.05$). The level of LIS tends to be at higher lumbar level in male comparing to female.

CONCLUSION: Anterolateral enstrumentation of the fifth lumbar vertebra is difficulf if high lying LIS impedes enstrumentation. High lying LIS may not allow to give parallel direction to the screw inserter sleve in order to insert screws into body of the fifth lumbar vertebra. In such cases, anterolateral enstrumentation of the fifth lumbar vertebra is possible by opening a burr hole in the LIS.

P51

The Correlation Between the Degenerative Changes and Osteoporosis in the Lumbar Spine of Elderly Patients

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INTRODUCTION:Disc degeneration,facet arthrosis and morphological changes of vertebra play an important role in spinal degeneration.The purpose of study was to examine the affects of osteoporosis on degeneration of lumbar spine.

MATERIAL AND METHOD:82 subjects were selected randomly among women older than 55 years of age who had back pain. Degenerative changes for all levels (L1-L5) such as disc pathologies,facet arthrosis and morphological vertebral changes were examined in MRI and X-ray. Disc degeneration were graded according to Thompson's classification.Degree of discopathy were defined in five grades (normal, bulging, protrusion, extrusion). Four grades of arthrosis of th facet joints were evaluated according to the modified classification of Pathria in axial MRI. Morphological changes of vertebra such as fractures, osteophytes and convcavity index were examined in X-ray. Subjects were divided into two groups which "T scores" in DXA were lower than "-2,5" is group1 and higher than "-2" is group2.

RESULTS: A significant difference between groups according to the disc degeneration, facet arthrosis, discopathy and no difference in morphological changes was found in Mann-Whitney-U analysis.In examination five lumbar level, disc degeneration and discopathy(except the L4-L5 level) for all level was significantly different between group1 and group 2. According to facet arthrosis, the difference was significant only in L3 vertebra.

DISCUSSION: Our results was similar in literature that demonstrated an inverse relation between osteoporosis and spondylosis. In this study osteoporosis was found negatively correlated with disc degeneration, discopathy and facet arthrosis although not correalated with vertebral fracture, osteophte formation and concavitiy index. Several authors showed that elevated disc degeneration was corraleted with BMD and degenerative disc disease was connected with facet arthrosis. We also concluded that degenerative changes is related negatively with osteoporosis.

P52

Wheather if Posterior Interbody Fusion with Posterior Enstrumentation have Any Effect on Lumbar Lordosis?

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Our purpose is to compare the effects of posterior lumbar interbody fusion (PLIF) on local segmental lordosis, with posterior enstrumentation with mesh cage or threaded cylindric cage.

METHOD: 32 patients (38 segments) were taken with degenerative disc disorders with lumbosacral or lumbar arthrodesis.In 15 cases with cylindric threaded cage (Group I), and in 17 cases (23 segments) with mesh cage (Group II) interbody fusion were perfrmed. For both groups in all cases posterior compressive pedincular enstrumentation and posterolateral fusion performed.

RESULTS: In Group I, preoperative segmental lordosis was 8.9 degrees and, in Group II it was 9.9 degrees. The difference between two groups were significantly different.At the final follow-up, group I with segmental lordosis mean was 10.9 degrees, at the second group mean was 15.3 degrees. The difference was significant .In group II, segmental lordosis increased was 5.4 degrees, and group I this increase was 2 degrees. Two patients in threaded cage group during operation dural tear occured. With none of the mesh cage place cases this complication occured.

DISCUSSION: Mesh cages for PLIF had a beter sagittal reconstruction, compared to cylindric threaded cages, however we consider no clinical difference between two techniques.

P53

Posterior Transpedicular Fixation and Posterolateral Fusion: A Treatment Option of Lomber Spondylolisthesis

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Spondylolisthesis is frequent cause of low back pain in modern community. Surgical treatment should be choice for patients with intractable pain and increasing deformity. The aims of surgery are reducing listhesis, obtaining adequate decompression and fusion.

In this study, we evaluated 32 patients whose were treated for lomber spondylolisthesis between 1996 and 2004 in our hospital, retrospectively. The patients were consists of included 29 females and 3 males, ranging in age from 22 to 70 years with a mean of 52.6 years. The level of spondylolystesis was at the L5-S1 in 19 patients, L4-L5 in 11 and L3-L4 in 2 patients. Spondylolystesis degrees according to Meyerding scale were grade I in 19 patients and grade 2 in 13 patients. Neurological status of patients was graded with Frankel scale. All patients have been evaluated with preoperative dynamic lomber graphs, computed tomography and magnetic resonance imaging. Posterior decompression, posterior transpedicular screw placement and posterolateral fusion have been done in all patients. The stabilization systems were evaluated with lomber graph and computed tomography, which obtained on the first postoperative day for all patients. Lomber graphs were repeated at 3 and 6 months for evaluating the fusion. Low back pain was improved in all patients. There was not any requirement for reoperation.

We report our experiences on surgical therapy of lomber spondylolisthesis in this study. Posterior transpedicular screw fixation and posterolateral fusion should be choice for the treatment of the lomber spondylolisthesis. The patients, demographic and clinical characteristic, operative details and results of the therapy were discussed.

P54

The Role of Sacroiliac Orthosis on Functional Level in Patients with Sacroiliac Pain

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İNTRODUCTİON: Sacroiliac joint pain is that sacroiliac joint dysfunction (SIJD) with/ without concomitant innominate torsional asymmetry,may cause LBP. SIJ is designed for stability rather than mobility, therefore additional stability procedure may be required. While lumbar braces are commonly used for lumbar disc diseases, there are very few studies on pelvic support for SIJ pain.

The aim of this study was to investigate the effects of sacroiliac orthosis on pain and funtional level in patients with SIJ dysfunction.

METHODS: 40 patients with SIJ pain were divided into two groups. 20 patients were treated with manual theraphy and exercises while 20 patients had SIJ orthosis inserted to the same treatment program. The treatment program was 8 weeks, 3 session per week. SIJ orthosis was taken off at the end of 4 th week. The pain level was measured with VAS scale, functional level was assessed by Oswestry Disability İndex and Roland-Morris Disability Questionnaires. Resumption of Activities of Daily Living Scale (RADL) was used to evaluate activity level returned.

RESULTS: Altough there were significant improvements in pain for both groups after the treatment, the pain relief in SIJ orthosis group ($t=14.17$ in rest, $t=31.74$ in activity) was greater than the control group ($t=7.19$ in rest, $t=28.68$ in activity). Functional level was higher in orthosis group after the treatment in according to Oswestry İndex ($t=2.82$, $p=0.007$) and to Roland-Morris Questionnaire ($t=-3.74$, $p=0.001$). RADL points for returning to activies was 141.61 in orthosis group and was 116.54 in control group ($t=1.24$, $p=0.022$).

CONCLUSİON: It was conluded that the use of SIJ orthosis inserted to rehabilitation program gives an additional benefits to relieve pain and to improve functional ability in management of SIJ dysfuntion. The level of returning to daily life could be higher with use of it. The results would be supported with further studies included diagnostic analjesic block.

P55

Surgical Management of Dorsolumber Tuberculous Spondylitis in Adults

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BODY: Over the last three years; we treated 16 cases of single level tuberculous spondylitis .All cases were managed by anterior decompression debridement and strut graft using anterolateral decompression or retroperitoneal approach. No internal fixation was used but postoperative plaster jacket was applied. The age of our patients ranged from 22 to 75 years. Four patients presented with neurological deficit.one case was graddB, one case was grade C and two cases were grade D according to Frankel classification.

The follow up period ranged from 18 months to 3 years (average 20 months). The functional and neurological recovery were satisfactory.

Fusion was achieved 5-6 months in 14 cases and delayed for 9-10 months in two cases.

We concluded that anterior radical resection and bone grafting without internal fixation is a safe and effective method in treatment of dorsolumber spondylitis.

P56

Treatment of the Pott Abscesses with Simple Drainage

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INTRODUCTION: In tuberculous osteomyelitis, current management is based on early diagnosis and the use of anti-tuberculous drugs. The clinical outcome can be sufficient with anti-tuberculous treatment alone. Surgical indications are reserved in certain circumstances such as progressive neurologic deficit, marked spinal instability, and failure of drug treatment.

In the literature, the serious complications have been reported in patients with large abscess. We performed the simple abscess drainage without arthrodesis in 11 patients while being treated medically.

MATERIAL and METHODS: Simple drainage was performed in 11 adult patients. There were 4 female and 7 male patients. Magnetic resonance imaging (MRI) demonstrated the extent of the abscess and the exact localization. Six psoas abscesses, two presacral abscessess, two epidural abscesses, and one combined epidural and presacral abscess were diagnosed. The definitive diagnoses of the patients was done microbiologically.

We prefered an anterior approach for drainage of abscess. The aspiration material was also used for the diagnostic purposes. We didn't perform the anterior or posterior spinal fusion. The brace has been used for two or three months, postoperatively. At follow-up period, we didn't find the complications such as neurologic deficit, spinal instability, and vertebral collaps.

RESULTS: We obtained good results after an average follow-up of 4,5 years (range 2-6 years). No further procedures (an example: arthrodesis) were necessary in our patients.

CONCLUSIONS: In patients with tuberculous vertebral osteomyelitis, there is an increased risk for progressive neurologic deficit, spinal inst

P57

Spinal Hydatid Disease. A Report Of 2 Cases

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INTRODUCTION: Spinal hydatid disease is rare in Egypt, even in the rural areas. Its prognosis is regarded as poor with high recurrence rate.

PATIENTS AND METHODS: This is a report of 2 cases treated in the last year in a university hospital. None of the 2 patients had pulmonary, liver or any other organ affection by the disease. The cysts affecting the spine were seen in the upper cervical region in one patient and in the thoracic region in the other. In addition to the vertebral involvement, both patients had intraspinal extradural hydatid cysts. Both patients presented with cord compression symptoms and, despite the use of CT and MRI, both were initially misdiagnosed and treated as Pott's disease.

