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INTRODUCTION

For more than 6 years EuroSpine – The Spine Society of Europe has been developing and enhancing a documentation system for spinal surgery in form of a registry. With Spine Tango we are meeting the growing demand to assess the safety and efficiency of all surgical interventions of the spine. Only few other fields in medicine are under comparable scrutiny. Reacting to these tendencies, endeavors of pioneer clinicians and the Spine Tango team in collaboration with the Institute for Evaluative Research in Orthopaedic Surgery of the University of Bern have led to the implementation of the only international spinal registry to date.

The constantly growing number of Spine Tango participants indicates that the system has overcome its development period. Now, having reached a recognized status we would like to encourage national societies and individual partners to join the registry. Health authorities will increasingly limit the accessibility of our treatment modalities if we do not fulfill the demanded standards. Therefore we are offering Spine Tango as a common language to make our service visible and transparent.

With a constantly increasing activity in the registry we would like to inform you about its history, its objectives and more.

Max Aebi
Registries, mainly focusing on arthroplasty of the hip, have a long tradition in orthopaedic surgery. The national project for Total Hip Arthroplasty in Sweden and the Müller Hip registry in Switzerland, the latter set up by the precursor of today’s Institute for Evaluative Research in Orthopaedic Surgery (IEFO) are two important exponents (1). IEFO, the institute in which the international spine registry Spine Tango is hosted, has gained its expertise by conducting numerous multicenter studies and registries (e.g. SWISSspine, shoulder TA registry, ankle TA registry...). In comparison to the other registries Spine Tango is covering the whole variety of surgical procedures in spine surgery. The collection of data over a period of more than six years and several major modifications have granted Spine Tango with the well acknowledged status it holds today.

In cooperation with the IEFO of the University of Bern the following pioneers have invested time and energy to develop Spine Tango: McGill University Montreal (Dec. 2002), Salem-Hospital Bern, Schulthess-Clinic Zurich (Nov. 2002), Orthopaedic Hospital Vienna (Nov. 2002), Walton Centre Liverpool (Dec. 2002) und Invalidisaatio Foundation Helsinki (Nov. 2003).

BRIEF HISTORY OF SPINE TANGO

1. Multicenter clinical trials and their value in assessing total joint arthroplasty.
Herberts P, Ahnfelt L, Malchau H, Strömberg C, Andersson GB.
Spine Tango enables you to document the whole spectrum of spinal pathologies and the possible surgical treatment options. The generic approach of the Spine Tango documentation system is a must to reach the maximum number of participants using a common web based technology. This, in turn, reduces the potential for customizing Tango to meet the individual expectations of specific users. There are, nevertheless, still a number of possibilities to parameterize the data collection processes according to the various hospital workflows in the user community. To give you the opportunity to document not only the surgical treatment, we have developed Spine Tango Conservative, which is currently being validated. It is due to be released in autumn 2009. Spine Tango is an international, non-commercial system under the auspices of EuroSpine aiming to enable national societies to control their own modules. A technology called "national module concept" has been implemented to enhance participation options and to provide the hardware structure for the security measures. In conclusion, Spine Tango is a unique applied medical and scientific documentation and technology solution. It is to the benefit of patients and physicians whilst generating evidence based findings to improve spinal care (2).

SSE Spine Tango: a European Spine Registry promoted by the Spine Society of Europe (SSE)
Eur Spine J 13:661-662. DOI 10.1007/s00586-004-0868-0
PERFORMANCE

**Internal quality control:** Assuming that you have a complete data collection Spine Tango enables you to monitor all types of surgery during a specific period, observing the date and duration of operation, patient characteristics and outcomes (patient and physician based).

**External quality control:** Benchmarking is a powerful management tool because it overcomes "paradigm blindness." Paradigm blindness can be summed up as the mode of thinking, "The way we do it is the best because this is the way we've always done it." Benchmarking opens organizations to new methods, ideas and tools to improve their effectiveness. It helps overcome resistance to change by presenting successful methods of problem solving that are different to the ones currently employed. Enabling benchmarking possibilities is one of the fundamental goals of the Spine Tango venture.
The newly released online statistics function of Spine Tango allows comparison of own data against the aggregated results of the data pool that all other participants generate. This comparison can be considered a very simple way of benchmarking, which means that the quality of what one organization does is compared with other similar organizations. The goal is to make changes towards better practice if benchmarking shows inferior results compared with the pool. There are, however, pitfalls in this simplified way of comparing data which can result in wrong conclusions (3). This means that important influential factors can make results appear better or worse than they are in reality and these factors can only be identified and neutralized in a multiple regression analysis performed by a statistical expert. Comparing input variables is less of a problem than comparing outcome variables. Therefore, the potentials and limitations of automated online comparisons need to be considered when interpreting the results of the benchmarking procedure.

