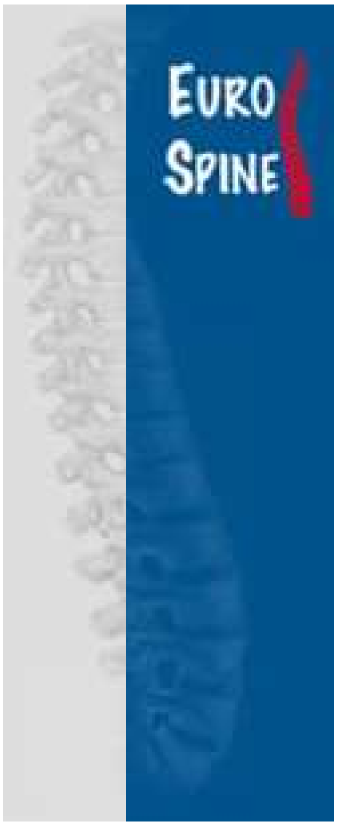
SPINE TANGO Report
International 2009



The International Spine Registry
EuroSpine

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www.eurospine.org

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INTRODUCTION

Since the year 2000 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 efficacy 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 Medicine 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 services visible and transparent. With a constantly increasing activity in the registry we would like to inform you about its history, its objectives and its current status.

M. Aebi

b UNIVERSITÄT BERN

NEW DEVELOPMENTS

Spine Tango Conservative: for the past two years we have been working on a documentation instrument for the non-surgical spinal therapies in order to complement the registry and make possible the assessment of all spinal treatments within the framework of one and the same registry. A first version of Spine Tango conservative was tested on a series of patients in 2009 and the results of this study are meanwhile available in the literature. Also, after another round of refinements and a validation study the first official version of the questionnaire will go live in early 2011

Spine Tango Pathways: we undertook a major effort for making available a comprehensive manual explaining all functionalities of the Tango in an easy, mostly picture based, way. This manual is meanwhile available for download on the front page of all Spine Tango modules.

Spine Tango Newsletter: you may have gotten it already. The newsletter wants to inform about latest developments, findings, publications and activities related to the Tango.

New software release: in fall/winter 2010 a completely redesigned software will displace the current Spine Tango program. Increased patient and user security, new features and more comfortable data handling are expecting the user community.

Spine Tango

SSE Spine Tango Pathways
Manual for Entering and Querying Data

Newsletter
EuroSpine - Spine Tango

Spine Tango

PROFILE

Spine Tango enables you to document the whole spectrum of spinal pathologies and the possible surgical and soon also the non-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 the Tango in order 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 early 2011.

Spine Tango is an international, non-commercial system under the auspices of EuroSpine aiming to enable national societies to control their own part of the registry. For that a technology called "national module concept" has been implemented to enhance participation options and to provide the hardware structure for appropriate security measures for patient and user privacy protection. 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 (1).

1. Aebi M, Grob D (2004)
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

APPLICATION

Quality control, outcomes research, postmarket surveillance of implants, national and international study network

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, the comparison of own performance with that of the national or international results in the Tango 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.

Outcomes research: this aspect is actually just taking a different view for the same basic activity, i.e. the systematic and prospective collection of key data regarding interventions and outcomes for and of spinal pathologies. While quality assurance is rather used for the purposes of improving ones` own standards of care, outcomes research wants to generate new medical and scientific knowledge and make it available in the peer-reviewed literature.

Postmarket surveillance of implants: implants play a major role in modern spine surgery and just like in the domains of total joint arthroplasty their true performance can only be evaluated by systematically following the devices after implantation and documenting their outcomes in large clinical databases like the Tango.

National and international study network: the Tango is a technology backbone and currently networks over 40 active hospitals in Europe, North and South America, Australia and Asia. This provides a great opportunity for national and international multicenter studies that piggyback on the ongoing routine data collection, add some hypothesis based questions and collect this extra information for the time of primary and followup data collection as specified in the joint study protocol.

DATA ENTRY

There are **4 possible ways** forms and questionnaires can be transferred to the database (Fig. 1)

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 IEFM 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.

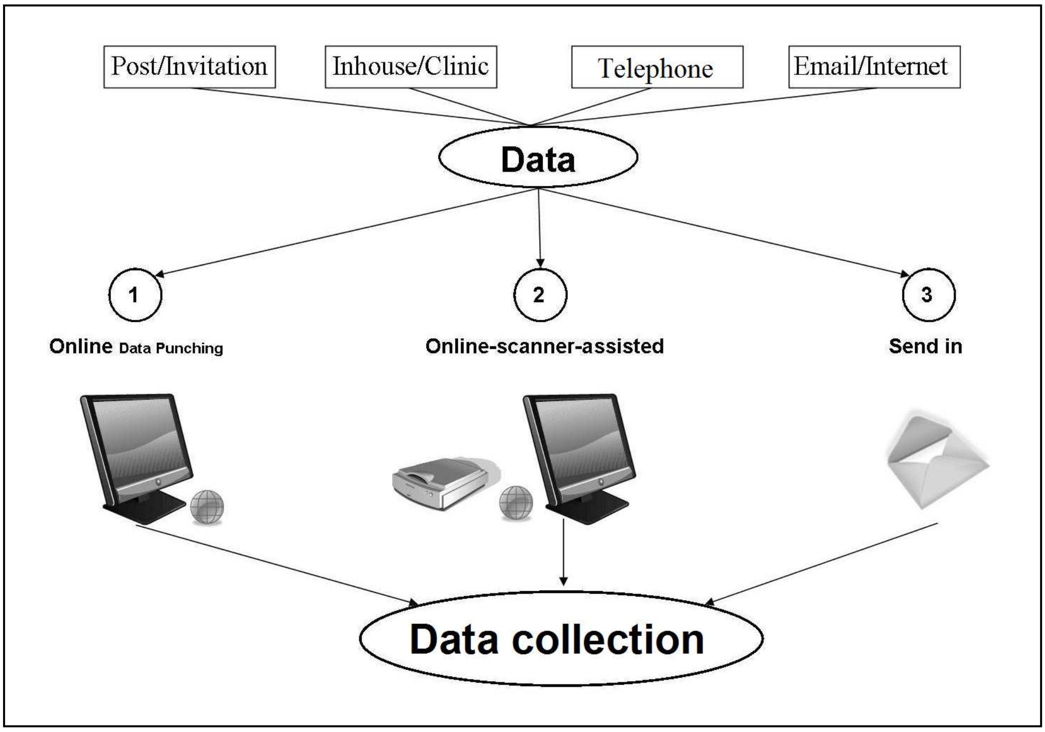


Fig. 1: Spine Tango methods of data entry

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 (2). In most cases of spinal surgery, this can be done after a minimum of 3 months after surgery as demonstrated by Mannion et al (3). Compare with Fig. 02. EuroSpine encourages one physician and patient based followup in the first year after surgery, ideally later than 3 months postop, and a second, at least patient based followup around year two after surgery. The registration of complications at any time during the postoperative period is self understood. 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 03 on the next page illustrates the ideal case of a complet documented treatment (5).