RESULTS:The correct diagnosis was made only after surgical re-exploration by an experienced surgeon and was confirmed later on by the pathologic and laboratory findings. Neurological improvement occurred following surgical decompression and excision of the disease. Antihelminthic therapy was given and the response to treatment was monitored by measuring the antibody titre.

CONCLUSION:This is the first report of a case involving the upper cervical spine. Surgery remains the best therapy for spinal hydatid disease. Prolonged antihelminthic therapy is necessary to prevent recurrence of the disease.

P58

The Effect of Surgical Timing on the Recovery of Neurological with the Thoracolumbar Spinal Tuberculosis

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Constructive results of early surgical treatment on neurological recovery have been maintain in the literature but effect of late surgical treatment on neurological recovery is unclear in the thoracolumbar spinal tuberculosis.

Between 1998-2003 years we reviewed retrospectively 11 patients with thoracolumbar spinal tuberculosis and neurological deficit, who had delayed surgical treatment because of various causes between 1-9 months with an avarage of 3.2 months.

In our cases mean age was 36 years (24-47), 7 were females and 4 males.

Local kyphosis was measured preoperatively. Neurological deficit was classified according to Frankel classification as grade A in 3 patients, grade B in 4, grade C in 4.

After exposure, the tuberculous lesion region, including the collapsed vertebrae and in-between intervertebral disc, was almost completely resected in order to release the segmental spinal cord. Then, autologous iliac, rib or fibular graft was harvested to complete interbody fusion. Except one patients who had L4 segment involvement, anterior titanium-alloy rod-screw system was used to reconstruct the stability of the affected segments .

Anti-tuberculosis chemotherapy was continued for at least 9 months, and the patients were supported with thoracolumbosacral orthosis for 3 months after surgery

Spinal fusion occurred at a mean of 4.2 months after surgery. During the follow-up period, a mean of 16 degrees of kyphosis correction was achieved after surgery in our group. In 2 case vertebral involvement was 4 while others had 2 vertebra involvement. Of all patients with neurological deficits showed obvious improvement. They were improved to lower grades 4 grades in one case 3 grades in four and, 2 grades in five.

As a results there was no correlation between the neurological recovery and time of surgery. We think that decompression should be performed in patients with neurological deficit even if the patients are admitted late.

P59

Brucellar Spondylo-Discitis with Rapidly Progressive Spinal Epidural Abscess Mimicking Lumbar Disc Herniation: Case Report

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Spinal brucellosis can be misdiagnosed as lumbar disc herniation because of non-specific neurological and radiological findings of this condition. This situation gives rise to rapid progression of the disease and some diagnostic delays. Some cases are even detected after the lumbar disc surgery. In this study, we present a rapidly progressing epidural abscess case as a result of brucellar sponylo-discitis, mimicking lumbar disc herniation and causing progressive neurological deficits. Patients with low back pain and/or sciatica should be evaluated for brucellosis with routin serological tests especially in endemic areas in order to manage diagnostic difficulties of this rare condition.

P60

The Results of Anterior Approach and Fixation in Thoracolumbar Vertebrae Tuberculosis

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INTRODUCTION: Although the radiological methods and antituberculosis treatment evolves with time, both the diagnosis and the treatment of the Pott's disease still remain to be a problem. The methods altering from conservative treatment to radical anterior debridement and fusion are being used in vertebrae tuberculosis. Considering these, we performed different methods to the patients that admitted to our clinic as conservative treatment (27), CT guided percutaneous drainage (21), anterior debridement and fusion together with posterior fixation (13) and debridement, fusion, anterior fixation in the same operation by anterior approach (12). The aim of this study is to present the results of the patients on whom debridement, fusion and fixation were performed by anterior approach between 1998-2001.

METHOD: 7 cases were female and 5 were male. The mean age was 40 years (22-65).In all of the patients, one or two vertebrae were affected.Radical debridement was performed to the affected region by using anterior approach. Allografts and the costae excised at the time of surgery were used for anterior fusion. Anti-tuberculosis therapy was given for 9-12 months.

RESULTS: The mean follow-up period was 5 years (4-6) The mean correction of local kyphosis angle was 17 degree. In the long term follow-up, the everage increase in kyphosis was 2 degree. 3 cases with neurological disorder improved completely in the follow-up period. According to Frankel's classification, 2 cases in groupC and one in groupD moved up to groupE.

DISCUSSION: Although there are many surgical procedures in vertebrae tuberculosis , anterior fixation is not common. We obtained satisfactory results in Pott's disease when the anterior fixation and grafting were performed in the same sessionafter the radical debridement of the vertebral region that the abscess was present. According to our clinical experience, we concluded that Pott's disease could be treated by anterior approach in an approopriate condition.

P61

Cervical Spinal Osteomyelitis in Hemodialysis Patient: Report of 2 Cases

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In long term hemodialysis some musculuskeletal pathologies are common. This are renal osteodystrophy, tenosynovitis, bone cysts, soft tissue calcification, increased osteomyelitis incidence and ischemic osteonecrosis. As a further fact, long term hemodialysed patients have increased tendency to infection desease.

CASE 1: A 66 years old man having hemodialysis for one year. Presented with acute quadrparesia.His radiological findings revealed epidural abcess in C4 and C5 levels. Via posterior approach C4 and C5 hemilamynectomies and abcess drainege has been performed. Microbiological studies did not any infection agents. In early postoperative period his quadrparesia has improved.

CASE 2: A 45 years old man having hemodialysis for three years. Presented with acute quadrparesia. His radiological findings revealed epidural abcess in the levels of C5, C6; ostemyelitis in the vertebral bodies C4, C5, C6, C7 and anterior kyphosis.Via anterior approach C4, C7 partial and C5, C6 total corpectomies, abcess drainege, fibular otogrefting and C4 for C7 screw-plate stablization has been performed. Staphylococcus aereus has been detected in microbiological studies. His neurological status has been improved in early postoperative period.

In hemodialysis patients immun supression and A-V fistulas are be common causes bacteraemia. In normal population vertebral pyogenic osteomyelitis has an incidence of %2-8 and lumbar region involvement is common.In hemodialysis patients incidence is higher and the involvement is more common in cervical region. Only in 25-45% of the cases, the infection agent are detected and %50 of them is the staphylicoccus.

In hemodialysis patients vertebral osteomyelitis may reveal similar clinical presantation with spondyloartropathy; especially in which the infection agent is not certain.In hemodialysis patients with vertebral innfectious involvemet the neurological status and vertebral stability must be evaluated and treated respectively as soon as possible.

P62

Multiple, Primary Paraspinal Hydatid Cysts Without Spinal Invasion: A Case Report

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INTRODUCTION: Hydatid cyst of the paraspinal muscles without spinal involvement is rare and can pose various diagnostic problems in the low back pain. We report our experience in the management of patient who developed multiple hydatid cysts in the paraspinal muscles without spinal association.

MATERIAL AND METHOD: A 67-year-old woman presented with signs and symptoms of back pain and multiple mass in his thoracolumbar and sacral area. The mass had been present for more than 1 year and slowly but steadily in size. MR images demonstrated a well defined cystic mass ('mother cyst') containing a few round lesions ('daughter cyst'). The liver, spleen, lungs, and brain were entirely normal at a detailed work-up by ultrasound and/or CT. Because of the high suspicion of hydatic disease, a complete surgical resection was performed, and germinative membranes and scolices were shown, establishing a histopathologic diagnosis of Echinococcus granulosus. Albendazole therapy was commenced.

RESULTS: At 2-year follow-up, a clinical and radiological examination yielded no evidence of recurrence and MR imaging demonstrated resolution of paraspinal muscles to their normal anatomy.

CONCLUSIONS: Hydatic disease is prevalent in most sheep-raising Mediterranean and other countries [1-4]. Primary cyst may localize anywhere in the body but commonly they are found in the liver (55-70%) and lungs (20-30%) [2]. Isolate paraspinal involvement is apparently more rare [4]. Back pain can be caused by a number of factors: Protruding disk, age, osteoporosis and fractures, back sprain and strain, tumors and infection. The most common cause of low back pain is degenerative disease [5].This case emphasized that in endemic areas A patient have a sign of the back pain and mass symptoms complain, if who live in the endemic area. We must be consider the cyst hydatid in the differential diagnosis.

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Hydatid Disease of the Vertebral Column and Stablisation: A Case Report

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Hydatid disease is a parasiter infection which in most cases echinococcus granulosus is the agent. The liver is mostly involved but involment of any region of the body is possible. Bone involvement is about % 0.5 to 1 and %50 of them is the vertebral column. Spinal canal localization is %1-2 ,vertebral hydatid desease shows a slow progress and the most common signs are pain and neurological symptoms related to cord compression.

CASE: 21 years old female admitted with back pain and monoparesis in the left leg. Radiogically findings revealed a cystic mass distructing L1 vertebra corpus and revealed the left psoas muscle. Via anterolateral approach L1 corpectomy, cyst resection, iliac allografting and screw rod stabilisation had been performed. The pathological analysis revealed hydatid cyst peroperatively. The monoparesis improved in early postoperative period, the albendazole+praziquantel treatment had been administered for 8 months postoperatively. No recurrance was present after1 year.postopretively,

Progression is slowed in vertebral hydatid deseaese ,rupture and multilocilation is common, caused by microfractures in the bone lamelles. The first signs are generally nonspecific and progression is common. Destruction of the vertebral body and the collapse causes kyphosis, besides cyst resection vertebral stabilisation is the choice of treatment. In most cases radical corpectomy is mandatory for total cyst removal. The most common complication is cyst rupture and following recurrances. The irrigation of the operation field by formaline, 0.5 silver nitrate or hypertonic solutions are suggested to avoid the recurrance. Albendazole, mebendazole, praziquantel or the combinations of these drugs must be admistirated as the medical treatment. As a result the total cyst removal can be done by resection of the involved vertebral segments and vertebral stabilisation as a key point for treatment.

P64

Thoraco - Lumbar Spine Tuberculosis: Anterior Debridement and Internal Fixation

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Tuberculous spondilitis remains an important pathological entity in developing countries and it's treatment contraversiol.

From Junary1995 to Marc 2001, 25 patients who had spine tuberculosis were treated operatively at our clinic.

