

## THE SELECTED ABSTRACTS FOR XXIV. ISMISS / SICOT COURSE

### XXIV. ISMISS / SICOT KURSU SEÇİLMİŞ-BİLDİRİ ÖZETLERİ

#### ANATOMICAL CONSIDERATIONS ON INSTABILITY: POSTERIOR PILLAR COMPONENTS AND ITS INFLUENCE

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Early stages of the lumbar motion segment degenerative cascade encompasses internal disc disruption, later disc dysfunction due to the delamination of the annulus fibrosus along with slackening of the outermost annulus fibrosus, longitudinal ligaments, inter-and supraspinous ligaments and instability/subluxation of the facet joints, all causing dysfunction of the spinal functional unit. The strong tendons of the longissimus dorsi muscles together with the tendinous insertions/origins of the multifidus muscles considerably reinforce the lumbodorsal fascia adjacent to the spinous processes. In the early stages of DDD these stabilizing structures are anatomically intact, although relaxed and therefore not functioning properly due to altered mechanics and insertion sites.

A "soft" dynamic stenosis typically also heralds "instability" or "dysstability" due to enthesopathy-type strains on the outermost annulus and ligaments on their insertion sites (inducing osteophyte and spondylophyte formation), and also by the slackening and infolding of soft tissues into the spinal canal, lateral recesses and root canals. Restoration of segmental height would afford re-engagement of the discoligamentous structures, joint capsules, and normalization of muscle action trajectories. Such distractive re-stabilization could conceivably normalize or at least improve segmental spinal mechanics, by itself eliminating undue and painful range-of-motion excursions, thereby taking painful strains off these structures, and also eliminate much of the soft tissue encroachment of bulging disc and ligamentum flavum on the central spinal canal, lateral recesses and neuroforamina. This concept of a staged reversal of pathologically altered segmental spinal mechanics would

seem to be a prerequisite for future biological intradiscal therapy solutions such as gene therapy and/or disc cell culture reimplantation.

In selected early stages of painful segmental settling, abnormal and painful "dysstabilities" and soft spinal stenosis, especially in younger individuals, a (typically distractive) dynamic restabilization realigns the spinal segments (antero-and retrolisthesis) and also affords an "indirect decompression" since the inbulging and infolding disc and ligamenta flava and joint capsules are stretched and realigned, reestablishing the patency of the central spinal canal, lateral recesses and neuroforamina for the neural elements, arteries, veins and lymphatics. Contrary to non-reversible fusion operations, this staged approach would seem to offer multiple lines of defense, and also "buy time" until the biological regenerative therapy solutions have become a viable clinical options. Challenges in the development of dynamic stabilizing devices are choice of the distractive fulcrum, implantation of the device through a minimally invasive approach and, if not biodegradability of the implant, so at least explantability and thereby reversibility of the surgical procedure.

Anterior column reconstruction (ALIF, PLIF, TLIF and discovertebral arthroplasty) typically realigns and heightens the spinal segment, thereby also reengaging and tensioning the annulo-ligamentous structures. The same holds for pedicle screw based dynamic restabilizing systems, provided that the screw head (fulcrum, hypomochlion) is placed as far anteriorly as possible. Surgical-technical challenges with this system are a non-traumatizing surgical approach, obviating undue damage to the paraspinal muscles, correct positioning of the pedicle screws, optimized segmental distraction and also adequate "stiffening" of the implant by appropriate tensioning of the cord. Irreparable muscle debilitation, overdistraction and overstiffening of the system are serious technical issues.

Conceptually, interspinous distractive spacer devices should carry less surgery-related mor-

bidity. Their relative ease of insertion (and explantation) must, however, be weighed against their less favourable geometrical trajectories and their relatively limited overall distraction force, in part due to the pleomorphology of the spinous processes and limited mobility and resilience of the functional spinal unit in intermediately degenerated situations (stiff segments). Erosion of the spinous processes over time along with bony remodelling is another potential hazard, especially with the less elastic and hard devices. To this end, diligent investigations of explanted devices would seem to be essential. Both pedicle-screw-based and interspinous distractive systems should be suitable for eliminating painful mechanical conflict of the posterior elements (kissing "spines", kissing laminae, subluxed, painfully impinged or impacted articular facets) and both types of dynamic stabilizers would seem to eliminate painful end range-of-motion "dysstability" and enthesopathy. The clinical indications for these systems remain to be determined as solid clinical data are becoming available.