2. Codman, Ernest A. (1916). A Study in Hospital Efficiency. Boston, Mass., privately printed

3. Mannion AF, Porchet F; Kleinstück FS, Lattig F, Jeszenszky D, bartanusz V, Dvorak J, Grob D. (2009) The quality of spine surgery from the patient`s perspective. Part 1: the Core Outcome Measures Index in clinical practice. Eur Spine J. 18 Suppl 3:367-73

4. Mannion AF, Elfering A, Staerkle R, Junge A, Grob D, Semmer NK, Jacobshagen N, Dvorak J, Boos N (2005) Outcome assessment in low back pain: how low can you go? Eur Spine J 14:1014-1026

5. Zweig T, Mannion AF, Grob D, Melloh M, Munting E, Aebi M, Tuschel A, Röder C. (2009) How to Tango – a manual for implementing Spine Tango. Eur Spine J 18 Suppl 3:312-2

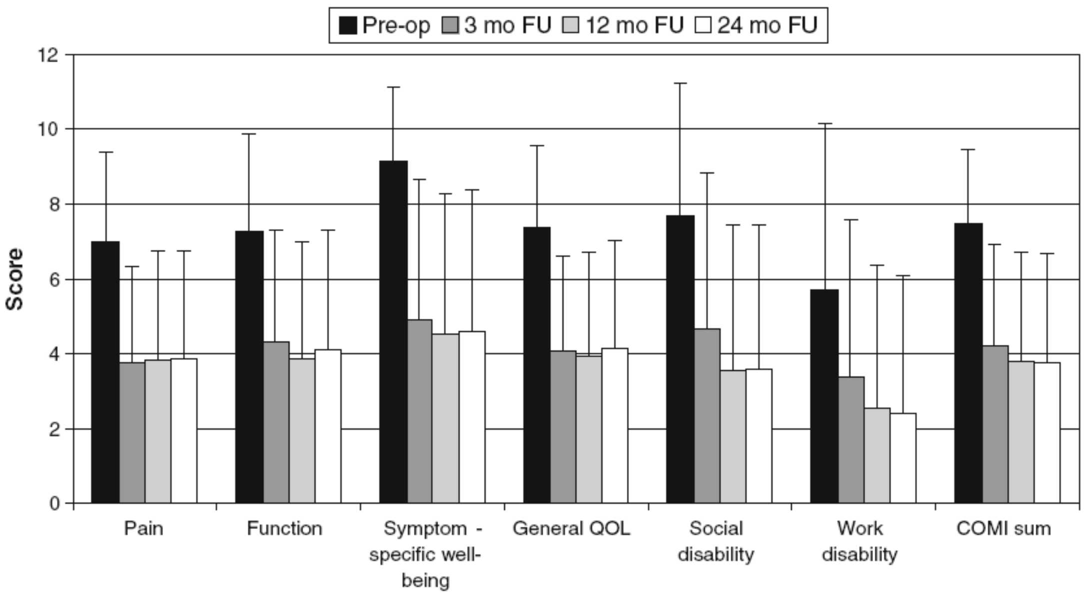


Fig. 2: Patient based outcome documentation with the COMI (Core Outcome Measure Index) questionnaires, AF Mannion et al. (2009)(3)

Pre-& postoperative documentation workflow of a case

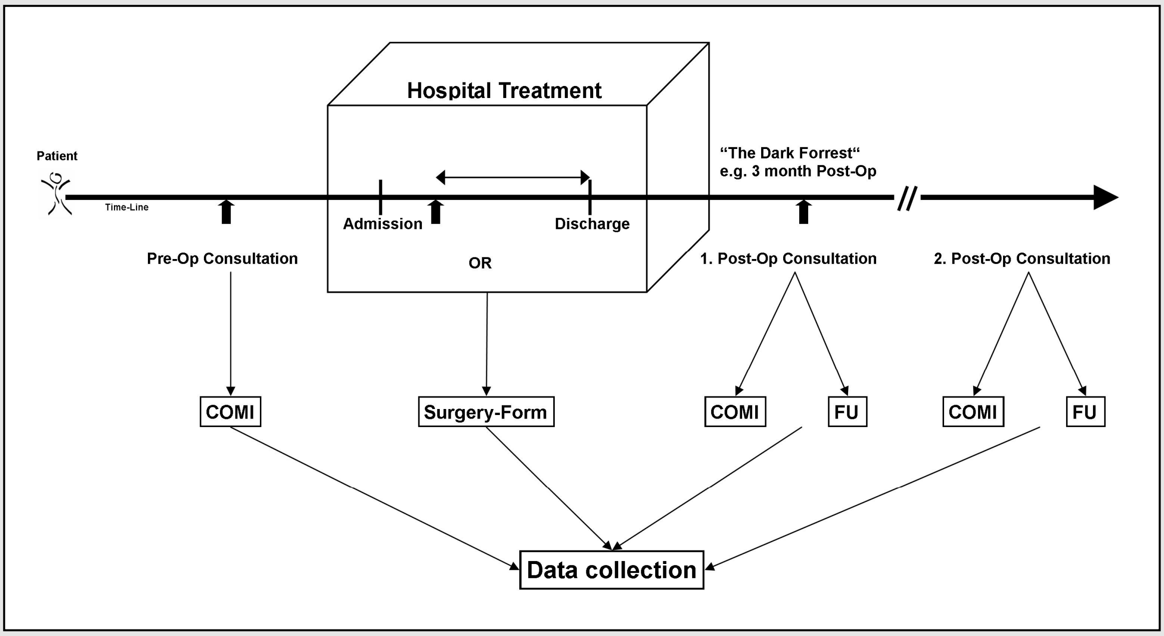


Fig 3: Timetable of data collection

Surgery form

front side

SPINE TANGO EURO SPINE Spine Tango **SURGERY** 2006

Directions
- *Use a #2 soft pencil for marking.*
- *Text answers must be entered with the web interface.*
- *All questions must be answered unless otherwise indicated.*
- *Completely fill in boxes to record answers.*

Question types
- *only 1 answer allowed*
- *multiple answers allowed*
- *mandatory questions*

Internal Use Only Not read by scanner

Last name	First name	Gender
Street		M.R.N.
Country code	Zip code	City
Occupation	Birthdate (DD.MM.YYYY)	Telephone

Level of procedure
upper cervical · mid lower cervical · cervicothoracic · cervico-thoraco-lumbar · thoracic · thoracolumbar · thoraco-lumbo-sacral · lumbar · lumbo-sacral · sacral · coccyx

Admission / Pathology

Day 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Month 1 2 3 4 5 6 7 8 9 10 11 12 **Year** 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16

Main pathology
degenerative disease · deformity · fracture/trauma · pathological fracture · spondylolisthesis · inflammation · infection · tumor · failed surgery · other: specify ....

Specification of Main Pathology *Only answer questions related to Main Pathology (Main Pathology "other" requires no specification).*

Degenerative Disease
Type of degeneration
black disc · disc degeneration · disc herniation · spondylosis · spondylarthrosis · spinal stenosis · adjacent segment degen. · other ....

Deformity
Type of deformity
scoliosis · kyphosis · combined · other ....
Type of scoliosis
single curve · double curve
Predominant etiology
idiopathic · congenital · neuromuscular · degenerative · posttraumatic · M. Scheuermann · other ....

(Pathological) Fracture/Trauma
Additional fractures w/different treatments require separate forms.
Type of (pathological) fracture/trauma
condylar (C0) · C0/1 dissoziation · C1 fracture · C1/2 instability · C2 dens fracture · C2 other fracture · soft tissue injury neck · fracture C3-L5/S1 · sacrum fracture · other ....
Dens fracture type
I · II · III
C3-L5/S1 AO fracture type
A1 · B1 · C1 · A2 · B2 · C2 · A3 · B3 · C3
Pathological fracture due to ...
osteoporosis · tumor · other ....
Fracture age
fresh fracture · old fracture
(In case of tumor, answer questions "Type of tumor" and "Localization" in section "TUMOR")

Spondylolisthesis
Type of spondylolisthesis
Type I (congenital, dysplastic) · Type II (isthmic) · Type III (degenerative) · Type IV (traumatic) · Type V (pathologic) · Type VI (postsurgical)
Grade of spondylolisthesis
Grade 0 · Grade I · Grade II · Grade III · Grade IV · Spondyloptosis (V)

Inflammation
Type of inflammation
inflammatory arthritis (seropos) · seronegative arthritis · ankylosing spondylitis (M. Bechterew) · other ....