The Process was located in thorocic part of vertebral column at 13, in lumbar part at 12 patients. There were 10 men and 15 women patients.

Average age was 40,5 (5-65) years and average follow up time was 73,5 month (43-140). All patients underwent anterior surgery.

All symptoms disappered in post operative period and fussion obtained after 6-7 months.

In conclusion based on the results of our study on the treatment at active tuberculosis spondylitis; internal fization along with anterior debritment and fussion provides a very high and effective rate of deformity correction and mointance.

P65

A Case of Infantil Pott's Disease with Five Years Follow-up

SABRİ AYDIN, NUVİT SARIMURAT, LALE HANCI,
MURAT HANCI (Cerrahpaşa Hospital, Turkey)

A case of tuberculous spondylitis in an eight motnh old boy is reported. The infant was presented with two months history of progressive paraparesis. Radiologic evaluation revealed thoracic spinal cord compression due to vertebral body collaps with abscess formation. Anterior radical debridment and bony grafting was performed. Anti-tuberculous drug treatment administered for eighteen months. At the immidiate post-operative period his neurologic functions gradually improved. On the fouth year of treatment he was ambulant, and had mimimal kyhpotic deformity despite of bony graft resorption.

P66

Posterior Epidural Abcess After Vertebroplasty- A Case Report

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Transpedicular vertebroplasty for the treatment of compression fractures of the thoracic and lumbar spine has been well described. Complications are rare and there are a few reported infectious complications requiring surgical management as corpectomy with anterior reconstruction and posterior stabilization but we have not seen any reports about epidural abscess in the literature. We presented a patient in whom posterior epidural abscess developed after vertebroplasty in which drainage and antibiotherapy was required for treatment.

METHODS: A 70 years-old female with a painful T12 osteoporotic compression fracture, without a radiologic and laboratory sign of infection, underwent percutaneous vertebroplasty using polymethyl methacrylate without complication. She had a medical history for type II diabetes mellitus,osteoporosis and hypertension. Pain relief was evaluated by visual analog pain scale.

RESULTS: She had significant improvement in pain after vertebroplasty at the second day. One week after operation, however, she had fever and increased back pain. On clinical examination, abscess formation was determined at the vertebroplasty site. Wound cultures revealed Acinetobacter species and S. aureus. It was drained surgically and antibiotic treatment was started. She had progressive neurologic deterioration (paraparetic) at the 25th day after vertebroplasty.MRI of the thoracolombar spine revealed posterior epidural abscess. Partial laminectomy and drainage were performed. She had complete neurologic recovery at the follow-up period.

DISCUSSION: An epidural abscess,which is an unusual complication of the vertebroplasty, represents a medical and surgical emergency. Treatment is generally urgent surgical drainage combined with antibiotics. Vertebroplasty should proceed under sterile conditions with great caution and antibiotic prophylaxis should be considered in risky patients to prevent this serious complication

P67

Spinal Epidural Brucella Abscess

NİYAZİ NEFİ KARA, MERİÇ ÜNAL (SSK Denizli Hospital, Turkey)

Brucellosis and brucella spondilitis is a chronic infection that caused by brucella genus bacteries(B. Melitentis, B. Abortus, B canis) especially B. Melitensis. Human brucellosis is primarily an occupational infection. Fever, night sweating, artralgia, back pain and fatigue are seen in most patients. Epidural abscess and granulation are the complications that seen occasionally but causes neurological deficits. Disease is typically seen in countries that milk and milk products are produced in non-healthful conditions. Disease is endemic in Mediterranean Countries, Middle East and Latin America. Medical therapy is generally efficient but if there is no response to medical therapy or there is neurological deficit, abscess formation or deformity, surgical therapy has become necessary. In our clinic, six cases of spinal epidural brucella treated, two of them had gone to surgery. In spondilodiscitis, in medical therapy only quinolones or rifampicin-docsicycline combination are efficient but if there is spinal epidural abscess, after surgical drainage and irrigation, same combinations can not efficient enough. Two cases that undergo surgery, streptomycine 1gr/day for 20 days added to therapy and it was successful. In this report, there are two cases that had back and left cruris pain; both of them has 1/320 brucella agglutination test, and in MRI one of them has abscess formation at the level L4-5 and the other has at L5-S1. The follow up and therapy has evaluated. In spinal epidural brucella with neurologic deficit, beside surgery, using streptomycine is very important for controlling the disease.

P68

Hydatid Cyst of the Lumbosacral Spine: A Case Report

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Hydatid disease occurs in humans as a result of faeco-oral contamination and spinal echinococcosis is rare even in areas where echinococcosis is endemic. Hydatid cyst primarily occurs in liver and lung. Bone involvement constitute only 0,5-2% of all hydatisosis. About half of bone involvement occurs in vertebrae. Thoracic spine is the most common site of the spinal hydatidosis. Primary hydatid cysts of the lumber and sacral spinal canal are very rare. According to affected level severe neurological deficits may occur.

We present a 31 years old man with cauda equina syndrome caused by a primary hydatid cyst of the lumbosacral spinal canal. He had admitted to hospital with left foot and low back pain three years ago. Magnetic resonance imaging revealed intraspinal hydatit cyst extended from L2 to S2. Cyst had been totally removed. He was symptom free for three years. After three year, he presented with acute cauda equine syndrome. His neurological examination revealed total plegia of dorsal flexion of the left foot and perianal hypoesthesia. MRI showed lumbosacral hydatidosis again. After total remove of the cyst, his neurological status revealed immediately relief.

P69

CT Guided Percutaneous Drainage and Disruption of Lumbar Spinal Synovial Cysts

ROBERT SEIGEL (Colorado Imaging, United States), JOHN WHITAKER

Lumbar region spinal synovial cysts are produced as a result of degenerative arthropathic changes in the facet joints. Radicular complaints are produced by cysts acheiving significant size to produce nerve root impingement and often in a lateral neuroforaminal location. These cysts may be surgically removed, but can recur. We report a variety of ct guided techniques to attempt palliative pain control either by cyst drainage, disruption, fenestration and/or placement of epidural steroids and anesthetic into the epidural space. The cysts may be punctured and drained via direct ct guided approach either with large spinal needle or small curved two needle technique (21 gauge spinal with 25 gauge curved neele with memory). Cysts are intiially filled with local anesthetic to reduce viscosity and allow more efficient drainage of synovial fluid. Steroids are introduced to reduce inflammation and the facet joint is often cannulated at the same time to attempt further drainage of synovial fluid and placement of steroids to reduce further inflammation and synovial fluid production. If possible, air is introduced under pressure to attempt cyst disruption. Because the procudure can produce temporary expansion of the cyst before disruption or drainage, conscious sedation with Versed and Fentanyl is always utilized. In many cases the patient is also administered epidural steroid under ct guidance.

A variety of illustrative cases will be presented to demonstate success and failure of the technique. Postoperative recurrences and preoperative attempts at palliative pain control will be shown. Some cases have thick outer walls and inspisated synovial fluid and are resistant to percutaneous therapy. Other cases can be disrupted or drained resulting in significant long-term pain control of over one year in some patients. This procedure can often be effective as a non-surgical alternative for pain reiief even if the cyst is only incompletely drained or disrupted.

P70

Endoscopically Checked Transpedicular Screw Insertion

TARIK YAZAR (Ankara University, Turkey), KEREM BAŞARIR

INTRODUCTION: Transpedicular screws are one of the most important components of the posterior segmental fixation systems. The most feared complication of transpedicular screw insertion is the possibility of neural damage due to contact during insertion process or continuous irritation of the malpositioned screw on the neural structures. There are many reports in the literature about complications related directly to malpositioning of the transpedicular screws. Currently the position of the screws is checked by palpation of the pedicle walls by the help of a guide wire and fluoroscopic control. Our objective was to inspect the screw hole endoscopically would prevent malpositioning of the transpedicular screws and decrease complications related to them.

MATERIALS AND METHODS: Between 2003 and 2004, 20 consecutive patients who underwent segmental spinal fixation by transpedicular screws for a variety of reasons were included. A total of 76 screw holes were endoscopically examined prior to insertion of the screws.

RESULTS: In three screws anterior penetration of the hole through the corpuscular wall was detected and a shorter screw was inserted. Lateral penetration of the vertebra was observed in one case and screw hole was rerouted. In another case osteopenic bone was visualized and the pedicle was grafted before insertion of the screw.

CONCLUSIONS: Complications due to malpositioned screws can be prevented by endoscopic visualization of the screw hole. Direct visualization of the hole aids in prevention of complications related to insertion of the screw through defective area. We believe, although it adds to the total operative time, avoiding the unpredictable complications worth the time spent.

Fig-1 Endoscopical view of intact bony lamellae.

Fig-2 Endoscopical view of anterior penetration of corpuscular wall.

P71

Safety and Success of Pedicle Screw Insertion for High and Middle Thoracic Pathologies

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INTRODUCTION: Pedicle screw fixation enables enhanced correction of spinal deformities. However, most authors prefer hook application in the high and middle thoracic levels for fear of neurologic complications with screws.

MATERIAL AND METHODS: Position of 99 screws applied in high and middle thoracic levels (T2 to T8) in 21 patients were retrospectively analyzed with radiographies and computed tomographies. Biplanar fluoroscopy was used at the T5 and above, and only lateral fluoroscopy could be used more distal levels because of the characteristics of the operation table. Diagnosis of the patients were spinal fractures in 8 patients, vertebral tumors in 8, and spondylitis in 5. Forty-nine screws were inserted into T2 to T5 (group 1), and 50 screws were inserted into the T6 to T8 (group 2).

RESULTS: There were 20 screw malpositions (20,2%) in 12 patients (57,1%). Ten of these were at T2 to T5, and 10 were at T6 to T8. Malposition rate was not statistically significant between two groups in spite of advantage of biplanar fluoroscopy at the T5 and above (p=0,95). The malpositions were inferior to the pedicle in one screw, lateral in 12, superior in one, and medial in three. All of these screws were located in the bodies of the vertebrae. However, 3 malpositioned screws were lateral to the pedicle and to the body.