### CLINICAL RESULTS OF LUMBAR AND CERVICAL DISC NUCLEOPLASTY (1200 CASES)

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**Aim of the Study:** The one year follow up results of 900 cases are reported.

**Material and Methods:** The Disc Nucleoplasty is a minimally invasive plasma discectomy. 900 patients, suffering from chronic lumbar back pain and radicular pain syndrome were treated by the percutaneous disc decompression procedure of Nucleoplasty. The Nucleoplasty is a new percutaneous disc decompression system, based upon the experience with Chymopapain, Nucleotome, Thermonucleolysis, Lase and IDET. The Nucleoplasty is a controlled therapy: low temperature and controlled ablation/coagulation. In one system you have two modes of action: ablation via plasma molecular dissection and coagulation via resistive heating. Nucleoplasty is an voltage mediated process. The

temperatures in both modes between 40-70 °C. The tissue is broken down into elemental molecules and low molecular weight gases, i.e. oxygen, nitrogen, hydrogen, carbon, dioxide, etc. The gases exit disc through introducer needle. The Nucleoplasty-electrode ("wand") is characterised by a small profile, bipolar, micro-machined tip and an s-curved tip of shaft. *Design goal:* no scar, decrease morbidity, out-patient-procedure. Outcome independent quantity of disc remove (average 0.5 g-1.0 g). Patient selection: Treatment of radicular/axial pain: Cases with leg and/or back pain has been treated. Importend is MRI evidence of contained disc protrusion. Discography, if indicated, has been done. Disc hight of 50-70% minimum is essential. Exclusion criterias: severe degenerative disc, spinal fracture or tumor, severe spinal stenosis, degenerative instability.

**Results:** Of the two year follow up examination: 67% of the patients were complete pain free, continues working regular duty. Complete relief of sciatica and parasthesias. 9% reported intermittend occasional low back pain, never in th intensity of the preoperatif state. Temporarily occasional pseudoradicular parasthesia, low grade. 20% reported about increase of low back pain during havy lifting (over 15 kg) and progressive sciatica and intermittend parasthesias 8 month after surgery. Narcotics temporarily needet. Resurgery has been done in 36 cases (4%). 0 case of paresis. Examination 1, 3, and 6, 12 and 24 month follow up: 78% good to excellent results. VAS score decreased from 8-9 pre surgery to 1-2 post surgery in 2 weeks. No medication after 2 weeks postoperatif. 75% of these patients were completely pain free post operatively. 25% were pain free after 2-3 weeks after surgery. 18% acceptable: VAS score decreased from 7-9 pre surgery to 4-5 popst surgery in 4 weeks, down to VAS 1-2 after 8 weeks. Medication needet 4-6 weeks after surgery. 4% poor: No significant decrease of pre-operative back and/or pain. Open surgery (Microdiscectomy) was done in 4%.

**Complications:** No bleeding, no perforation of the ventral ligaments, no infection.

**Conclusion:** Nucleoplasty is a quick an safe procedure of minimally invasive disc-decompression with excellent clinical results. There is no signifi-

cant difference between male and female patients- Significant pain relief postoperatively during the first 4 weeks after the Nucleoplasty-procedure. Persistent pain relief in the follow up. No severe complications are reported.

**PERCUTANEOUS LUMBAR ENDOSCOPY:  
EVOLUTION AND ACTUAL  
FORAMINOSCOPIC CONCEPT**

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After the first decade with clinical experience in percutaneous intradiscal applications for intradiscal decompression since 1979 and endoscopic biportal technique since 1982, the idea to combine simultaneous endoscopic control with direct extradiscal tissue elaboration across an uniportal approach arose in the later eighties. Experiments with modified urologic workscopes designed for cystoscopic applications demonstrated in 1990, that endoscopic applications are possible also in non-preformed anatomical spaces when some hyperpressive irrigation was used for local atraumatic tissue spacing. So we introduced endoscopic coaxial foraminoscopy clinically for the first time in February 1991 for the treatment of a foraminal sequestered herniation. Since then the technology became almost standardized for this specific range of indication. The posterolateral approach from 9-12 cm from the midline follows the same criteria as for intradiscal applications, but the working cannula is directed to the foraminal sequester, which is extracted under endoscopic control then with a special working scope. Our first clinical series of 160 cases brought successful results in 131 cases, including an initial learning curve. 22 patients needed later on conventional open surgery w/wo fusion. Here the initial results trend to "black or white": or the sequester is removed or not. Relatively freshly sequestered fragments without local scar-adhesions are easier to remove. Anatomical limits can occur in L5/S1 when high iliac crests do not allow enough flat approach to medioforaminal sequestra. Detailed knowledge of foraminal anatomy is mandatory. Hospital stay

could be reduced to 2 to 3 days, out-patient care is possible as well.