Infection
Infection specification
pyogenic · parasitic · tuberculotic · fungal · other ....
Affected structure(s)
spondylitis · discitis · spondylodiscitis

Tumor
Type of tumor
primary malignant · primary benign · secondary malignant · tumor like lesion · other ....
Localization
vertebral body · posterior bony elements · extradural · intradural extramedullary · intradural intramedullary · other ....
Specify type of tumor ....

Failed surg.
Type of failed surgery
non-union · instability · neurocompression · postop. infection · implant failure · sagittal imbalance · frontal imbalance · other ....

Comments regarding main pathology: ....

Most severely affected segment/vertebral body
not applicable/assessable · unknown · C0 · C0 / 1 · C1 · C1 / 2 · C2 · C2 / 3 · C3 · C3 / 4 · C4 · C4 / 5 · C5 · C5 / 6 · C6 · C6 / 7 · C7 · C7 / Th1 · Th1 · Th1 / 2 · Th2 · Th2 / 3 · Th3 · Th3 / 4 · Th4 · Th4 / 5 · Th5 · Th5 / 6 · Th6 · Th6 / 7 · Th7 · Th7 / 8 · Th8 · Th8 / 9 · Th9 · Th9 / 10 · Th10 · Th10 / 11 · Th11 · Th11 / 12 · Th12 · Th12 / L1 · L1 · L1 / 2 · L2 · L2 / 3 · L3 · L3 / 4 · L4 · L4 / 5 · L5 · L5 / S1 · S1 · sacrum (S2-5) · coccyx

Extent of lesion
1 segment/vertebral body · 2-3 segments/vertebral bodies · 4-5 segments/vertebral bodies · >5 segments/vertebral bodies

Additional pathology *(Answer to question "Main pathology" is excluded)*
none · degenerative disease · other: specify .... · deformity · fracture/trauma · pathological fracture · spondylolisthesis · inflammation · infection · tumor · failed surgery

Number of previous spine surgeries
0 1 2 3 4 5 >5
Answer "0" excludes both "Previous surgery" questions ("at same level" and "at same hospital")

Previous surgeries at same level
no · yes · partially
Previous surgeries at same hospital
no · yes · partially

Previous treatment for main pathology
none · surgical · < 3 mon. conservative · 3-6 mon. conservative · 6-12 mon. conservative · > 12 mon. conservative

15.05.2008

The year on the form indicates the developmental version.

Surgery form

back side

SPINE TANGO — ***SURGERY***

Internal Use Only - Not read by scanner

Surgeon .... Assistant ....

Surgery

Day 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Month 1 2 3 4 5 6 7 8 9 10 11 12 **Year** 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16

SURGICAL PROCEDURE

Surgeon credentials
- specialized spine
- board certif. orthopaedic
- board certified neuro
- orthopaedic in training
- neuro in training
- other ....

Goal of surgery
- pain relief
- functional improvement
- neurological improvement
- cosmetic improvement
- diagnostic measures
- other ....

Morbidity state
- unknown
- ASA1 (no disturbance)
- ASA2 (mild/moderate)
- ASA3 (severe)
- ASA4 (life threatening)
- ASA5 (moribund)

Anterior access
- no anterior access
- transoral
- anterior
- anterolateral
- cervicothorac. anterolat.
- cervicothorac. a.lat. w/sternotomy
- cervicothor. a.lat. w/ thoracot.
- thoracotomy
- thoraco-phrenico-lumbotomy
- retroperitoneal
- transperitoneal
- other ....

Posterior access
- no posterior access
- midline
- paramedian
- posterolateral
- other ....

Technology
- conventional
- MISS/LISS
- loops
- microscope
- endoscope
- CASS
- other ....

Blood loss
- unknown
- none
- < 500 ml
- 500 - 1000 ml
- 1000 - 2000 ml
- > 2000 ml

Operation time
- unknown
- < 1 hr.
- 1-2 hrs.
- 2-3 hrs.
- 3-4 hrs.
- 4-5 hrs.
- 5-6 hrs.
- 6-8 hrs.
- 8-10 hrs.
- > 10 hrs.

Components
- yes
- no

Component description

Not needed if SEDICO implant tracking is used.

Supplier: .... **Article No:** ....

Article name: ....

Surgical Measures

Note: "anterior" / "posterior" refers to location of MEASURES in the spine, NOT to access!

Decompression
- none
- anterior } ***specify ...***
- posterior

Location in spine, choose at least one!

- discectomy
- vertebrectomy partial
- vertebrectomy full
- other ....
- osteotomy
- laminotomy
- hemi-laminectomy
- laminectomy
- facet joint resection partial
- facet joint resection full
- flavectomy
- foraminotomy
- sequestrectomy

Fusion
- none
- anterior } ***specify ...***
- posterior

Location in spine, choose at least one!

- interbody fusion between adjct. vertebrae (ant. appr.)
- interbody fusion between adjct. vertebrae (post. appr.)
- interbody fusion between dist. vertebrae (ant. appr.)
- interbody fusion between dist. vertebrae (post. appr.)
- posterolat. fusion
- posterior fusion
- other ....

Fusion material
- none
- autol. bone
- allog. bone
- bone subst.
- cement
- other ....

Stabilization rigid
- none
- anterior } ***specify ...***
- posterior

Location in spine, choose at least one!

- interbody stabil. with cage (ant. approach)
- interbody stabil. with cage (post. approach)
- vertebral body replacement by cage
- plates
- pedicle screws with rod
- pedicle screws with plate
- facet screws
- transarticular screw
- laminar hooks with rod
- pedicle hooks with rod
- lateral mass screw with rod
- lateral mass screw with plate
- odontoid screws
- other ....

Stabil. motion preserving
- none
- anterior } ***specify ...***
- posterior

Location in spine, choose at least one!

- disc replacement
- dynamic stabilizat.
- other ....

Percutan. measures
- none
- post. } ***specify ...***

Choose one!

- facet block
- root block
- discography
- vertebroplasty
- kyphoplasty
- other ....

Other surgical measures
- no
- yes } ***specify ...***

Choose one!

Surgical notes ....

....

Discharge

Day 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Month 1 2 3 4 5 6 7 8 9 10 11 12 **Year** 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16

(Answer "none" in both "Surgical" and "General complications" excludes all remaining questions.)

Surgical complications
- none
- wrong level
- nerve root damage
- cauda equina damage
- spinal cord damage
- bleeding in spinal canal
- bleeding outside spinal canal
- malposition of implant
- duralesion
- wound infection
- implant failure
- other ....

General complications
- none
- anaesthesiological
- cardiovascular
- pulmonary
- cerebral
- kidney/urinary
- liver/GI
- death
- other ....

Measures taken
- none
- intervention during surgery
- re-intervention after surgery
- conservative medical
- conservative functional
- extended hospital stay
- other ....

Surgical intervention/re-intervention
- none
- hematoma evacuation
- abscess drainage
- metal removal
- re-implantation
- refusion
- suture
- other ....

Status of Complications

Surgical	resolved	improved	persisting
General	resolved	improved	persisting

Comments regarding discharge

....