DATA ENTRY

There are 4 possible ways forms and questionnaires can be transferred to the database (Fig. 2)

1. Online data entry via the web-interface (no software to be installed)
2. OMR (Optical Mark Reader) i.e. scanner-assisted entry of paper forms
3. Paper based data capture with mailing to the IEFO or other partner institutions for OMR scanner-assisted entry of paper forms
4. Hybrid method of online data entry and OMR scanner-assisted entry of paper forms (not pictured)

In the rectangles multiple methods of gathering patient and physician generated data are shown [per mail, in house, outpatient clinics, telephone and new electronic media]. The goal to generate a comprehensive database is achieved by collecting data of the patient layer and the clinic/physician layer.

Having created a consistent data set the options of analyses are almost unlimited. Outcome evaluation can now be done in particular.
A COMPLETE CASE

Following Ernest Codman’s “end result system” the result of a surgical intervention should be recorded if the outcome can be considered as definitive (3). In most cases of spinal surgery, this can be done after a minimum of 6 months after surgery (Fig 3). EuroSpine additionally encourages the registration of complications at any time during the postoperative period.

Patient based outcome documentation with the COMI (Core Outcome Measure Index) questionnaires for neck and back pain has become an essential part of the Spine Tango documentation (4).

The figure below illustrates the ideal case of a completely documented treatment (5).

---

The year on the form indicates the developmental version.
Surgery Form

<table>
<thead>
<tr>
<th>Surgery</th>
<th>Day</th>
<th>Month</th>
<th>Year</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Surgeon credentials</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>specialty</td>
<td>specialty</td>
<td>specialty</td>
<td>specialty</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goal of surgery</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>cosmetic improvement</td>
<td>diagnostic measures</td>
<td>neurological improvement</td>
<td>other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Morbidity state</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ASAM (no disturbance)</td>
<td>ASAM (moderate)</td>
<td>ASAM (severe)</td>
<td>ASAM (life threatening)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Anterior access</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>no anterior access</td>
<td>transoral</td>
<td>anterior</td>
<td>anterolateral</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Blood loss</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>500-1000 ml</td>
<td>1000-2000 ml</td>
<td>&gt; 2000 ml</td>
<td>other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operation time</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4 hrs.</td>
<td>4-5 hrs.</td>
<td>&gt; 10 hrs.</td>
<td>other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Surgical Measures</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Decompression</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>none</td>
<td>anterior</td>
<td>posterior</td>
<td>specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fusion material</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>interbody fusion between vertebrae (anterior)</td>
<td>facet joint resection partial</td>
<td>facet joint resection full</td>
<td>other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stabilization rigid</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>interbody fusion between vertebrae (posterior)</td>
<td>facet screws with plate</td>
<td>facet plate</td>
<td>other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percutaneous measures</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>disc replacement</td>
<td>facet block</td>
<td>microdiscectomy</td>
<td>other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other surgical measures</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>yes</td>
<td>specify</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Surgical notes</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>

---

<table>
<thead>
<tr>
<th>Discharge</th>
<th>Day</th>
<th>Month</th>
<th>Year</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Surgical complications</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>bleeding in spinal canal</td>
<td>implant failure</td>
<td>other</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measures taken</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>conservative functional</td>
<td>conservative medical</td>
<td>other</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Status of Complications</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>resolved</td>
<td>improved</td>
<td>persisting</td>
<td>other</td>
</tr>
</tbody>
</table>
Follow-up (low back)

patient based, front

Spine Tango COMI
Patient self-assessment

Low Back 2008

Examination interval
- 3 months
- 6 months
- 9 months
- 1 year
- 2 years
- 3 years
- 4 years
- 5 years
- e.g. 4 months
- 4 months/12 months
- other: _______ years = 0.33 year

Back problems can lead to back pain and/or pain in the legs/buttocks, as well as to sensory disturbances such as tingling, ‘pins and needles’ or numbness in any of these regions.