**PERCUTANEOUS ENDOSCOPIC AND  
MICROSCOPY-ASSISTED LUMBAR  
NUCLEOTOMY**

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For 15 years the percutaneous endoscopic nucleotomy of contained lumbar disc herniation has been in use in our department. Essential for the success of this method is a careful diagnosis to decide the correct indication. With the first 164 patients (1990-1997) the postoperative follow-up checks have been carried out for 5 to 13 years. The average age of patients operated on was 43 1/2 years for male patients (n=102) and 40 years for female patients (n=62). The level of disc removal was mainly L4/5 (n=126) and in 38 cases L3/4. 123 patients (75%) had got therapy-resistant low back pain and radiculopathy, and 41 patients (25%) had got therapy-resistant low back pain only. The patients suffered from relevant symptoms for six months on average (3 months - 2 1/2 years) before consulting our department. The preoperative diagnosis applied consisted of standard X ray of lumbar spine and CT, in 95 cases (58%) additional MRI and in 37 cases (22.6%) a further myelography with subsequent myelo CT was applied. An intraoperative discography was the basis of our operating. The postoperative follow-up check was done 5 to 13 years later (7.7 years on average). It revealed very good results with 116 patients (70.7%) and fairly good results with 21 patients (12.8%). 27 patients (16.5%) showed persistent neurological symptoms postoperatively. 12 out of them needed conventional microdiscectomy from 3 weeks to 6 months later, another 5 patients within 12 months and another 3 patients 2 or 3 years later. We have had no major complications. For cases of contained disc herniation this is a highly effective, minimal-invasive operation method.

For some time now we have been gaining experience with minimal-invasive microscope-assisted nucleotomy in lumbar herniation. We use conventional dorsal approach. The advantage of this

method compared with the traditional microsurgical technique, is the smaller minimal traumatizing access required through transmuscular dilatation by offering optimal three-dimensional visualisation of the surgical field. Our most recent results are highly promising.

#### THE TECHNIQUE OF FORAMINOPLASTY IN PED AND MED PROCEDURE

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Japanese Society for the study of Endoscopic and Minimally Invasive Spine Surgery (JESMISS) has been founded in 1998 and operated educational, scientific purposes or to do assist all those involved with health care and so on. In 1995 endoscopic surgery was introduced for the first time. At first laparoscopic spine surgery, retroperitoneoscopic spine surgery has been tried. At September 1998 MicroEndoscopic Discectomy (MED) was introduced in Japan. The number of posterior Endoscopic approach to the lumbar spine have gradually increased. So far about 12000 cases of posterior Endoscopic approach have already performed. On 13 May 2005 Japanese government has approved the application of endoscopic procedure to lumbar disc herniation. The controversy in applying the use of PED (Percutaneous Endoscopic Discectomy) and MED to treat the lumbar disc herniation remains an issue of discussion. But we try to use original PED system with foraminoplasty since 2002 for the first time in Japan.

But the cause of intraoperative complications during this sophisticated surgery must be attributable to unrealistic and unpractical training system, shortage of experienced surgeons and no appropriate credentialing system. To overcome these problems, the Committee of Endoscopic Surgical Skill Qualification System was gained in JOA with 6 members who fulfill the requirements that are to be a councilor of JOA, a surgeon represents their Mother Society, a holder of certification by an appropriate specialty board and has established the credentialing system to encourage the surgeons to be trained to obtain privilege of endo-

scopic surgery. They shall serve for a 3 years term. As to the number of cases necessary to certify that the applicant must have a competence to be able to complete popularized endoscopic surgeries by his or her own efforts, surgeons must have an experience with over 30 cases in posterior lumbar discectomy or 20 cases in endoscopic anterior approach experience of some advanced endoscopic surgeries in the field of spine surgery.