....

....

Abbreviations:
MISS = Minimally Invasive Spine Surgery; LISS = Less Invasive Spine Surgery; CASS = Computer-Assisted Spine Surgery

15.05.2008

COMI (low back)

patient based assessment, front side

Spine Tango COMI
Patient self-assessment

Low Back
2008

Directions
- *Use a #2 soft pencil for marking.*
- *Only one answer per question allowed*
- *Completely fill in boxes to record answers.*
- *Mandatory informations*

Internal Use Only
Not read by scanner

Last name	First name	Gender
Street		M.R.N.
Country Code	Zip Code	City
Occupation	Birthdate (DD.MM.YYYY)	Telephone

Examination interval

- before surgery
- 4 weeks
- 6 weeks
- 2 months
- 3 months
- 6 months
- 9 months
- 1 year
- 2 years
- 3 years
- 4 years
- 5 years
- other: .... years

e.g. 4 months
= 4 months/12 months
= 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.

1 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

2 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?

	0	1	2	3	4	5	6	7	8	9	10	
no pain												**worst** pain that I can imagine

2b How severe was your **leg pain (sciatica)/buttock pain** in the last week?

	0	1	2	3	4	5	6	7	8	9	10	
no pain												**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...

COMI = Core Outcome Measures Index

15.05.2008

COMI (low back)

patient based assessment, back side

14

Spine Tango COMI

Patient self-assessment
Low back

6 **<u>During the past 4 weeks</u>**, 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

7 **<u>During the past 4 weeks</u>**, 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

8a 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: ....

....

8b How bothersome were these complications?

- ( ) not at all bothersome
- ( ) slightly bothersome
- ( ) moderately bothersome
- ( ) very bothersome
- ( ) extremely bothersome

9 **Since the operation in our hospital**, have you had any **further** operation(s) on your lumbar spine (back) **<u>in our or in other hospitals?</u>**

- ( ) no
- ( ) yes, but at a different level of the spine.
- ( ) yes, at the same level of the spine (same segment)

10 **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

11 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

Day ( ) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Month ( ) 1 2 3 4 5 6 7 8 9 10 11 12

Year ( ) 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19

Signature: ....

Follow-up

physician based, single sided

SPINE TANGO

EURO SPINE — Spine Tango

FOLLOW-UP 2006

Directions
- *Use a #2 soft pencil for marking.*
- *Text answers must be entered with the web interface.*
- *All questions must be answered unless otherwise indicated.*
- *Completely fill in boxes to record answers.*

Question types
- ○ *only 1 answer allowed*
- ☐ *multiple answers allowed*
- ☐ *mandatory information*

Internal Use Only
Not read by scanner

Last name	First name	Gender
Street		M.R.N.
Country code	Zip code	City
Occupation	Birthdate (DD.MM.YYYY)	Telephone

Level of procedure
- ○ upper cervical
- ○ mid lower cervical
- ○ cervicothoracic
- ○ cervico-thoraco-lumbar
- ○ thoracic
- ○ thoracolumbar
- ○ thoraco-lumbo-sacral
- ○ lumbar
- ○ lumbo-sacral
- ○ sacral
- ○ coccyx

Follow-up

Day 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Month 1 2 3 4 5 6 7 8 9 10 11 12 **Year** 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16

Follow up interval
- ○ 6 weeks
- ○ 3 months
- ○ 6 months
- ○ 1 year
- ○ 2 years
- ○ other (yrs.) ....

(Ex. 4 months=0.33 yrs. (4/12))

Work status
- ○ not at work since OP
- ○ started partially, same job
- ○ fully reintegrated
- ○ resumed work, but quit again
- ○ resumed work, different job
- ○ has been dismissed
- ○ retired since OP
- ○ retired before OP
- ○ housewife
- ○ child/student
- ○ other ....

Only comment on those goals/measures which were indicated for the "Goal of surgery" question on the "SURGERY" form.

Surgical goals/measures achieved
- ☐ none
- ☐ pain relief
- ☐ functional improvement
- ☐ neurological improvement
- ☐ cosmetic improvement
- ☐ diagnostic measures
- ☐ other ....

Surgical goals/measures partially achieved
- ☐ none
- ☐ pain relief
- ☐ functional improvement
- ☐ neurological improvement
- ☐ cosmetic improvement
- ☐ diagnostic measures
- ☐ other ....

Surgical goals/measures not achieved
- ☐ none
- ☐ pain relief
- ☐ functional improvement
- ☐ neurological improvement
- ☐ cosmetic improvement
- ☐ diagnostic measures
- ☐ other ....

Medication
- ☐ none
- ☐ NSAIDs
- ☐ opiates
- ☐ steroids
- ☐ antidepressives
- ☐ vitamin B complex
- ☐ antibiotics
- ☐ other ....

Overall outcome (examiner)
- ○ not applicable
- ○ excellent
- ○ good
- ○ fair
- ○ poor

Rehabilitation
- ☐ none
- ☐ home-based
- ☐ outpatient rehab / physio
- ☐ inpatient rehab / physio
- ☐ other ....

Decision
- ○ no further follow-up
- ○ further follow-up
- ○ revision foreseen
- ○ other primary intervention foreseen

Comments regarding follow-up ....

Complications

Complications
- ○ no *(Answer "no" excludes all remaining questions.)*
- ○ yes

Time
- ○ early, Op-day - 28 days postop
- ○ sub-acute, 2 - 6 months
- ○ late, > 6 months ....

Type
- ☐ sensory disturbance
- ☐ motor disturbance
- ☐ sphincter disturbance
- ☐ non-union
- ☐ implant failure
- ☐ instability
- ☐ liquor fistula
- ☐ superficial wound infection
- ☐ deep subfascial wound infection
- ☐ spondylitis
- ☐ disciitis
- ☐ wrong segment
- ☐ malposition of implant
- ☐ recurrence of symptoms
- ☐ graft complication
- ☐ sequelae anaesthesia
- ☐ internal medicine
- ☐ other ....

Therapeutic consequences
- ○ none
- ○ non-operative inpatient
- ○ non-operative outpatient
- ○ reintervention
- ○ other ....

Individual consequences
- ☐ none
- ☐ increased pain
- ☐ prolonged impairment
- ☐ reduced social activities
- ☐ permanent impairment
- ☐ other ....

Examiner ....

Comments regarding complications ....

Conservative Therapy draft

front side

SPINE TANGO

CONSERVATIVE THERAPY 2009

EURO SPINE — Spine Tango

Directions
- *Use a #2 soft pencil for marking.*
- *Text answers must be entered with the web interface.*
- *All questions must be answered unless otherwise indicated.*
- *Completely fill in boxes to record answers.*

Question types
○ *only 1 answer allowed* ☐ *multiple answers allowed*

Internal Use Only / Not read by scanner

Last name	First name	Gender
Street		M.R.N
Country code Zip code	City	
Social security number (ADI no.)		Birthdate (DD.MM.YYYY)

☐ Mandatory information

Level of therapy
○ upper cervical ○ mid lower cervical ○ cervicothoracic ○ cervico-thoraco-lumbar ○ thoracic ○ thoracolumbar ○ thoraco-lumbo-sacral ○ lumbar ○ lumbo-sacral ○ sacral ○ coccyx ○ ISJ

ISJ = ilio sacral joint

Admission / Pathology

Date
Day 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Month 1 2 3 4 5 6 7 8 9 10 11 12 **Year** 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16

Therapy ○ outpatient ○ inpatient

Diagnosis validated with
☐ anamnesis ☐ clinical evaluation ☐ X-ray ☐ layer picture ☐ laboratory ☐ other ....