There was not screw related neurologic complication. In one patient, 3 screws were revised because one of them was in the spinal canal. In the other patients, revision did not required for an average 14,3 months follow-up. Five patients with spinal metastasis were died 6 to 15 months after operation because of their primary disease. There was one dural tear (4,7%), and it was treated by lumbar spinal drainage. There was one superficial infection (4,7%), also.

CONCLUSIONS: Thoracic pedicle screw fixation in high and middle thoracic levels may be a reliable method of treating spinal pathologies in routinly used operation conditions.

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New Transpedicular Screw Technique Yields Very Accurate Placement, Without an Assist Device: Evaluation of 1636 Transpedicular Screws

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This study reportys a new transpedicular screw insertion point which resulted in a very low screw malposition rate in the placement of 1636 transpedicular screws

From 1997-2005, transpedicular screw-rod fixation systems were used in 327 patients with thoracolumbar and lumbar spine pathology (spondylolisthesis, trauma, tumor, infection, and congenital deformities). In these patients, we inserted the transpedicular screws in a new location, at the lowest portion of the lateral (superior) facet joint that would allow for screw insertion. Using this new location, 1636 transpedicular screws were placed under lateral and anteroposterior flouroscopic guidance. Positions of all screws were evaluated on the first postoperative day with screw-CT scans and direct x-rays. Screw location was categorized according to Youkilis's classification system. Only fourteen of 1636 screws (0.8%) significantly (class III) violated the pedicle wall: three medially and three laterally.

Transpedicular screw insertion at the lowest point possible on the lateral (superior) facet joint, without the use of any assist devices, results in a very low screw malposition rate. Assist devices are expensive, and are not necessary to achieve very low screw malposition rates

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The Incidence of Lumbosacral Transitional Vertebrae (Anatomic and radiographic study)

ERCAN ÇETİNUS, MEHMET ŞENOĞLU (Kahramanmaraş Sütçü İmam University, Turkey), YAKUP GÜMÜŞALAN, MURAT ÜZEL, AHMET KARAOĞUZ

OBJECTIVE: Lumbosacral transitional vertebrae (LSTV) is a common finding in general population with a reported prevalence of 4–21%. Their clinical significance is controversial with no consensus as to their relationship to low back pain or disc prolapse. A LSTV is one in which the last lumbar vertebra shows elongation of its transverse process, with varying degrees of fusion to the "first" sacral segment. The term LSTV is used to avoid having to decide whether the vertebra is a "sacralized L5" or a "lumbarized S1". In 1982, a classification system for LSTV was proposed by Castellvi et al., based on plain radiographic appearances. The purpose of this study was to determine the incidence of LSTV in our region.

METHODS: Lumbar anteroposterior radiographs of 223 patients attended to orthopaedics and neurosurgery outpatient clinics were evaluated for detection of LSTV. 28 of the patients were male and 195 were female. The mean age was 55.9 (range of age: 15-84) years. In addition to radiographic examination, 96 dry sacrum bones were also evaluated for LSTV.

RESULTS: Radiologic changes related to LSTV in the lumbar spine were noted 45 radiographs of 223 patients (20.1 %). Sacralization was detected in 21 patients (9.4%), and lumbarization was detected in 24 patients (10.7%). Distribution of radiographically detected LSTV according to Castellvi classification system is below.

Sacralization: 21 (9.4%)	**Lumbarization:24 (10.7%)**
Type1a:4	Type1 :11
Type1b:3	Type2a:4
Type2a:8	Type2b:1
Type2b:1	Type3a:2
Type3a:0	Type3b:4
Type3b:3	Type4 :2
Type4 :2	

Sacralization was determined in 9 of 96 dry sacrum bones. According to Castellvi classification system 2 sacrum were of type 4 and 7 sacrum belonged to type 3b.

CONCLUSION: Detailed evaluation of preoperative lumbosacral graphies in view of LSTV is essential in order to prevent unsuccesful surgery due to performing the operation in wrong space during lumbar disc surgery.

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Our Experiences About Pedicularscreewing Techniques

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INTRODUCTION: Spinal instrumentation is a progressive and a seperate branch in vertebral surgery.In spinal surgery , surgeon must know the spinal anatomy and the vertebral structure well, because of the fact that the vertebral coloumn's special structure and the relationship between the vertebral body and the neuronal components. Complications seen in vertebral surgery are about %40. Decreasing the numbers of these complications depends on the surgeon's knowledge and experiences.

MATERIALS AND METHODS: In this retrospective study we have evaluated 8 patients (5 male -3 female) with the average age of 37.5 years (10-65) to whom revision operation applicated. Patients had been operated in different clinics. Posterior fusion had been applied to all patients for the reason of fracture in five cases, scoliosis in two cases and spondilolisthesis in one case.

Fracture was detected at transpedicular screws and rots because of pseudoarthrosis caused by insufficent fusion and segment in five cases, separation between screws and the vertebral body was detected in one case, pain and neurologic deficits caused by abnormal applying of transpedicular screews (extracorporial,intervertebraldisc,canalis medullaris,neuronal roots) were detected in four cases.

FINDINGS: Sufficent fusion in 3 cases, revision and reimplantation in 5 cases were seen in intraoperatively. Implants were taken out. Pain relieved in postoperatif period; neurologic deficits dissapeared in postoperative 3 months.

CONCLUSION: Pedicular screwing procedures used in vertebral fractures, spondilolisthesis, scoliosis, lordosis, kyphosis must be applied with a preoperative well planning and multidisciplinary approach. Although high technologic monitoring and imaging techniques are available, surgeon is face to face with patient and anathomic guides in operation. Knowledges and experimentation of surgeon comes will decrease the number of complications in pedicular screwing procedures.

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Preliminary Experience with Vertebroplasty in the Treatment of Different Types of Thoraco-Lumbar Fractures

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Althought percutaneus treatment of osteoporotic fractures of the thoraco-lumbar area is at least two decades old, it has recieved widespread interest over the last five years.

Our group during the period January-December 2004 treated 20 patients with this tecnique using in all the cases Cortoss (Orthovita) that is known to have the same mechanical properties of human bone. Twelve patients were females, the mean age was 65 (range 59-83).

The majority of patients were treated for osteoporotic fractures (12 cases), 4 patients suffered from neoplastic fractures, three for acute compression fractures (grade A1 in the Maergel classification) and one for vertebral angioma. The only clinical indication for treatment was local pain. A preoperative MRI or CT excluded the presence of bone fragment inside the canal and of a significant canal narrowing. Among the patients with osteoporotic fractures 3 had three levels treated, and 5 had two levels treated during the same procedure. All the cases were performed under local anesthesia. Patient Outcome was scored using the VAS score obtained preoperatively, and at 1 and 3 months follow up. Overall 19 of 20 patients improved (95%) significantly. The only failure was observed in a patient with multiple levels osteoporotic fractures. In acute traumatic fractures mobilization was achieved during the second postoperative day without bracing and at follow-up (mean 9 months) no kyphosis was observed. The whole group showed a significant $p<0.001$ decrease in pain score was observed (9 preoperative vs 3 postoperative).

Extravasation of cement in the perivertebral veins was observed in 9 cases (45%) and spread of cement to the lungs appened in 2 cases (10%). No cases of canal migration of the cement was observed. The technique of vertebroplasty can in our experience be used in different types of vertebral fractures with significant succes if the endpoint of treatment is pain control, and side effects of cement migration seem to be neglegibe.

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Fractures of the Cervical Spine in Patients with Spondylitis Ankylosans- Surgical Solutions for a Dangerous Situation

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INTRODUCTION: The cervical spine of a patient with spondylitis ankylosans (Bechterew`s disease) is exposed to maximal risk by physical load. Even minor trauma leads to fractures due to the poor elastic behaviour ("bamboo spine")

MATERIAL AND METHODS: Between 1990 and 2004, 36 patients were surgically treated. All patients were examined pre- and postoperatively, when leaving trauma unit for rehabilitation. Single (n=11), two session dorsoventral stabilisations (n=11), ventral stabilisations (n=11), dorsal procedures and one laminectomy alone were performed. The injury pattern, segments involved, pre-and postoperative neurostatus due to Frankel`s Score as well as complications were analysed.

RESULTS: Preoperative neurodeficits occured in 35 patients. All cases showed improvement, the operation did not result in a neurological deterioration in any case. Thus, patients with delayed treatment due to late diagnosis showed a more severe level of preoperative neurodeficit and lower improvement. The cause of 3 patients with fatal outcome were ARDS and cerebral ischemia. With 12 (33%) perioperative complication we saw 3 infections, one vein thrombosis, 5 implant failures with the need of revision and the 3 fatalities.

DISCUSSION: Standard procedure for these lesions intends to be open reduction of fracture dislocation, anterior decompression and autograft fusion, followed by dorsoventral stabilisation (one or two sessions) respecting instrumentation level at least one segment above and below fusion. Diagnostics involve CT or MRI of whole spine, as additional injuries are common. Causative trauma may be very slight. As consequence, late diagnosis, overlooked injury and misinterpretation of plain radiographs is not rare. These patients only come to treatment with neurodeficits ("fatal pause"); this leads to more severe neurolesions, complications and lower improvement after surgery.

P77

Transitory Insipid Diabetes Caused by Cervical-Cord Injuries

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A high percentage of patients with cervical spine injury and consequent qiadriparesis or quadriplegia had significant disorders of hypotalamus function-transitory insipid diabetes.

On our Clinic during 2000year we treated 6 patients out of 8 developed this complication. In most cases occured after 5 days since being injured. There arose central hyperthermia (infection reasons were excluded).which was very resistant to all the medicaments as well as the measures for lowering body temperature. Several days after hypertermia there appeared extreme poliuria(patients urinated over 15l per 24h.). By labaratory analysis there was stated a decreased specific weight of urine (1001-1003) whichc indicated to insipid diabetes. Such metabolic disorder led to a more difficult general state'of patients (somnolence, electrolytic disbalance and to more serius threat on life). We interduced vasopressin pills or spray into therapy wchich dosin was followed and corrected in accordance with clinical and labaratory parameters. In direct corelation with it there was normalazing of body temprature and improving of the patient's general state.