#### MICRODECOMPRESSION OF THE NERVE ROOT IN PATIENT WITH LUMBAR SPONDYLOLYSIS

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**Purpose:** The main source of pain in patient with spondylolysis is a compression of the nerve root which pass through lytic isthmus. We reported acceptable results after microsurgical nerve root decompression in young to middle-aged patients. However, micro-decompression in elderly patients have not been reported. The purpose of this report is to present clinical feature and an efficacy of microsurgical decompression in elderly patients with spondylolytic spondylolisthesis.

Clinical feature of elderly patients with spondylolytic spondylolisthesis:

They showed mainly root compression symptoms accompanied with or without cauda equina compression. The intermittent claudication was identified in 83% patients. The pain or numbness was not always improved with bending posture like degenerative canal stenosis.

The neuroradiological characteristic image in elderly patients was a scream canal sign (a new CT and MRI sign in spondylolysis). The wide canal sign is well known as a MRI sign that remind a physician spondylolysis even if conventional x-ray films show no clear discontinuity in the isthmus. Posteriorly displaced detached lamina made an enlarged spinal canal. We can detect a large oval transsectional image of dural tube in both T2 weighted axial MRI and CT scan at isthmic level. In elderly patients, the enlarged dural tube was compressed from both sides by osteo-cartilaginous process which was growing as degenerative proliferative changes in isthmic spondylolysis. We

named bilaterally compressed large axial image of dura "scream canal sign" after famous art - The Scream- by Edward Munch. The dura image just looks like the face of man painted in The Scream.

Instability in slipped segment has not clearly seen in functional x-ray. Percentage of slippage was less than 30% and lumbar lord was preserved in elderly patients. From the x-ray finding, we think that the number of patients who need spinal fusion is very few.

Elderly patients have a lot of systemic diseases. It is sometimes very difficult to perform the conventional operative method because of complications those they had. Recently a delirium becomes major problems as a postoperative complication in elderly patient with prolonged bed rest. Minimally invasive surgery will be primarily indicated in patient with spondylolytic spondylolisthesis who failed conservative therapies.

**Patients:** There were 14 men and 4 women with a mean age of 68.7 years. The level of spondylolysis was L5 in 14 cases and L4 in four. The mean duration of the symptom is 3.8 years. In spite of over than 3 months conservative treatment all patients showed no improvement. Mean preoperative JOA score was 13.5 point. The nerve root block is useful for establishing the diagnosis of nerve root compression at the isthmus. The scream canal sign was identified in both MRI and CT. A pedicular spur and proliferating osteo-cartilaginous mass were demonstrated around the lytic isthmus in lumbar CT.

**Operative Methods:** A 2-3 cm midline incision was enough to access the isthmus under the microscopic control. By cutting cranial edge of floating lamina with cutting bur, the caudal aspect of lytic lesion of the pedicle was clearly identified. The pedicular spur and proliferating osteo-cartilaginous mass was totally resected to achieve nerve root decompression.

**Results:** Unilateral decompression was performed in 5 cases and bilateral in 13. The mean operation time was 56 minutes. Blood loss was minimum. The mean follow-up period was 16.5 months (28-6). Preoperative JOA score 14.8 point postoperatively improved to 23.6 in average.

**Discussion and Conclusion:** Invasive surgeries such as Gill operation, direct repair or spinal

fusions were indicated for painful spondylolysis. But microsurgical decompression to the nerve root that passing beneath the lytic isthmus is effective for the improvement of patient symptoms as a minimally invasive spinal surgery. We have already reported preferable results in young and middle-aged patients. We also indicate this technique to elderly patients. We believe the pain in elderly patients with spondylolysis comes from compromised nerve root passing just ventral of lytic isthmus as well as younger patients. Slipped segments were always stable and lordotic curvature was preserved. Consequently there were quite few cases to need spinal fusion. I believe that the microsurgical nerve root decompression is useful technique to improve the pain in patient with spondylolytic spondylolisthesis.

#### THE CONTINUUM OF INDICATIONS IN NON-FUSION TECHNOLOGIES

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The main targets of therapy in DDD and also the ideal goals of surgery are the decompression of neurogen structures, pain relief, preserving the range of motion, segmental stabilization and replicating the natural function of the disc. At least the last two goals cannot be achieved with the classical surgical techniques. As there is at that time no treatment with "restitutio ad integrum", not the maximum possible, but the most adequate treatment should be applied.