Main pathology
○ functional disease ○ structural disease ○ functional & structural disease

Specification of structural disease
☐ degenerative disease ☐ deformity ☐ spondylolistesis ☐ inflammation ☐ other

Specification of main pathology *Only answer questions related to Main Pathology*

FUNCTIONAL DISEASE

Type of functional disease
☐ articular blockade ☐ myosclerosis ☐ muscular hypot. ☐ muscular shortening ☐ muscular insufficience ☐ malposition ☐ paralysis ☐ segmental instability ☐ segmental dysfunction ☐ whiplash ☐ hypermobility ☐ pseudoradicular syndrome ☐ cranial dysfunction ☐ visceral dysfunction ☐ other ....

STRUCTURAL DISEASE

Degenerative disease
☐ black disc ☐ segmental instability ☐ discopathy ☐ disc herniation ☐ spondylarthrosis ☐ spinal stenosis ☐ other ....

Deformity

Type of deformity
☐ scoliosis ☐ kyphosis ☐ other ....

Predominant etiology
☐ idiopathic ☐ degenerative ☐ M. Scheuermann ☐ other ....

Spondylolisthesis

Type of ...
○ unknown ○ Type I (congenital, dyspl.) ○ Type II (isthmic) ○ Type III (degenerative) ○ Type IV (traumatic) ○ Type V (pathologic) ○ Type VI (postsurgical)

Grade of ...
○ unknown ○ Grade 0 ○ Grade I ○ Grade II ○ Grade III ○ Grade IV ○ Spondyloptosis (V)

Inflammation
☐ inflammatory arthritis ☐ infectious ☐ spondylarthropathies ☐ other ....

Other
☐ chron. pain disease ☐ fibromyalgia ☐ soft tissue lesion, neck ☐ CRPS (M. Sudeck) ☐ muscular disease ☐ neuromuscular disease ☐ radicular syndrome ☐ other ....

Duration of disease *W = Weeks, M = Months*
○ < 6 W ○ 6 W - 3 M ○ 4-6 M ○ 7-12 M ○ > 12 M

Number of previous spine operations for same pathology and spinal level(s)
○ none ○ 1 ○ 2 ○ 3 ○ >3

Number of previous therapy sessions during the last 12 months *according to patient information*
○ unknown ○ none ○ 1 -9 ○ 10 - 18 ○ 19 -27 ○ > 27

Medication at admission
☐ none ☐ NSAID ☐ other analgetics ☐ weak opioide ☐ strong opioide ☐ muscle relaxants ☐ sleep promoting drugs ☐ SSRI ☐ tricyclic antidepressants ☐ anxiolytics ☐ anticonvulsants ☐ neuroleptics

Flags*
☐ unknown ☐ red ☐ yellow ☐ orange ☐ blue ☐ black

WHO Scheme ○ Level 1 ○ Level 2 ○ Level 3

Comments regarding main pathology ....

Therapy

Beginning of therapy
Day 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Month 1 2 3 4 5 6 7 8 9 10 11 12 **Year** 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16

Therapist credentials
☐ orthopedic surgeon ☐ neurosurgeon ☐ rheumatologist ☐ physical doctor ☐ chiropractician ☐ osteopathic phys. ☐ physiotherapist ☐ ergotherapist ☐ pain therapist ☐ other ....

Goals of functional therapy
☐ none ☐ pain relief ☐ functional improvement ☐ neurological improvement ☐ diagno. measures ☐ other ....

Goals of structural therapy
☐ none ☐ pain relief ☐ functional improvement ☐ neurological improvement ☐ diagno. measures ☐ other ....

***Flags**
Red: Biomedical Factors; serious spinal pathology
Yellow: Psychosocial or behavioral factors
Orange: Abnormal psychological processes
Blue: Socioeconomic/work factors
Black: Occupational and societal factors

Conservative therapy draft

back side

SPINE TANGO

CONSERVATIVE THERAPY

Therapeutic Measures

Invasive pain therapy
- no
- yes — *specify* →
  - facet block
  - root block
  - epidural infiltration
  - epidural catheter
  - pain pump
  - medullary stimulation
  - IDET
  - IRT
  - radiofrequency therapy
  - cryodenervation of facets
  - alcohol denervat. of facets
  - neural therapy
  - acupuncture
  - ISJ infiltration
  - other ....

Pain medication
- none

Current medication...
- continued
- discontinued
- added/modified — *spec.* →
  - NSAID
  - other analgetics
  - weak opioide
  - strong opioide
  - muscle relaxants
  - sleep promoting drugs
  - SSRI
  - tricyclic antidepressants
  - anxiolytics
  - anticonvulsants
  - neuroleptics

Physiotherapy
- no
- yes — *specify* →
  - strength training
  - therapy for scoliosis
  - endurance training
  - neurorehabilitation
  - stabilisation training
  - other ....

Manual therapy
- no
- yes — *specify* →
  - mobilisation
  - manipulation
  - techniques for soft tissues
  - stretches
  - neuromeningeal mobil.
  - visceral techniques
  - trigger point treatment
  - craniosacral techniques
  - massage
  - other ....

Physical modalities
- no
- yes — *specify* →
  - interference power
  - thermo therapy
  - diathermy
  - shockwave therapy
  - TENS
  - ultrasound
  - lumbar orthosis
  - laser therapy
  - other ....

Group programmes
- no
- yes — *specify* →
  - back training program
  - cognitive behavioural therapy
  - pain management
  - ADL (activities of daily living)
  - MTT group programmes
  - other ....

Psychological intervention
- no
- yes — *specify* →
  - cognitive behaviour therapy
  - psychotherapy
  - relaxation therapy
  - coping strategies
  - other ....

Occupational medicine measures
- no
- yes — *specify* →
  - ergonomic measures
  - occupational retraining
  - work reintegration
  - work hardening
  - other ....

Other therapeutic measures
- no
- yes — *specify* → ....

Therapist's notes ....

End of therapy

Date of end of therapy

Day 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Month 1 2 3 4 5 6 7 8 9 10 11 12 **Year** 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16

General complications
- none
- yes

Answer "none" in "Therapeutic" and "General complications" excludes "Measures taken" and "Status of complications".

Therapeutic complications
- none
- nerve root damage
- cauda equina damage
- spinal cord damage
- bleeding in spinal canal
- bleeding outside spinal canal
- duralesion
- wound infection
- electrode malposition
- electrode dislocation
- other ....

Measures taken
- none
- cons. pharmacological
- conservative functional
- prolonged inpatient stay
- operative Intervention
- other ....

Status of complications

General	resolved	improved	persisting
Therap.	resolved	improved	persisting

Achieved goals of therapy

	functional disease a	p	n	stuctural disease a	p	n
pain relief	○	○	○	○	○	○
functional improvement	○	○	○	○	○	○
neurological improvement	○	○	○	○	○	○
diagnostic measures	○	○	○	○	○	○
other	○	○	○	○	○	○

a = achieved
p = partially achieved
n = not achieved

Consultation
- rheumatology
- physical medicine
- orthopedy
- spine surgery
- other ....

Further scheduled measures
- none
- other conservative therapy
- surgical intervention

Comments regarding end of therapy ....

....

Therapist ....

EPITOME OF AVAILABLE DATA

Overview (Pool)

Data from the

Surgery form: demographic data, distribution and specification of diagnosis, different details related to main pathology, complications

Followup form: followup interval, overall outcome, achievement of surgical goals

Short exemplary analysis on Total Disc Replacement (Pool):

Level of procedure,

Demographic data,

Type of degeneration,

VAS (COMI)

STATISTICS AND COMMENTS

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 over 30.000 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 subgroup with dynamic stabilization of the cervical and lumbar spine using disc arthroplasty.