Which of the following problems troubles you the most? Please tick ONE BOX only:
- back pain
- leg/buttock pain
- sensory disturbances in the back/leg/buttocks, e.g. tingling, ‘pins and needles’, numbness
- none of the above

For the following 2 questions (2a and 2b) we would like you to indicate the severity of your pain, by ticking the appropriate box (where "0" = no pain, "10" = worst pain you can imagine). There are separate questions for back pain and for leg pain (sciatica)/buttock pain.

2a How severe was your back pain in the last week?
- no pain
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- worst pain that I can imagine

2b How severe was your leg pain (sciatica)/buttock pain in the last week?
- no pain
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- worst pain that I can imagine

3 During the past week, how much did your back problem interfere with your normal work (including both work outside the home and housework)?
- not at all
- a little bit
- moderately
- quite a bit
- extremely

4 If you had to spend the rest of your life with the symptoms you have right now, how would you feel about it?
- very satisfied
- somewhat satisfied
- neither satisfied nor dissatisfied
- somewhat dissatisfied
- very dissatisfied

5 Please reflect on the last week. How would you rate your quality of life?
- very good
- good
- moderate
- bad
- very bad

Please go to the next page...
Follow-up (low back)
patient based, back

Spine Tango COMI

During the past 4 weeks, how many days did you cut down on the things you usually do (work, housework, school, recreational activities) because of your back problem?
- none
- between 1 and 7 days
- between 8 and 14 days
- between 15 and 21 days
- more than 22 days

During the past 4 weeks, how many days did your back problem keep you from going to work (job, school, housework)?
- none
- between 1 and 7 days
- between 8 and 14 days
- between 15 and 21 days
- more than 22 days

Answer the following questions only if you are completing this questionnaire AFTER the operation.

Did any complications arise as a consequence of your operation in our hospital (e.g., problems with wound healing, paralysis, sensory disturbances)?
- no
- yes, please describe these: ____________________________

How bothersome were these complications?
- not at all bothersome
- slightly bothersome
- moderately bothersome
- very bothersome
- extremely bothersome

Since the operation in our hospital, have you had any further operation(s) on your lumbar spine (back) in our or in other hospitals?
- no
- yes, but at a different level of the spine.
- yes, at the same level of the spine (same segment)

Over the course of treatment for your back problem, how satisfied were you with your overall medical care in our hospital?
- very satisfied
- somewhat satisfied
- neither satisfied nor dissatisfied
- somewhat dissatisfied
- very dissatisfied

Overall, how much did the operation in our hospital help your back problem?
- helped a lot
- helped
- helped only little
- didn’t help
- made things worse

Date
Month
Year
Signature: ____________________________
Follow-up
physician based
EPITOME OF AVAILABLE DATA

Overview (Pool)

Basic demographics
Distribution of diagnoses
Stratification of levels
Stratification of vertebrae

Short exemplary analysis on lumbar spinal stenosis (Pool)

Demographics
Distribution of levels
Extent of lesion
Previous surgery
Previous treatment
Blood loss
Method of decompression
Time of surgery
Length of stay
Complications
Outcome physician based
COMI back
COMI leg

Documentation of surgeries is provided by different types of institutions (EuroSpine, Short Report 2008)
A study of the weighting and frequency of statistical reports was published by Windish in Jama in 2007 (6). This work comprises the study of 239 original articles in 6 journals (American Journal of Medicine, Annals of Internal Medicine, BMJ, JAMA, Lancet, New England Journal of Medicine) with regard to statistical evaluation. 91.6% of the articles included descriptive statistics and 50.2% were compiled from simple statistical methods. Multivariate analyses were used for 68.6% of the cases. All the above-mentioned methodologies can be used in Spine Tango. The Spine Tango International Pool offers 25,000 eligible cases. The number of entries increases constantly.

Below you will find a short summary of all the documented surgeries in Spine Tango followed by a detailed assessment of the patient sub-group with the diagnosis degenerative lumbar spinal stenosis.