A compromise is the treatment with little and increasing invasive therapy steps, according to the "Step Algorithm for Treatment for Spinal Disorders". The three classical steps are Percutaneous Surgeries, Open Disc Surgeries and Fusion Surgeries. The Step Algorithm of the third millenium is extended to six surgical steps with Arthroplasty Surgeries (Partial Disc Replacement, Total Disc Replacement [TDR]) and Posterior Dynamic Stabilization, e.g. Dynesys. With Disc Arthroplasty and Dynamic Stabilization new concepts of restoring segmental stability without definite irreversible destruction are introduced in Spine Surgery. In contrast to loss of motion with fusion, with TDR motion and spinal balance are

restored. A relatively neutral and more physiological stress flow to the adjacent levels can be achieved, despite to progressive damage to these segments after fusion surgeries. Another treatment step and the future of TDR could be the biological disc repair e.g. with Autologous Disc Chondrocyte Transplantation (ADCT) or gene transfer.

Nevertheless fusion surgeries cannot totally be replaced by Arthroplasty. Nowadays the real instabilities (e.g. fractures, tumors) and deformities (e.g. scolioses, kyphoses) remain for fusion surgeries.

#### **SACROPLASTY: A MINI-INVASIVE PROCEDURE IN TREATING SACRUM FRACTURES WITH BONE CEMENT**

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**Introduction:** The incidence of osteoporosis and osteoporotic fractures has clearly increased with elderly population. A further increase is even expected during the next years. Vertebral compression fractures are frequent and common in osteoporosis. As a minimal invasive operative treatment percutaneous cement augmentation (vertebroplasty) has become more and more popular in recent years. 80-90% of the patients treated in this way obtain a prompt and persistent reduction of their pain. In addition a progress of the kyphotic deformity of the augmented vertebra is prevented. Another localisation of osteoporotic fractures are sacrum insufficiency fractures. These fractures were treated mainly conservatively with bed rest and analgetica. Recently the technique of percutaneous cement augmentation has been described for minimal invasive treatment of these fracture.

**Surgical Technique:** The principle of the surgical procedure is quite similar to vertebroplasty. The patient is in a prone position on a radiolucent table. After stab incision k-wires and bone biopsy canals (8 ga) are inserted percutaneously into the lateral mass of S1 keeping under control of an image intensifier. After verification of a correct position of the cannulas in the center of the S1 body, PMMA cement of high viscosity is injected into S1 with permanent C-arm control. After setting of the bone cement the cannulas are removed.

In case of a bilateral fracture in terms of suicidal jumpers fracture additional stability is provided by one or two percutaneous sacro-iliac screws.

**Results:** Up to now we performed a sacroplasty procedure in 14 patients (13f, 1m) with an average age of 77.4 (49-87) years. The patients sustained a Sacrum insufficiency fracture without an adequate trauma or had a banal fall. All sacroplasties were performed bilateral. An additional stabilisation with one or two percutaneous sacro-iliac screws was performed in 4 patients. The patients had a relevant relief of their low back pain after the operation and during their stay in the hospital. The results of an ongoing clinical and radiological follow-up examination will be presented at the meeting.

**Conclusion:** This sacroplasty procedure is a minimal invasive procedure for stabilizing sacrum insufficiency fractures. Depending on the type of the fracture an additional percutaneous sacro-iliac screw fixation is reasonable and can be performed with minimal extra effort. The technique is safe in practise. In the early follow up the clinical results remain promising.

#### **MINIMAL ACCESS FUSION WITH X TUBE**

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Between May 2004 and January 2006 we have used the X-tube [38 patients] and Quadrant [12 patients] minimal access systems on 50 consecutive patients when performing a one or two level posterior instrumented lumbar fusion  $\pm$  decompression. The operations have been performed for the following conditions: lytic spondylolisthesis 9 cases; degenerative spondylolisthesis 24 cases [7 previously treated by decompression]; post-decompression/discectomy 10 cases; degenerative motion segment 7 cases. The clinical problems were Low Back Pain and Sciatica in 40 patients, spinal claudication in 4 patients and mechanical Low Back Pain only in 6. 17 of the patients had previously undergone a total of 27 previous operations at the affected levels, all decompressive except for one non-instrumented fusion.

The age range of the patients lay between 18-85, with a mean of 58. The operations performed were 26 TLIF's at a single level, 5 TLIF's at two levels, 17 sin-

gle level pedicle screw fusions [PSF], one two level PSF and one hybrid [TLIF at L4/5 and PSF at L5/S1].