6. Windish D, Huot SJ, Green ML (2007).
Medicine Residents' Understanding of the Biostatistics and Results in the Medical Literature;
JAMA. 2007;298(9):1010-1022.

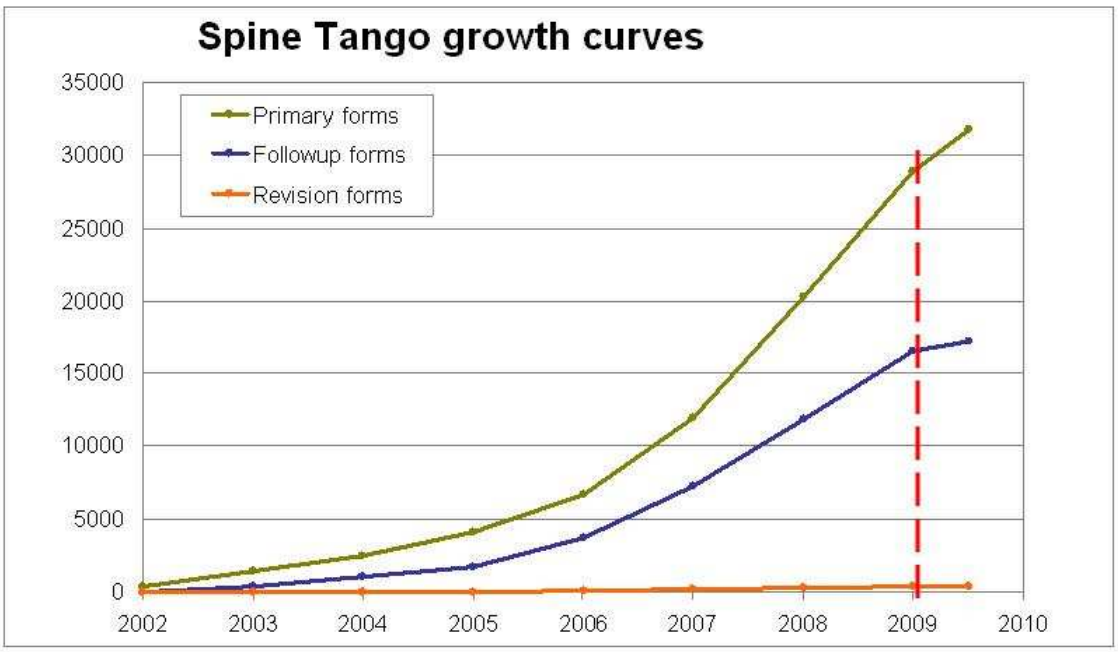


Fig 4: Growth curves of implemented forms (primary and revision surgery and followup) over the years.

The following graphics are based on the international Spine Tango data pool using all submitted forms until the end of the year 2009. Only form versions 2005 and 2006 were considered. They added up to 24327 surgeries.

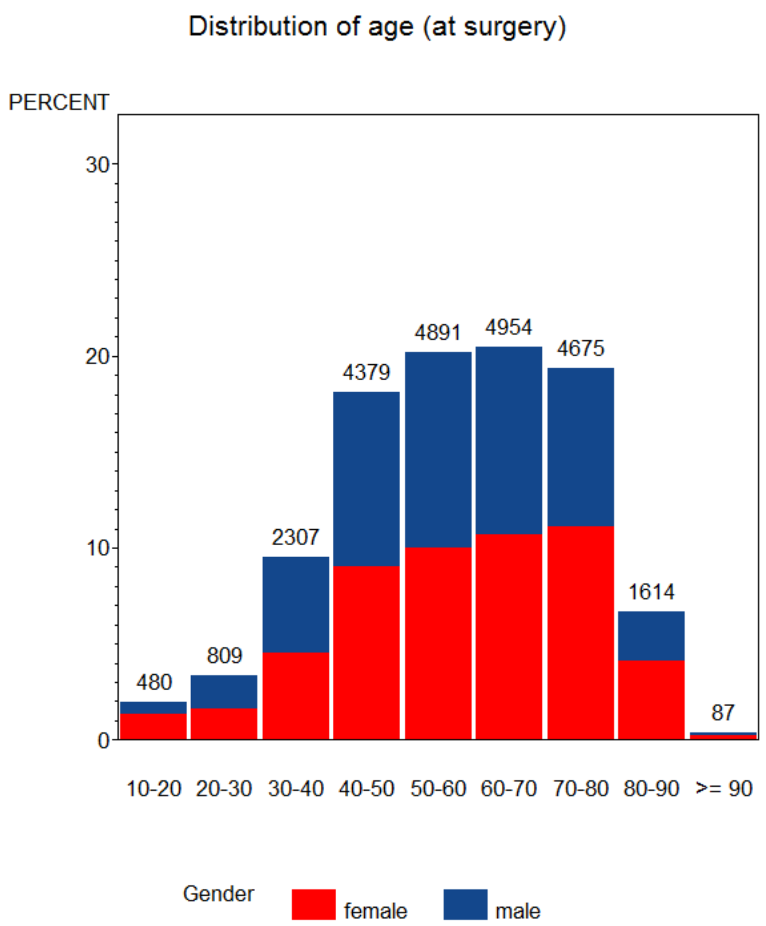


Fig 5: Demographic data - distribution of age and gender (surgery form)

Figure 5 shows that the majority of spinal interventions happen in the four life decades between an age of 40 and 80 years.
For females the majority of surgeries happen in patients aged 70-80 years. The male main group is between 50-60 years old (n= 2473) and makes up 21.3% of all surgeries in males.