Distribution of age (at surgery)

Distribution of diagnoses

Inflammation
Other
Infection
Deformity
Failed surgery
Tumor
Path. Fractur
Fractur/Trauma
Spondylolisth.
Degenerative
Most severely affected segment (C0/C1 to L1/L2)

Most severely affected segment (L2/L3 to L5/S1)
Most severely affected vertebrae

- C1
- C2
- C4
- C5
- C6
- C7
- Th1
- Th2
- Th3
- Th4
- Th5
- Th6
- Th7
- Th8
- Th9
- Th10
- Th11
- Th12
- L1
- L2
- L3
- L4
- L5
- S1
- S2-5
- coccyx

Most severely affected segment by extension of lesion

- L1 / 2
- L2 / 3
- L3 / 4
- L4 / 5
- L5 / S1

Extension of lesion:
- 1 Seg
- 2-3 Seg
- 4-5 Seg
- >5 Seg
An exemplary analysis for lumbar spinal stenosis using the Spine Tango Pool

Although the diagram below only shows a sporadic annotation, it can be established that operations on patients with lumbar spinal stenosis are performed in higher ages. The wish to spend ones later years at a higher quality of life has grown in recent years. This tendency is reflected in the high proportion of patients between age 70 and 90. A paper based on data taken from the Spine Tango about complications in the elderly was published in "Der Orthopäde* in 2008 (6).

6. Spinal surgery in the elderly: does age have an influence on the complication rate?
"Der Orthopäde* 2008 DOI 10.1007/s00132-008-1233-5
Unsatisfactory results after higher lumbar interventions are observed. This has been quantified in an investigation based on Tango data (7). Segment L2/3 compared to L4/5 has a 2.7 times higher probability of a poor result (p=0.003). Further studies are necessary to confirm this observation and the reason thereof. It can only be presumed whether anatomic varieties (higher root density) or even vascular reasons are contributing factors.

The majority of interventions affected only 1 or 2-3 segments – this is reflected in the statistics for blood loss and operation time.

A notable fact is that 20% of the patients have had previous operations. This is probably a reflection of the structure of the clinics documenting with Spine Tango, which are predominantly specialist spine centers receiving referrals of failed surgery. The indication for the new intervention requires further analysis. Is this due to an insufficient primary decompression or is it due to a relapse?

Most patients underwent conservative therapy lasting 6 to 12 months or longer. This raises several questions. Is one waiting too long in the case of clear indications? Was the conservative therapy sufficient?
In 60% of the cases the patient blood loss is < 500ml. Without relevant secondary illness, a transfusion is therefore seldom required. Here further economical studies would be welcome. The data in Spine Tango facilitate this.

It is worth noting that in the graphic “Decompression methods” multiple answers are possible in Spine Tango for certain questions! This is also an area for further research.
In these exemplary studies we have not stratified according to therapy methods (i.e. sole decompression vs. instrumentation). This explains the wide range of the results below concerning hospitalization time.

Calculate the OP capacity for spine surgery in your clinic based on the required OP times.
The table above lists complications. The high number of *dura lesions* compared to the number of *root injuries* is unusual. We might assume here that not all root injuries have been registered (ward). An external audit is planned for the Spine Tango in the future. In addition a patient based outcome assessment will be rated higher than the surgeon based outcome. Following: evaluation according to McNab together with the evaluation of back and leg pain according to visual analog scale (VAS).
Here we see comparable curves for leg- and back pain which is not reflected in the literature. This observation could be due to the small number of follow-ups.
In the year 2008 promising new clinics in several countries started to document and are joining Spine Tango: Netherlands, Slovenia, Brazil, Hungary.

Please note that the participant community is subject to a certain dynamic but is constantly growing.

Bound to non disclosure agreements we cannot name some institutions therefore here only some figures.

Spine Tango is an independent and non-commercial project and freely available for all members of EuroSpine.