A clear patophysiological mechanism of this disorder has not been completely axplained. Consulting literature, patophysiology,phrmacology... we think that these changes occur in the following way. By the decompostion of polymorfonuclears (macrifags), which fagocitated the decomposing products on the place if spinal-cord lession endogenic pyrogen is liberated, raising the body temperature by directly affecting the center for thermoregulation in hypothalamus. Due to continous excitation on hypothalamus its supraoptical nuclei responsible for ADH secretion are included. There appears the reduction of its concetration in blood and cosequent poliuria. A dehydration added to the previous disorders leads to significant rise of temperature (aggravated sweting and a direct influence on hypothalamus), that enables establishing "circulus vitiosus" of metabolic changes.

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Nonoperative Treatment of Thoracolumbar Burst Fractures: A Middle Term Follow up Study

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INTRODUCTION: The aim of this retrospective study was to assess the clinical and radiological results of the nonoperatively treated thoracolumbar burst fractures without neorological deficit.

MATERIAL AND METHODS: Sixteen thoracolumbar burst fractures which admitted to our clinic and treated nonoperatively from 1997 to 2002 were included in this study. None of those patients had neurological deficit. There were eight male and eight female patients. Mean age was thirty-eight years (range between eighteen to sixty-four years). The average duration of follow-up was thirty months (minimum twenty-four months, maximum forty-eight months). The mechanisms of the injury were: falling from high more than two meters in seven, pedestrian accidents in five, vehicular accidents in four patients. Twelve AO type A, four type B burst fractures were noted. All patients treated with a thoracolumbar orthosis. At the final follow-up, patients were evaluated with Denis Pain and Work Scale system. Radiological follow-up evaluation was consisted of measurements of local kyphosis angle and determining the amount of spinal canal encroachment rate.

RESULTS: At the final follow-up, five patients recorded as P1 and W1, eight patients recorded as P2 and W2, three patients recorded as P3 and W3 according to Denis scale system. When compared with the preinjury values, significant increase in local kyphosis angle ($p=0.022$) and significant decrease in the rate of spinal canal encroachment ($p=0.024$) were detected at the final radiological examinations

CONCLUSION: Besides the increased angle of kyphosis after the treatment of thoracolumbar burst fractures without neurological deficit, the clinical outcome is satisfactory. On the other hand, the ratio of spinal canal encroachment rate is improved by nonoperative treatment. Our study suggests that nonoperative treatment of those types of fractures gives good clinical results.

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Non-Operative Treatment of Thoracolumbar Fractures: Clinical and Radiological Outcomes

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INTRODUCTION: The aim of this retrospective study was to analyze the clinical and radiological results of nonoperative treatment in the thoracolumbar fractures without neurological deficit.

MATERIAL and METHODS: Thirty-five patients with thoracolumbar fractures, who were treated and followed at least twenty-four months between 1997-2002, were included in this study. No patient had associated neurological findings before treatment. There were eighteen male and seventeen female patients. Mean age was thirty-nine years (range between eighteen and seventy-two years). Mechanisms of the injury were falling from high more than two meters in eighteen, pedestrian traffic accident in seven, simple falling in six, vehicular traffic accident in four cases. According to Denis Pain and Work Scale system, nineteen fractures were compression while sixteen fractures were burst type fractures. After a careful neurological examination, all patients were managed non-operatively. (Thoracolumbar orthosis in twenty-eight cases bed-rest in seven cases). Latest follow-up evaluation consisted of a questionnaire with a performed complete clinical examination as recommended by Denis. Radiological examination consisted of the measurement of local angle of kyphosis, sagittal index, anterior vertebral height and anterior vertebral compression angle.

RESULTS: Eleven patients recorded as P1 and W1, seventeen patients recorded as P2 and W2 and seven patients recorded as P3 and W3 according to Denis rating system. A significant increase in the angles measured was found in the latest radiological examinations ($p=0.001$).

CONCLUSION: On the basis of our study we have found that, besides the poor radiological results, clinical outcomes are satisfactory. We recommend non-operative treatment in thoracolumbar compression and burst fractures, which do not have neurological dysfunction.

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Pediatric and Adolescent Spine Fractures

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OBJECTIVE: Spine fractures in growing ages differ from those in adults as far as the anatomy, biomechanics and results are concerned. A series of pediatric and adolescent patients with spinal fractures was studied.

MATERIAL AND METHODS: Between January 1995 and january 2000, 66 patients (<18 years old) were treated either with concervative or operative treatment modalities in our clinic. In this series common causes of injuries were motor vehicle accident and fall from a height.

RESULTS: The thoracic region was commonly injured, accounting 25 fractures (37.8%) followed by the thoracolumbar junction with 22 fractures (33.3%) and the lumbar region with 19 fractures (28.7%). Radiologic evaluation at initial and follow up examination showed that in the patients treated nonoperatively, kyphosis progressed an average of 11 degrees and in the patients treated operatively, scoliosis progressed an avarage of 14 degrees.

CONCLUSIONS: The study discusses the cclinical presentation, treatment and some of the complications of injuries of the thoracal and lumbar spine in pediatric and adolescent patients.

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Percutaneous Vertebroplasty

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Spontaneous vertebral compression fractures are important health problem of elderly people of aging population. Main in causes are osteoporosis and metastatic spinal tumours. A minimal invasive procedure, vertebroplasty is used for the last several years for the management of cases.

In this study, 19 patients which are treated with percutaneous vertebroplasty at Dokuz Eylül University Hospital Neurosurgery Clinic are presented with clinical and radiological results.

Of 19 patients, 16 were osteoporotic and 3 were pathologic compression fractures due to metastatic spinal tumours. Mean age of patients is 71.8 y.o.(60-84 years) and 13 are women and 8 are men. Mean visual analogue score (VAS) was 8.1 before vertebroplasty. Percutaneous vertebroplasty was performed for one level in 14 patients and for two level in 5 patients. Postoperative mean VAS score was determined as 1.8. Methyl metacrilate leakage is seen in four cases, three to the disc space without any problem, one to the spinal canal with resultant paraplegia.

Percutaneous vertebroplasty is a minimal invasive procedure that can be used for management of spontaneous vertebral compression fractures with succesful results.

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Vascular Complications in Spinal Trauma: Role of Endovascular Therapy

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OBJECTIVES: Vascular injury associated with spinal trauma is uncommon and can cause life-threatening clinical conditions. We retrospectively reviewed all vascular injuries encountered after spinal trauma that were diagnosed during the last 5 years in our institution.

METHODS: We reviewed 14 patients with a mean age of 47 years (5 to 65 years) having spinal trauma who were diagnosed as associated vascular injuries by means of catheter angiography. All patients were suspicious for vascular injury after initial radiological (CT, MRI, Doppler US) and clinical work-up.

RESULTS: Two patients were asymptomatic, while the remaining 12 had some symptoms related to vascular injury at the time of admission. Among 12 symptomatic patients, 6 had neurologic symptoms, and the remaining 6 had symptoms unrelated to nervous system. Vascular injuries were located in the cervical region in 11 patients, and in the lomber region in 3 patients. There were arteriovenous fistula in 5, pseudoaneurysm in 5, and arterial dissection in 4 patients. The mechanism of vascular injury included penetrating trauma in 6 patients, nonpenetrating trauma in 4, and iatrogenic penetrating injury in the remaining 4 patients. Ten patients were treated endovascularly with persistent elimination of the vascular lesions associated with symptom-free clinical follow-up, two patients were managed with medical therapy only with good clinical follow-up, and the remaining two were managed symptomatically.

CONCLUSION: Although vascular injury after spinal trauma is very rare, endovascular therapy allows to eliminate majority of these potentially dangerous lesions with good long-term clinical follow-up.

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Percutaneous Reduction and Stabilization of Thoracolumbar Fractures Without Neurological Deficit: A New Technique

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INTRODUCTION: The consequences of traumatic thoracolumbar vertebral fractures include pain related to the fracture, progressive collapse of the fractured vertebral body leading to spinal kyphosis. Because of the inherent risks and invasive nature, surgical treatment of traumatic vertebra fractures has been limited to cases in which there is concurrent spinal instability or neurological compromise. The purpose of this study is to evaluate early patient outcomes of a new technique in which traumatic thoracolumbar vertebral fractures were treated by kyphoplasty with use of autogenous bone graft plus biphasic calcium phosphate granules instead of bone cement and combination of percutaneous instrumentation.

MATERIALS AND METHODS: The technique was applied to 6 patients. The ages of the patients range from 24 to 81, average of 53 years. Fracture level was Th12 in 2 patients, L1 in 2 patients, L2 in one patient and L1 and L4 in one patient. The cavity created by kyphoplasty balloon was filled with mixture of autogenous bone graft harvested from posterior superior iliac spine and biphasic calcium phosphate granules (BCP). After filling, pedicle screws and rods were inserted percutaneously to one above and one below levels.

RESULTS: All the patients were satisfied with the procedure. The average follow-up time was 6 months. The correction rate in local kyphosis angle was measured as 4.8 degrees and loss of correction at the latest follow-up was 17 %.

CONCLUSION: As a minimal invasive procedure, kyphoplasty seems to be a reliable and effective method for the treatment of osteoporotic, metastatic and many traumatic thoracolumbar fractures. The use of autogenous bone graft instead of bone cement is a promising method to prevent neurological deficit and thermal effects related with cement application. Bone graft placement into the kyphoplasty cavity promotes the bony healing.

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Traumatic Lumbar Nerve Root Avulsion: Case Report

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Lumbosacral root avulsion was firsth described at 1955 and very few cases have been reported since then. In this report, we present a multiple trauma case with inappropriate lower extremity neurologic deficit.