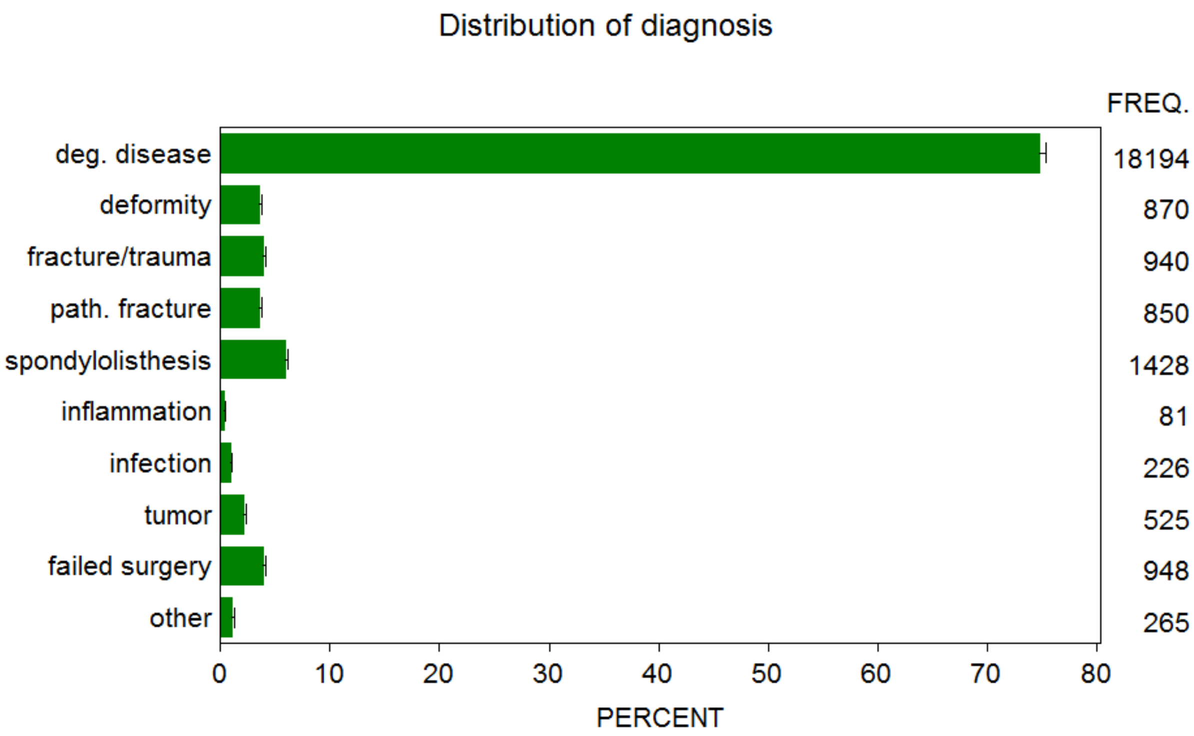


Fig 6: Distribution of diagnosis (surgery form)

Three quarters of all patients suffered from a degenerative disease as main pathology.
The types of degenerative diseases with their distribution are shown below (Fig. 7). The most frequently checked fields were disc herniation, spinal stenosis and disc degeneration. Please note the multiple choice format of this question. There was an average of 1.4 answers per case.

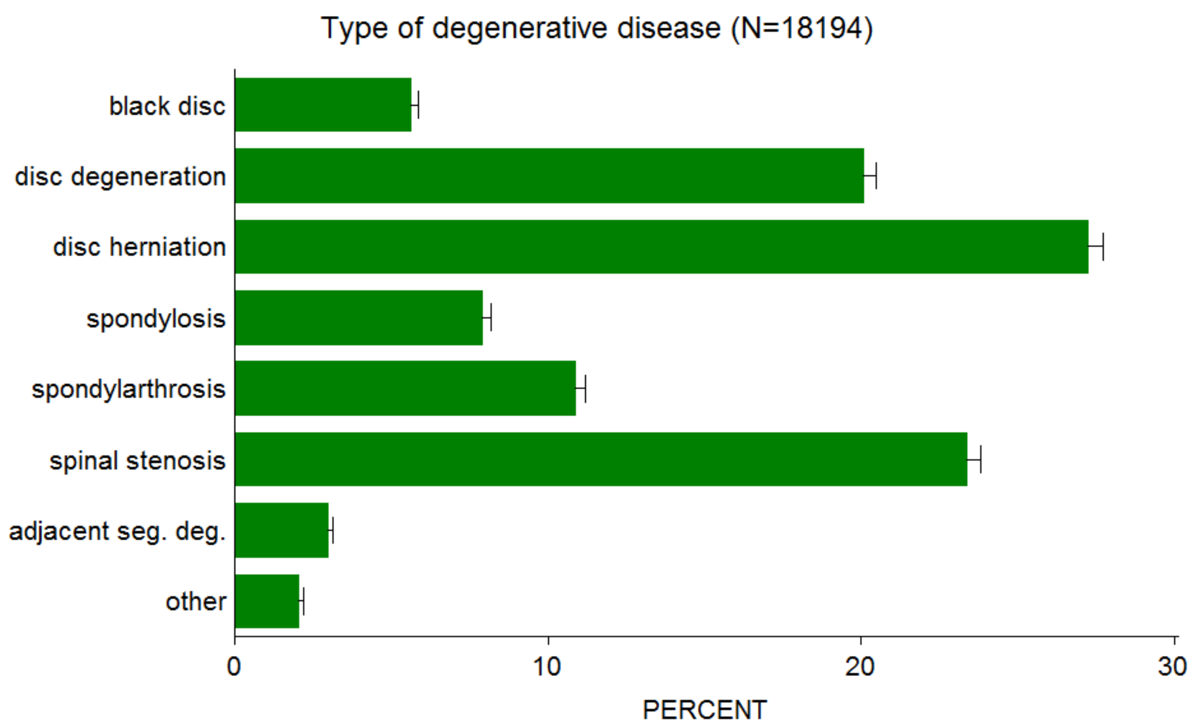


Fig 7: Type of degenerative disease (surgery form)

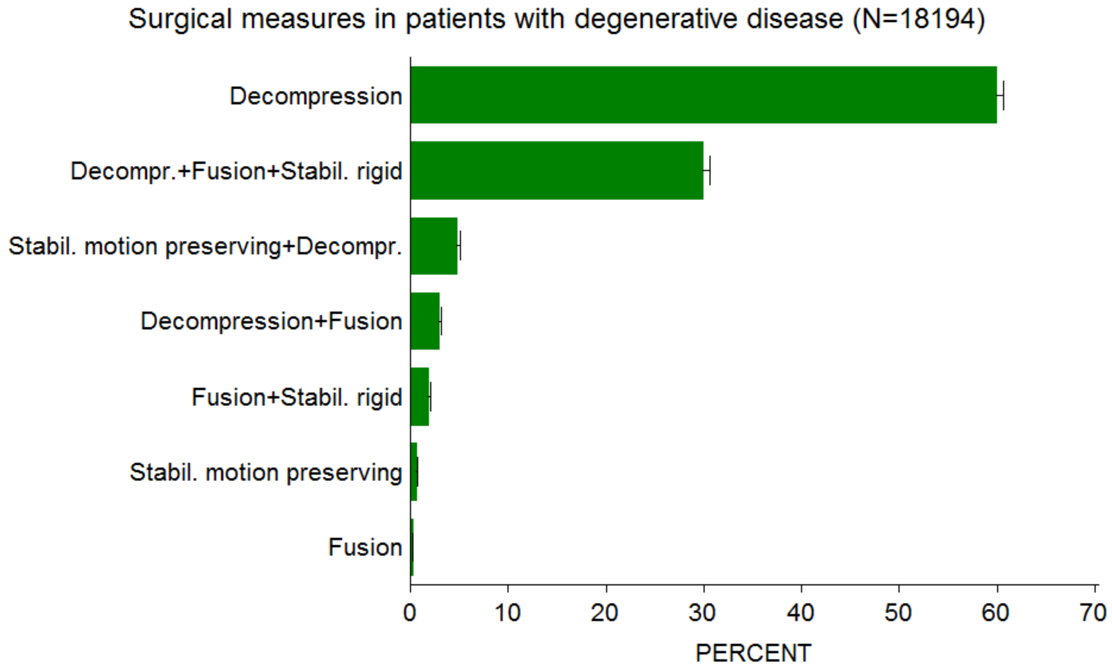


Fig 8: Surgical measures for degenerative disease (N=18194) (surgery form)

The most frequently performed surgical measure in patients with degenerative disease was the sole posterior decompression.

Of the 930 documented fractures in the surgery form, 56 were classified as C2 dens fractures (6%) (not shown).