This rating shows the load of forms divided by the number of clinics per country (i.e. "documentation density")

<table>
<thead>
<tr>
<th>Country</th>
<th>N (clinics)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>3</td>
</tr>
<tr>
<td>Belgium</td>
<td>3</td>
</tr>
<tr>
<td>Canada</td>
<td>1</td>
</tr>
<tr>
<td>Finland</td>
<td>2</td>
</tr>
<tr>
<td>Germany</td>
<td>11</td>
</tr>
<tr>
<td>Italy</td>
<td>1</td>
</tr>
<tr>
<td>Mexico</td>
<td>1</td>
</tr>
<tr>
<td>UK</td>
<td>1</td>
</tr>
<tr>
<td>USA</td>
<td>1</td>
</tr>
<tr>
<td>Switzerland</td>
<td>5</td>
</tr>
<tr>
<td>Singapore</td>
<td>1</td>
</tr>
</tbody>
</table>
The model of the MEMdoc and MEMdoc-Module (module) system is designed around the principle of data separation. Users in local hospitals connect directly to a module server. This server consists of a local MySQL database, an Apache web server and the custom MEMdoc-Module application. This server can sit within the same clinic as the user or in some remote location depending on the needs of the group hosting the module. The physical and network security of this server is left up to the hosting entity. Some groups choose to restrict access to the module to users within the local subnet while others allow open access from anywhere. The module database contains all user and clinic information as well as the basic demographic data of patients. No medical data is stored on the module server. Users connect to the module with a standard web browser using the HTTP (port 80) protocol. This protocol is sufficient for most installations since access to modules is normally restricted by the firewall of the hosting entity and the data stored on the module server does not contain any medical related data. It is, however, possible to run the entire module in HTTPS (secure-HTTP) mode.

The second part of the MEMdoc-Module system is the MEMdoc central server. Whenever module users create or access medical data (e.g. documentation forms) they are automatically redirected to the MEMdoc central server. This connection is transparent to the users. The link between the user’s web browser and the MEMdoc central server is made through the MEMdoc module controller. The only data passed through the module controller to the MEMdoc central server are internal ID’s for the user, patient, clinic, department and module. Additionally, the birth year and gender of the patient is also sent for doing statistics. These parameters are passed using the HTTP (port 80) protocol. Once the user has been redirected to the MEMdoc central server then all further data entered (e.g. documentation forms) are sent over port 443 using HTTPS. MEMdoc uses a Thawte certified SSL web server certificate with 256-bit encryption. All medical data is retrieved from and stored directly to the MEMdoc central server. Medical data never passes through the module server and is never stored on the module server.
The physical and network security of all the MEMdoc servers is maintained by IEFO (Institute for Evaluative Research in Orthopaedic Surgery) at the MEM Research Center. This includes the MEMdoc central (web) server, the MEMdoc database server and the MEMdoc module controller. Additionally, any modules that are hosted within IEFO fall within the same security parameters. All servers are physically housed at the MEMcenter in Bern in a dedicated, locked, climate controlled and monitored server room. The network is protected by a Sonicwall Pro 2040 firewall with real-time gateway anti-virus, anti-spyware, anti-span and intrusion prevention. The firewall only allows access to the servers via ports 80, 443, 8080 and 22 (SSH). The database server is housed on the designated LAN (local area network) side of the network and only accessible through the other servers in the network. Each server is continuously monitored to log all connections and to detect any suspicious activity.

The following hardware is recommended for a MODULE
- Midrange Tower- or 19" Rack server
- CPU Intel Core 2 Duo or Xeon Dual Core or AMD Opteron
- RAM > 2 GB
- Hardware raid 1 or 5
- Linux compatible (SUSE 10.2, …)
PUBLICATIONS

Papers in peer reviewed journals


Röder C, Staub LP, Dietrich D, Zweig T, Melloh M, Aebi M,.Benchmarking with Spine Tango: potentials and pitfalls, Eur Spine J,epub ahead of print


Abstracts in peer reviewed journals


Papers in other journals


Delank KS. Spine Tango – one year German module, Orthopaedic news 04/2008 Congress edition 2

Vieweg U, M Lühn. SSE Spine Tango - ein praktikables Assessment-Tool in der Wirbelsäulen chirurgie, Orthopädische Praxis 44, 10, 2008

Oral presentations


Delank KS. The time after data acquisition– How to publish with Spine Tango, German Joint Congress for Orthopaedics and Trauma, Berlin, Germany, Oct. 22-25, 2008

Grob D. Spine Tango - From the development to the complete implementations, German Joint Congress for Orthopaedics and Trauma, Berlin, Germany, Oct. 22-25, 2008