CASE: A 9 years old boy strucked by a car had been refered to our center with multiple injury. There were right humerus proximal fracture, bilateral pubis rami fracture and suspicious sacrum fracture on grafies. Neurological examination was normal except his resistance to move the left lower extremity due to pain, as his explanation, although our strong insistence. We planned coservative treatment and follow up for the fractures. At second day he was still unable to move the extremity although willing to do. He could not dorsiflex the ankle and foot fingers, could flex the lesser toes, could not extend and flex the knee and also the hip. Sensorial examination could not be defined clearly because of the patients unreliable answers, but roughly he was feeling the extremity altough there were some unclear hipoesthesic regions. We made computed tomography scanning of the pelvis with suspicious of sacrum fracture. At CT, there was sacrum fracture on left side with minimal rotation.. MRI had reported as hematoma at L2 level on the left side. We performed laminectomy at L2 level to drain,but saw dura lesion and left sided root avulsion. At second week, hip flexors and extensors gained grade 3 motor power, while knee extensor and flexors were grade 4. Unfortunately, great toe extension and ankle dorsiflexion was absent. Patient was discharged from hospital with home rehabilitation program. Lumbar nevre root avulsion and streching was a rare condition due to the solidity and strength of pelvis. In our case we thougth that the lateral hiperflexion of the patient due to the sudden strike migth have caused the streching of the lumbar nevre root to strech and avulse. Although this type of injury is uncommon to be faced, it should be in mind that in patients wirth pelvis fracture.

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Bone Scan With Spect as a Guide to Kyphoplasty

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PURPOSE: To evaluate the utility of bone scan with SPECT in identifying compression fractures of the spine responsible for back pain of which kyphoplasty would lead to significant improvement of the symptoms.

MATERIALS AND METHODS: 27 consecutive patients with back pain due to compression fractures were included. All patients underwent prospectively plain X-Rays, MRI and bone scan with SPECT. All the patients had kyphoplasty at the levels that demonstrated significant tracer uptake on the bone scan. All patients completed a pain and function questionnaire (SF-36) before the kyphoplasty, immediately following the procedure and 1 month later. The change in the pain score was compared between the patients who had concordant findings on the bone scan and the MRI and the patients who had discordant findings on the two studies.

RESULTS: The bone scan identified a total of 42 compression fractures while the MRI identified a total of 51 compression fractures. Eighteen patients had the same levels identified by both bone scan and MRI (Group A). Nine patients had an additional compression fracture identified on the MRI (Group B). All patients had significant relief of the symptoms following the kyphoplasty. The change in pain score immediately following the procedure and at one month was similar in both groups (P=0.36 and P=0.46 respectively).

CONCLUSIONS: Bone scan with SPECT can help identify the levels of compression fracture responsible for back pain. Kyphoplasty at these levels can alleviate the symptoms of the patients.

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Neurologic Deficiency in Thoracolumbar Vertebrae Fractures: A Retrospective Study in a Series of 26 Patients

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INTRODUCTION: A retrospective clinical examination of all patients with neuromuscular deficit accompanying fractures of vertebrae who underwent an anterior or posterolateral decompression and posterior fusion was completed.

MATERIAL AND METHODS: Between 1996 and 2002 26 patients (16 men and 10 women) underwent surgical treatment for post-traumatic paralysis caused by thoracolumbar fractures. Mean follow up period was 4.5 years (6-1). Clinical data of 26 patients were reviewed. ASİA impairment scala was used for determination criteria. Totally, 26 patients having positive bulbocavernos reflex and being categorized as ASİA A were included into study. İn an average operation duration of 16 hours anterior or posterolateral decompression were complited successfully in all cases. İn addition to decompression we had done duramater repairement in 14 cases. Posterior fusion had applied to all patients for stabilisation. İv methylprednisolone was used to all patients.

RESULTS: When the patients had come to their last clinical controls we detected 8 cases as ASİA A, 4 cases as ASİA B, 4 cases as ASİA C, 2 cases as ASİA D and 8 cases as having normal sensorymotor functions (ASİA E) As a comlication decubitis ulcer in need of reconstructive surgery were come into existence in 4 cases having no any norological impeirment.

CONCLUSION: The surgical management of the thorocalumbar fractures with neurological deficit must be individualized based upon fracture anatomy and neurologic status of the patients. This retrospective study showed that effectiveness of decompressive surgery on thorocalumbar fracture with neurologic deficiency was not time dependent. We believe that paraplegic patients may get benefit from decompression in optimal stuations without any time restriction. And we also believe that decompression should have done in cases further than 72 hours after injury. Moreover immediate decompression must be applied to cases las

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The Results of Pedicle Screw Application to the Fractured Vertebrae in Thoracolombar Fractures

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INTRODUCTION: There are numerous fixation and grafting methods for the treatmant vertebral fractures. Newer techniques and principles overtake the old in due time. Screwing of the fractured vertebrae provides; 1- strengthing of the system,2- stabilisation of the fragmants, 3- volume expansion in vertebral body, 4- restoration of the canal. The aim of this study is to persent the results of pedicle screw application to the fractured vertebrae in a group of our patients.

METHOD: Between 1995-2004, pedicle screw application was performed to 78 of 230 patients operatad on due to vertebral fractures.In 35 of cases single screw, in 43 of 2 screws were applied to the fractured vertebrae. This choice depends on whether the pedicle is damaged or not. 43 of the cases were male and 35 were female.The mean age was 40,2 years(16-71). 33 fractures were burst type, 42 were compression and 3 were fracture-dislocations. The fracture levels were as follows:T8 fracture in 1, T11 fracture in 2, T12 fracture in 17, L1 fracture in 29, L2 fracture in 17, L3 fracture in 7, L4 fracture in 5.

RESULTS: The mean follow-up period was 3,5years (1-9). The complications were screw fracture (1 case) and loss of correction (1 case). Neurologic disorder was present in 18 cases and the average improvement according to Frankel's classifications was at least one degree in the follow-up period. The average increase in vertebral body angle was 2,5 degree and the average improvement in canal diamater was %40 postoperatively.

DISCUSSION: The aim of the surgery in thoracolumbar fractures are to obtain the stability of the vertebrae, to prevent deformity, to correct the deformity and to decompress the spinal canal. We observed strengthing of the system, increasing of the canal diameter and prevention of correction loss. The saticfactory surgical results and positive feed-back we obtained from our patients implies that pedicle screw application to the fractured vertebrae can be accepted as a beneficial procedure.

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Outcomes of Conservative Treatment in Thoracolomber Fractures

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PURPOSE: Incidence of vertebral fractures increase by development of technology 90% of these are thoracolomber fractures. Both operative methods are the advised treatment methods according to the indications. In this study we aimed to review the results of thoracolomber fractures treated by conservative methods.

METERIALS AND METHODS: Between January 1999 and December 2002, 49 patients with thoracolomber fractures were treated conservatively in our clinic. All of these fractures were treated by TLSO. Patients were evaluated by measurement of kyphosis angle, sagittal index, loss of height by using A/P and lateral roentgenography and computerized tomography at the beginning of the treatment and during the follow up. And at the last examination that Dennis pain and work scale were used.

FINDINGS: Patients were followed average of 42 months (24-72 months). There were 20 female and 29 male. Fracture etiology consist of 27 (55 %) traffic accident, 17 (35 %) falling from a hight, 3 (6 %) after a near fall, 2 (4 %) direct trauma. Mostly accomponient pathology consist of cranial trauma 5 (10 %) and calcaneus fractures 5 (10 %). Thirty-one (63 %) of these were compression fracture, 18 (37 %) were burst fracture. Before treatment mean kyphosis angle was 19.2 degrees, at the last examination was 21.2°. Mean sagittal index was 16.4° before treatment and 16.5° at the last examination. Mean loss of height was 21.6 % before treatment and 25.1 % at the last examination.

DISCUSSION: With proper indication, thoracolomber fractures can successfully be treated by conservative methods avoiding from surgical complications and high costs.

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Posterior Instrumentation for Thoracolumbar Fractures: A 5-Year Concecutive Series

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INTRODUCTION: Thoracolumbar fractures are relatively common injuries. Numerous classification systems have been developed to characterize these fractures and their prognostic and therapeutic implications. The treatment of unstable thoracolumbar spine fractures remains controversial. Theoretical biomechanical advantages of transpedicular screw fixation include three-column control of vertebral segments and fixation of a vertebral segment in the absence of intact posterior elements.

METHODS: The series consisted of 58 consecutive patients, with 68 fractures treated with transpedicular bone-anchored instrumentation and arthrodesis from 2000 through 2005. Plain radiographs were available in all cases; CT scans and MRI were obtained in 50 and 43 cases, respectively.

RESULTS: Most fractures were located on thoracolumbar (43 %) and lumbar (36 %) regions. Multilevel fractures were detected in eight patients (13 %). The principal problem encountered was screw malposition, which occurred in 8 of the 68 (11%) instrumented fractures. No major acute complications such as death, paralysis, or infection occurred. Neurologic function improved in 40 of 58 patients (68 %) and did not worsen in any.

CONCLUSION: Posterior stabilization can be effective with Chance fractures and flexion-distraction injuries that have marked kyphosis, and in translational or shear injuries. Advances in understanding both biomechanics and types of fixation have influenced the development of reliable systems that can effectively stabilize these fractures and permit early mobilization.

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Early Results of the Two Cases with Fractures-Facet Dislocation at the Thoracic Vertebra Treated with Anterior-Posterior Surgery at the Same Session

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SUMMARY: Two neglected cases who had high energy traumatic fractures of the thoracic spine with facet dislocations and with columna vertebralis deformity were surgically stabilized with anterior discectomies, posterior instrumentation and fusion in the same session applied at a later time. The cases were evaluated postoperatively with clinical and radiological findings.

MATERIAL AND METHOD: Two cases with high energy trauma at the thoracic columna vertebralis because of falling from high places and in road traffic accidents were evaluated. There were multiple fractures at the thoracic vertebra and facet dislocation without neurological deficit in these two cases. In these two cases there were inadequate conservative treatment post traumatically and inadequate stabilization with corset usage. Total duration untill surgery after the trauma was 1 month(man) to 29 months(woman). Their mean age range was 25 (20-30). The level for the facet dislocation and vertebra translation was between the T9-10 and T8-9. Intervertebral disc releasement and graft were applied anterior surgery. At the same session 2 rods were fixed by transverse connectors with the help of pedicle screws and hooks involving the T6-L1 and T4-L1 vertebra levels from the posterior aspect. Compression is applied to correct the kyphosis and translation is applied to correct the scolyotic deformity.An allogreft and otogeneus graft is added from the posterior. The clinical and radiological appearances of the cases after the follow-up period were evaluated.