The mean operating time was 148 minutes for a PSF, 172 minutes for a TLIF, rising to 225 minutes for a 2 level TLIF. The mean blood loss for a TLIF was 341 mls for a single and 860 mls for a 2 level fusion, compared to 556 mls for a single level PSF.

The mean post-operative stay for a single level TLIF was 5.8 days, for a 2 level TLIF was 6.3 days, and for a single level PSF was 6.6 days. This compares favourably with historical controls by the same surgeon. We are as yet unable to comment on the fusion rate. The main complications were as follows: dural tears in 5 patients, one requiring a revision operation to repair the tear. Malpositioned screws in 4 cases. 2 were symptomatic and were revised. Residual or recurrent radicular pain in 8 patients, with 4 settling spontaneously and 3 requiring [successful] revision surgery due to cage migration in one case, a fracture subluxation in another, and ossification within the neuroforamen in the third. A further patient has persistent neuropathic pain.

There were no haematomas, delayed wound healing or superficial or deep infections.

The most notable post-operative feature is the lack of local pain associated with the surgical exposure, with 22% of patients taking no analgesia by the time of discharge from hospital, and 46% taking only simple Paracetamol as required. In the majority we have avoided harvesting graft from the pelvis. Of the 14 patients who have returned to work so far, the mean is at 8 weeks.

We believe the minimal access compromises the ability to satisfactorily prepare a posterior bone graft bed, particularly if a wide decompression is required, and we prefer to use a TLIF approach in these circumstances.

#### **INTERSPINOUS LOCKER FIXATION/LIGAMENOTOPLASTY IN STENOSIS OR DEG. SPONDYLOLISTHESIS**

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**Introduction:** Lumbar spinal stenosis is commonly seen in conjunction with degenerative spondylolis-

thesis and/or instability. Spinal fusion has been the most effective surgical procedure for lumbar spinal stenosis. But performing fusion in the elderly population has its own risks and disadvantages. Interspinous locker fixation (ILF) with ligamentoplasty is a new procedure designed to provide dynamic stabilization to the lumbar spine. The objectives of this study are to describe the surgical technique of ILF and to analyze the short-term clinical and radiological results.

**Materials and Methods:** Between January 2004 and January 2005, 28 patients underwent ILF with ligamentoplasty. After induction of general anesthesia, a midline skin incision is made over the spinous processes of the stenotic levels. Usually a 4 cm incision is needed for one-level surgery. The fascia is incised on the side of decompression about 1 cm laterally from the midline. The supraspinous ligament is detached from the spinous process with an osteotome. Under microscopic view, the interspinous ligament between adjacent spinous processes is removed, while preserving the spinous processes. Using a high-speed drill, decompressive foraminotomy is performed through the midline window. The entire laminar margins are retained while excising ligamentum flavum with a Kerrison rongeur. An appropriate sized titanium interspinous locker is then inserted into the interspinous space. Both spinous processes are tied with an artificial ligament woven in the form of figure-of-eight around the bases of spinous processes and passing through the hole of the interspinous locker. The wound is closed in layers.

**Results:** Mean follow-up was 17.1 months (range, 9 to 21 months). There were 15 men and 13 women with a mean age of 62.9 years (range, 41 to 85). A total of 35 levels were surgically treated: L3-4 in 7 patients, L4-5 in 13, L5-S1 in 1, and L3-4-5 in 7. The mean operative time and blood loss per level were 132.7 mins (range, 60-285 mins) and 302 cc (range, 150-750 cc), respectively. After surgery, lumbar lordosis was well preserved. Sagittal rotation angle in flexion was increased from -2.16 to 1.05 degrees, but it was not significant. Relative sagittal rotation angle was significantly decreased from 10.43 to 6.62 degrees ( $p=0.03$ ). Overall 25 (89.3%) postoperative patients were very satisfied or satisfied. Three cases developed a serous wound discharge, however there was no concomitant laboratory evi-

dence of infection. These patients were managed by needle aspiration and responded well. There was no intraoperative neural injury.

**Conclusion:** Considering its less invasive and non-fusion nature, ILF seems to be an appropriate method for elderly patients with spinal stenosis with or without low grade degenerative spondy-

lolisthesis. Retaining laminar margins minimizes blood loss and prevents embolic complications commonly seen in the elderly. Longer follow-up study is being continued to evaluate the true benefits of this procedure.

**Key words:** Interspinous locker fixation, spinal stenosis, elderly patients.