Vieweg U. Evaluation of methods and collaboration with the industrial partners, German Joint Congress for Orthopaedics and Trauma, Berlin, Germany, Oct. 22-25, 2008

Ogon M, Tuschel A. A detailed analysis of workflow in Speising/Vienna, Austria, German Joint Congress for Orthopaedics and Trauma, Berlin, Germany, Oct. 22-25, 2008

Zweig T. The German Spine Tango module - status quo, German Spine Tango user meeting, Cologne, Germany, Sept. 22, 2008


Melloh M. Challenges in establishing an international spine registry and benchmarking in spinal surgery. AMOCK Research Seminar, University of Otago, Dunedin, September 30, 2008
Oral presentations (cont.)

Melloh M. Challenges in establishing an international spine registry and benchmarking in spinal surgery. Jeffrey Shields Meeting, University of Otago, Dunedin, September 25, 2008


Zweig T, Melloh M, Staub L, Aghayev E, Barz T, Rieger P, Theis JC, Röder C. The international spine registry Spine Tango - status quo and first results. XXIV Triennial World Congress SICOT/SIROT, Hong Kong, China, Aug. 24-28, 2008

Zweig T, Melloh M, Staub L, Aghayev E, Barz T, Rieger P, Theis JC, Röder C. Predictors of dural tears in posterior spinal fusion, XXIV Triennial World Congress SICOT/SIROT, Hong Kong, China, Aug. 24-28, 2008


Melloh M. Challenges in establishing an international spine register and benchmarking in spinal surgery. Research Day University of Otago, Dunedin, April 24, 2008


Oral presentations (cont.)


Melloh M, Staub L, Röder C, Barz T, Theis JC. The International Spine Register SPINE TANGO – Status Quo and First Results. NZOA Annual Scientific Meeting, Auckland, October 14-17 2007

Melloh M, Status quo and first results from the international spine registry SPINE TANGO. Workshop. EuroSpine Congress, Brussels, October 2-6, 2007

Melloh M, Staub L, Röder C, Sommer S, Rieger P, Barz T. Anterior lumbar interbody fusion (ALIF) vs. instrumented posterolateral fusion (PLF): are there advantages for one of the two methods regarding complications and rehabilitation? 8th EORT Congress, Florence, May 11-15, 2007


Oral presentations (cont.)

Melloh M, Staub L, Barz T, Sommer S, Röder C. Anterior lumbar interbody fusion (ALIF) vs. instrumented posterolateral fusion (PLF): Are there advantages for one of the two methods regarding complications and rehabilitation? Annual Swiss Congress of Orthopaedic and Trauma Surgery, Luzern, September 20-22, 2006


Posters


Melloh M, Staub L, Aghayev E, Barz T, Theis JC, Röder C. The International Spine Register Spine Tango – Status Quo and First Results. 9th EFORT Congress, Nice, May 29 - June 1, 2008

Melloh M, Staub L, Aghayev E, Barz T, Theis JC, Röder C. Predictors of dural lesions in posterior spinal fusion. 9th EFORT Congress, Nice, May 29 - June 1, 2008


Posters (cont.)

Melloh M, Staub L, Röder C, Barz T, Theis JC. Predictors of Dural Tears in Posterior Spinal Fusion. NZOA Annual Scientific Meeting, Auckland, October 14-17, 2007


Doctoral candidates

Mrs Ling Wisgien and Mr Jimson Arampankudy
Outcomes and radiologic assessment in operative treatment of spondylolisthesis
Doctoral adviser: PD Dr. K.-St. Delank

Mrs Ayla Yagdiran and Mr Marcus Spangenberg
Outcomes and radiologic assessment in operative treatment of lumbar spinal stenosis
Doctoral adviser: PD Dr. K.-St. Delank

Mrs Silvia Gerighausen
Comparison of outcomes and radiographic findings of conservative and operative treatment of spondylodiscitis
Doctoral adviser: PD Dr. K.-St. Delank

Mr Marcus Meixner
Evaluation of Spine Tango conservative in a general practice setting
Doctoral adviser: Prof. Aebi, Th. Zweig

MPH thesis

Mr Johnny Kessler
The development and validation of a documentation system for the conservative treatment of spinal disorders
Advisors: C. Röder, M. Melloh
Thomas Zweig, MD
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Statistics
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