FINDINGS AND RESULTS: Preoperative and postoperative follow-up measurements were done to evaluate the prominent sagittal plane deformity of the cases. Thus the kyphosis angle had been corrected at %41.6 by regressing from 77 to 45 and in the second case had been corrected at %14 by regressing from 45 to 39. There were not a loss of correction,pseudoarthrosis, infection, neurological deficit and back pain affecting the daily activities adversely in neither of the cases.

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Traumatic Vertical Atlantoaxial Dislocation. Case Report

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INTRODUCTION: Traumatic vertical atlantoaxial dislocation is rare but serious injury. It occurs in only 1-2% of patients admitted to hospitals with acute cervical injuries.

MATERIAL AND METHOD: A 6-year-old girl was delivered to the emergency service, after pedestrian injury by a motor vehicle accident. A neurologic examination at that time showed quadriplegia. She was noted to have swelling in left leg. Respiration was irregular and the patient was entubated by intensive unit team. Plain radiographs showed a wide separation between the atlas and axis and fractures of pelvis and left femur. Computed tomografic scans demonstrated vertical dislocation of atlantoaxial joint. The patient immediately underwent surgery. Posterior midline approach was used. The facet capsules and ligamentum flavum were completely disrupted at C1-2 level. The dura was noted to be ruptured. The spinal cord was contused and hemoragic. The dura was repaired and posterior atlantoaxial fixation performed using sublaminary wiring. Femur fracture was stabilized by external fixateur. She regained consciousness on fourth day after the trauma. After four weeks, quadriplegia slightly decreased; the left upper extremity had 2 over 5 strength. But a paralyzed diaphragm required long-term pulmonary support. The patient never discharged from the intensive care unit and died 18 months after the trauma.

CONCLUSION: It has been generally accepted that all atlantoaxial instability require immobilization. It can be achieved with skeletal traction and followed by C1-C2 fusion. However, severe ligamentous disruption with a high risk of neurological deterioration if skeletal traction is applied. So axial compression is safety method to achieved reduction by posterior approach.

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The Impact of Pseudoarthrosis on Clinical Outcome in Isolated Spinous Process Fractures of Six Adjacent Level Thoracic Vertebrae: Report of a Case

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Spinous process fractures are rare injuries of polytraumatized patients and are most often seen in C7 vertebra. Isolated spinous process fractures are extremely rare especially in the thoracic region. Also the management of multilevel spinous process fractures is unclear. We present a case with isolated spinous process fractures of six adjacent levels in the thoracal spine from T5 to T10.

MATERIALS AND METHODS: 58 year old male being hit by an automobile presented with back pain which worsened upon lying on his back. His examination revealed tenderness over the spinous processes over most of the thoracic spine with crepitation and paravertebral muscle spasm. There were no motor or sensory deficits. Anteroposterior (AP) and lateral X-rays failed to show the spinous processes in the thoracal region. CT scan of entire thoracal vertebrae revealed isolated spinous process fractures at all levels from T5 to T10 (Figure 1). There was no compression of vertebral bodies or narrowing of the canal. Patient was treated with a brace. Control CT scans were obtained at 6th and 12th months. Backpain was evaluated subjectively using visual analog scale (V.A.S.) and spinous process compressions for each fractured level. (Table 1)

RESULTS: V.A.S. scores decreased from 8 to 2 at three months but all spinous processes were tender. At 6 months no tenderness was detected and V.A.S. was 0 . CT scans of 12th month revealed pseudoarthroses at all 6 spinous processes (Figure 2). At 2 years follow-up it was seen that he had no loss of range of motion. He can flex, extend and also lie on his back without pain.

CONCLUSION: Even multiple spinous process fractures are minor injuries. Superimposing ribs prevent detection of thoracic spinous processes on X-rays and CT can be used for diagnosis. Osseous union is not the sole determinator of clinical outcome. Pseudoarthrosis of multiple spinous process fractures can be totally symptom free which makes this nonunion insignificant clinically.

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The Complications of Minimal Invasive Percutaneous Treatment (Balloon Kyphoplasty) of Osteoporotic Vertebrae Fractures

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Fractures of the osteoporotic vertebras are common seen in elderly patients. The treatment modalities of these fractures have been argued in many years. Patients with these fractures become depended because of pain. Respiratuar and gastrointestinal complications are also seen in these patients. Depression and death are not rare.

Minimal invasive treatment modalities became very popular last years.

In our clinic, between June 2001 and December 2004, we performed balloon kyphoplasty in 35 vertebras of 28 patients. The 15 of the patients are women and 13 of the patient are men. Balloon kyphoplasty was performed in 1 patient's 3 segments and 5 patients' 2 segments. The rest of the patients single segments.

The fractures were, between T6 - L5 vertebras. T12- L1 vertebral segments were the most seen (48 %).

We did not notice any neurological complications. Intradiscal cement noticed in 6 patients. We performed anterior decompression and fusion one of these 6 patients because of the discitis , caused by intradiscal cement. In the two patients, cement noticed by the perispinal region. In the one of the patients, we noticed another fractured segment the day after surgery. But the patient did not accept another operation.

In the literature, it was found that the fracture probability of the one segment upper, and one segment inferior of the performed vertebral fractures is 30%. Intradiscal cement invasion is also common complication.

The complications of balloon kyphoplasty are not rare although, suitable patients and experienced surgeon. Besides the neurological complications, the others are not so important and can be managed easily.

We, propose the balloon kyphoplasty, because of it's being minimal invasive method, no much more alternatives and patients' happiness.

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Long Term Prognosis of the Primary Spinal Tumors

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OBJECT: Primary spinal tumors are rare lesions that comprise 0.4 % of all tumors. Also 10 % of primary bone tumors arise from the vertebral column. The ratio between primary spinal tumors to metatstatic spinal tumors is 1/10-20. We presented a clinical series of patients with primary spinal tumors.

METHOD: Between January 1996 and December 2004, 29 patients (19 female, 10 male) with primary spinal tumors were treated in our department. The mean patient age was 40.4 years (range12 - 75 years).Of these patients, 10 (34.5%) were plasmasitoma, 4 (13.8%) were Paget's disease, 3 (10.4%) were cordomas, 3 (10.4%) were hemangiomas, 2 (6.9%) were osteosarcomas, 2 (6.9%) were osteoblastomas, 2 (6.9%) were osteid osteomas, 1 (3.4%) was non-Hodgkin lenfoma, 1 (3.4%) was aneurysmal bone cyst, 1 (3.4%) was condrosarcoma. Of these patients 17 (58.6%) were malign and 12 (41.4 %) were benign tumors. Surgical treatment was preferred in 79.4% of the cases (approached anteriorly in 7, approached posteriorly in 9, approached from both ways in 6 and approached transcondylarly in 1 of the patients). Additionally, 21.7% of the surgical cases got radiotherapy and chemotherapy. Mean follow up time was 2.9 years (range 3 months-8 years). Communication with one of the patients was lost during the follow-up. Seven patients (25%) were dead. Among these patients, three were plasmocytomas, two were chordomas, one was a chondrosarcoma and another one was osteosarcoma. One of the plasmocytomas transformed into multiple myeloma in the fourth year of the follow-up and her paresis deteriorated into paraplegia. Tetraplegia developed in the end of the first year in another patient with osteosarcoma on C1-2 levels.

CONCLUSION: The optimal management of the primary spinal tumors is surgery. The goal of the surgery should be complete removal whenever possible. When tumor excision results in an instability of the vertebral column, concurrent spinal stabilization and fusion should be performed.

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Intradural Spinal Tumors: Retrospective Analysis and Early-Term Outcome of 28 Consecutively Operated Cases

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INTRODUCTION: In this study the results of 28 intradural spinal tumor cases which were operated in our clinic between 2000-2004 are analysed. The retrospective analysis of the clinical, radiological, pathological and early- term surgical outcomes are aimed.

MATERIAL - METHOD: The diagnosis in all cases have been evaluated under history clinicopathological and neuroradiological factors. Preoperative neurological state of the cases have been evaluated with Mc Cormick Scala. In statistical comparisons;chi square importance test and in duration and age comparisons, Kruscal-Wallis Test were used.The degree of importance was taken as p=0.05.

RESULTS: Of the patients 50% (14) were female, 50% (14) were male.Average age was 41,9±19,1(8-84 age range). The most frequent symptoms were pain and motor deficit 39.3% (11). Localizations were thoracal 57.1% (16), cervical 25% (7), lumbosacral 17.9% (5). The average symptom duration was 49.7±58.3 weeks. Preoperative neurological states in Mc Cormick Scala were grade 1 42.9% (12) and grade 2 21.4% (6). The proportion of intramedullary-extramedullary was 25% / 75%. In pathological diagnosis, meningioma schwannoma were sited mostly in extramedullary and ependymoma in intramedullary. In females; meningioma 75%, in males; schwannoma 62.5% and ependymoma 75% were mostly seen. Total 64% (18), gross total 35% (10) resections were made. In early-term surgical outcomes, total and partial recovery was observed in 57.1% of the cases. These proportions were 62.5% and 66.7% in meningioma and schwannoma, 42.9% in ependymoma.

CONCLUSION: The positive factors of the prognosis are early diagnosis,good preoperative neurological state, effective surgery and total resection. There is no meaningful difference in comparison of early term surgical outcome with age, sex, symptom duration, localization, neurological state, tumor-dura relation, pathological diagnosis and surgical technique. (p=0.984,p=0.471,p=0.531,p=0.146, p=0.184, p=0.677, p=0.462, p=0.333)

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Aneurysmal Bone Cyst of the Upper Thoracic Spine

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PURPOSE: Aneurysmal bone cyst (ABC) is an uncommon benign, expansive, osteolytic lesion, capable both of rapid enlargement and spontaneous resolution. It is generally observed in young adolescents, in a spinal localisation in 10% of the cases. These lesions may easily be mistaken for a malignant tumor both radiographically and pathologically. In the spine, it usually grows rapidly and can cause extensive bone destruction and compress neural structures with eventual vertebral collapse. Operative management of such a lesion may be complicated by profuse hemorrage. We report an aneurysmal cyst in a 14-year-old girl who had an acute exacerbation of spinal cord compression because of an ABC in the second thoracic spine.

MAT METH: Surgical access to T2 vertebral body through standard cervical approache may be difficult and extensive. Adequate exposure of this area can be achieved in children, using a partial manubrial sternotomy. This procedure was successfully performed in a 14-year-old girl whose T2 vertebra had been completely replaced by a large aneurysmal bone cyst that had produced major paraparesis. Surgical treatment was facilitated by preoperative embolization of the highly vascular tumor. In the first stage, excision of the tumor was performed with posterior approach without extensive intraoperative blood loss, transpedicular stabilization of the spinal column was achieved. In the second stage, anterior approach was performed with excision of the vertebral body, restoration of the anterior column with cage and plate-screw fixation. Spinal fusion resulted in complete restoration of neurologic function, eradication of the cyst, and stabilization of the cervicothoracic spine.

DISCUS: At the 12 month follow-up examination, he was neurologically intact and without any leg pain or gait disturbance. The limited manubrial split approach to T2 vertebra is recommended. We conclude that embolization of ABC reduce intraoperative bleeding thus enhancing resectability.

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Combined Posterior Cervicothoracic Fusion with Fibula Graft and Implant: A Technical Alternative in Complicated Cases

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INTRODUCTION: Stability of the cervicothoracic region in complicated cases with aetiologies such as trauma and tumours may bring the need for combined anterior and posterior instrumentation and fusion. The fusion of the cervical spine through anterior procedures had been discussed widely, however, fusion through posterior approaches had been less frequently reported.

METHODS: A 49 years-old female patient with the known diagnosis of thyroid papillary carcinoma was referred to neurosurgery clinic. Her neurological examination demonstrated the involvement of the right C7, C8 and T1 nerve roots. The magnetic resonance imaging showed, the metastatic involvement of the C6-T2 vertebral anterior and posterior elements. There was also metastatic soft tissue component at the T1-2 level causing posterolateral spinal cord compression. A two-stage surgery was planned depending on the long life expectancy of the primary tumour. The first stage was the posterior approach because of the posterolateral spinal cord compression caused by the extradural mass lesion. The second stage was anterior C6-T2 corpectomies and stabilisation.

RESULTS: At the first stage of the surgical treatment, the patient underwent C6-T2 laminectomies, foraminotomies and subtotal tumour removal at T1and T2 and decompression of the spinal cord. To maintain stabilisation, bilateral C4-5 lateral mass screws, T3-4 transpedicular screws with bilateral rods and fibula allograft between C6-T2 spinous processes were introduced. The fibula graft was drilled and a tunnel was formed to attach to the rods by a tranverse bar. At the same time, the proximal and distal ends of the fibula graft were drilled to form a saw tooth to fit onto the spinous processes and bilateral to laminae. The spinous processes and neighbouring bony tissues were decorticated to facilitate bone fusion. The postoperative period was uneventful but the patient regre

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Diagnose and Treatment Planning in Benign Vertebral Tumours

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INTRODUCTION: Primary vertebral tumours are usually rare.%0.4 of all neoplasms and %10 of all musculoskeletal tumours are seen in vertebral column. Primary vertebral tumours have more privileges from other musculoskeletal neoplasms. Non-morbid benign tumours seen in extravertebral locations may cause serious clinical and surgical complications when diagnosed in columna vertebralis because of the spesific vertebtal structure and strict relation between the neuronal componets and vertebral column. Patients with benign vertebral tumours usually have a non-spesific pain which is not relieved with nonsteroidal and rest.

MATERIALS AND METHODS: In this retrospective study we have evaluated 15 patients (13 male-2 female) with the average age of 28 years (5-53 years.) who were treated in our clinic between January 1995-January 2000. All of them had pain and were treated conservatively. They all evaluated with conventional roentgenograms, CAT, MRI and radionuclear imaging. Laboratory results were non-spesific. The tumours of all patients were excised. Posterior instrumentation and fusion applicated to four of patients after exicision.

FINDINGS: Microscopic findings were concordant with osteoid osteoma in five cases, hemangioma in two cases, osteoblastoma in two cases, anevrymal bone cyst in one case and benign fibrous osteoma in one case. Microscopic findings of two patients were diagnosed as chronic osteomyelitis. After postoperative period, the pain relieved in all patients. No recurrance seen in 2 year follow-up.

RESULTS: Although vertebral benign tumours are rarely seen, they may appear with pain and progressive neurologic deficits. Careful clinical and radiologic evaluation must be done by paying attention for the possibility of tumoural lesions, for the patients with chronic lumbago. A multidisciplinary approach including surgeon,radiologist and pathologist must be done in vertebral tumours.

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Metastatic Vertebral Osteosarcoma Without Pulmonary Metastasis

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Primary osteogenic sarcoma metastasize to bone very rarely without pulmonary involvement. Importance of our case is presentation of the patient with neurologic signs due to spinal metastasis of osteogenic sarcoma without pulmonary metastasis.

We present a case (16 year - old male) of metastatic vertebral osteosarcoma without pulmonary involvement. The patient presented with severe back pain, urinary incontinence and loss of movement of legs two years after initial treatment of osteosarcoma of left proximal femur. Bone scintigraphy and magnetic resonance imaging of vertebral column showed single metastses in the 10th thoracic vertebra. The tenth vertebra with pedincules, intervertebral discs of upper and lower region and pleura in close proximity were resected by an anterior approach. Four cycles of chemotherapy were administered in postoperative period. The patient died of infection 13 months after detection of metastases.

In conclusion, this case documents that extrapulmonary metastases of osteosarcoma might develop in patients other than pulmonary metastases.It should be kept in mind that unusual metastatic sites without pulmonary involvement can be observed in osteosarcoma cases.

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Haemangioma of L1 Vertebral Body: Treatment with Percutaneus Polymethylmethacrylate Vertebroplasty

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INTRODUCTION: Haemangioma is the benign tumor that is most frequently localized in the spine. Radiotherapy or surgical excision are treatment options for symptomatic haemangioma. Minimal invasive augmentation techniques of vertebral bodies have been recommended to treat osteoporotic vertebral fractures and neoplastic vertebral collapse. Vertebral haemangiomas can be treated with this technique in selective cases.

CASE: A 59-year-old female patient admitted to our clinic with 4 years history of back pain. Orthopaedic and neurologic evaluations revealed slightly loss of power in right hip flexion and no sensory deficit was found. Results of routine laboratory tests were normal. Radiographic examinations revealed thickening of L1 vertebral trebaculae. MRI of the lumbar spine documented a hyperintense nodular formation (haemangioma) at right paramedian L1 vertebral body. Visual Analogue Scale (VAS) was used for quantitative measurement of pain. Preoperative VAS revealed 8 points. At surgery, a posterior percutaneous transpedicular approach was used for reaching L1 vertebral body of the patient under local anaesthesia. A 4 mm canulla introduced to the L1 vertebral body under fluoroscopic guidance. Low viscosity, radiopaque, 1.5 cc PMMA bone cement applied into the cavity. No early complications were seen.

RESULTS: Postoperative radiographs and CT scan demonstrated successful filling of the cavity. Postoperative VAS revealed 1 point. Patient discharged from hospital at postoperative first day on foot.

CONCLUSIONS: Percutaneous vertebroplasty can be considered a safe, effective, inexpensive, semi-invasive method for symptomatic vertebral haemangioma. However, a careful technique is required.

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Synchronous Spinal Cord and Thoracal Spinal Vertebra with Soft Tissue Metastases from Follicular Thyroid Carsinoma

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Follicular thyroid carsinoma (FTC) rarely manifests itself as distant metastatic lesion, and when present, is usually found in flat bones. A soft tissue metastasis is extremely rare, and synchronous metastases to spinal cord, thoracal vertebra and soft tissue is not reported in the literature so far.

A 45-year-old male presented with paraparesis of 4 months of duration with swelling on the interscapular area started 6 months ago. On examination general condition and vital signs were normal. Neurologic examination revealed severe spastic paraparesis and hipoestesia below of fourth thoracal dermatoma. Magnetic resonance imaging (MRI) demonstrated a space-occupying lesions involving thoracal epidural space, lamina and corpus of T5-T6 vertebrae with serious cord compression and paraspinal soft tissue. No other metastases were found with CT scan of thorax, abdomen and brain.We performed a laminectomy and tumor excision. Histopathologic examination demonstrated metastatic FTC. The patient underwent thyroidectomy and began medical treatments. He also recieved radiation therapy as part of his treatment.

This case of follicular thyroid carsinoma reported because of its rarity. Early diagnosis (by MRI) is important; with progressive weakness or sphincter disturbances the prognosis worsens.

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Simultaneous Cerebral, Spinal and Lungs Metastases from Choriocarcinoma

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Choriocarcinoma is a malignant form of gestational trophoblastic neoplasia (GTN). Cerebral metastasis have been reported in 3 to 28% of patients with choriocarcinoma.

A 20-year-old woman presented with back pain and motor weakness of lower extremity that started about seven days ago. Neurologic examination revealed a spastic paraplegia and sensory deficit below T4. Serum alfa feto proteine was 12.000 iü/ml. Pulmonary computed tomography showed bilateral multiple lesions in the lungs. Thoracal magnetic resonance imaging revealed extradural lesion at the level of T2-3 vertebra. Also, cranial magnetic resonance imaging demonstrated multiple metastatic cerebral lesions with hemorrhage. The patient was operated and T1-T4 laminectomy was performed. The hemorrhagic vascular mass was subtotally removed. Histopathologic features of the specimen revealed choriocarcinoma.

Cerebral metastasis from choriocarcinoma is a cause of poor outcome in GTN. To our knowledge, no cases of metastases in the cerebral and the thoracal spine with lungs metastases coexistence have been reported in the literature.

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