The most frequent trauma were C3-L5/S1 fractures (N=805) with the distribution of the AO fracture types shown below (Fig. 9)

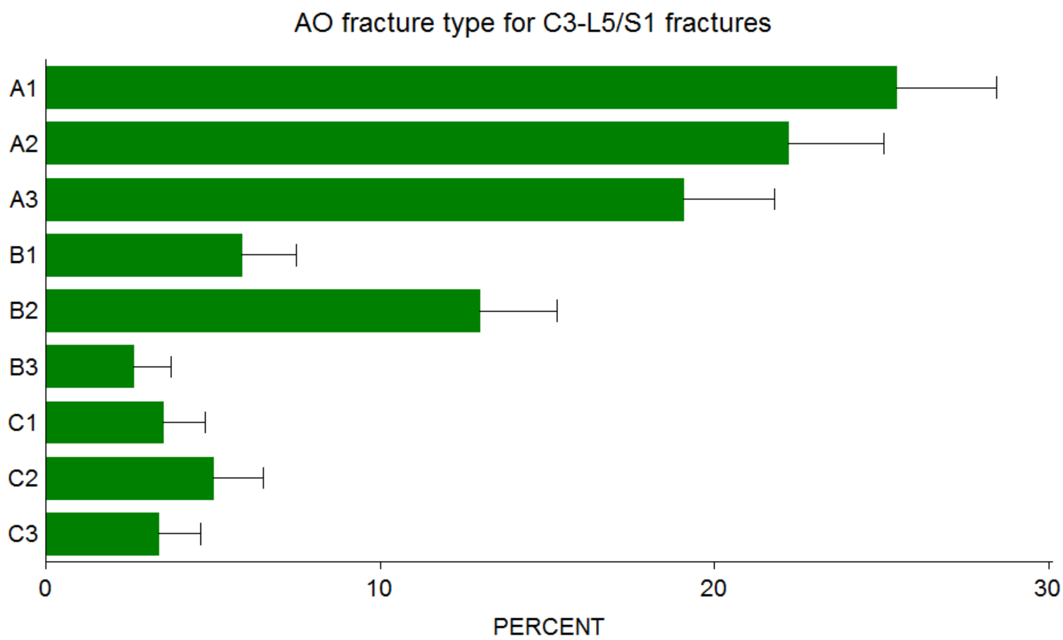


Fig 9: AO fracture types in patients withC3-L5/S1 fracture (N=805) (surgery form)

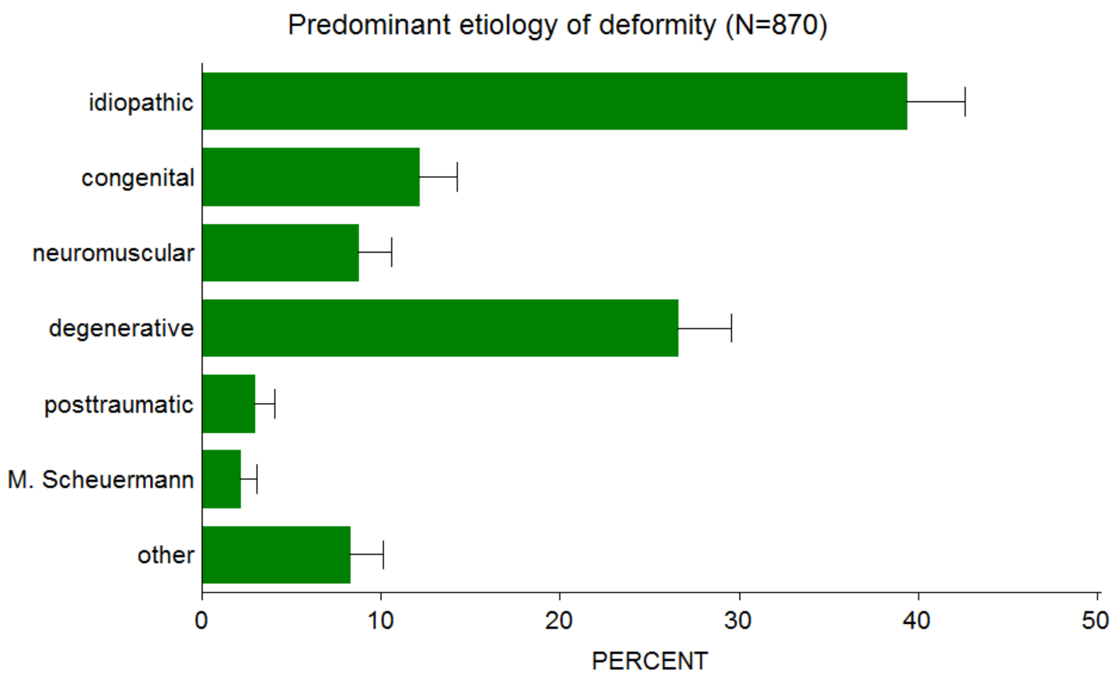


Fig 10: Predominant etiology of deformity (N=870) (surgery form)

There are 870 documented deformity cases in the database. The predominant etiology is shown in fig. 10 with idiopathic and degenerative etiologies as the most common ones.
Most of the spondylolisthesis cases have a degenerative etiology (n=811), followed by the isthmic type (n=464).

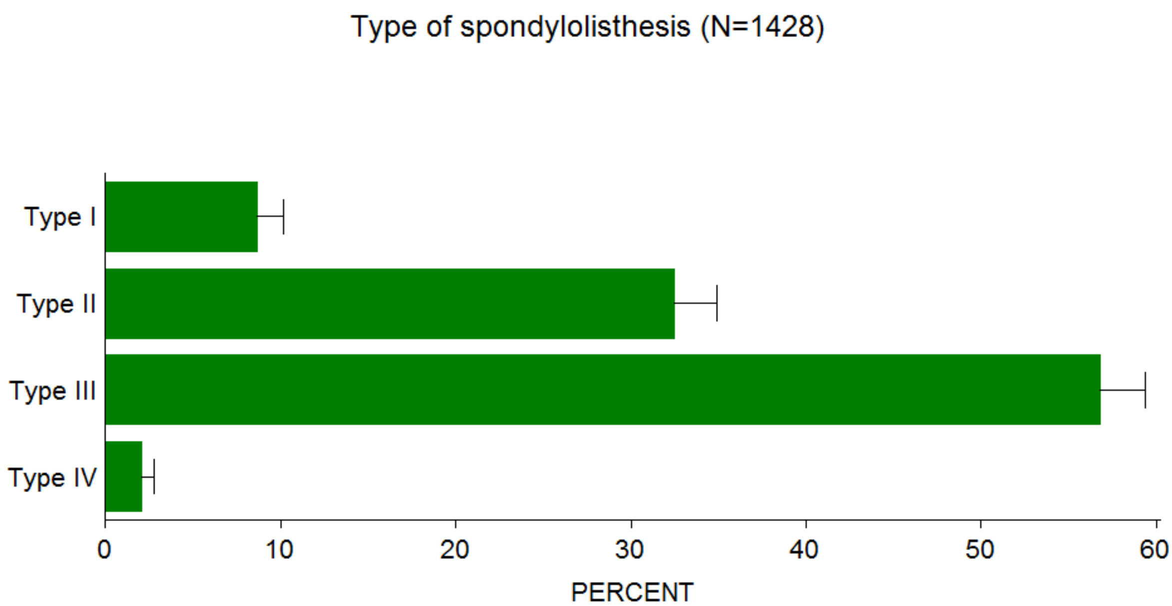


Fig 11: Type of spondylolisthesis (N=1428)(surgery form)

Tab 1: Classification of the various types of spondylolisthesis of Neugebauer & Newman, adapted by Wiltse et al.

Type I	congenital, dysplastic	Type IV	traumatic
Type II	isthmic	Type V	pathological
Type III	degenerative	Type VI	postsurgical

Different details related to the main pathology (surgery form)

Following we show the distribution of the spondylolisthesis grade for the three most frequent types (Fig 12-14). In Type I (congenital, dysplastic) spondylolisthesis Grade II dominates whereas in the degenerative spondylolisthesis cases Grade I is most frequent with over 60%.

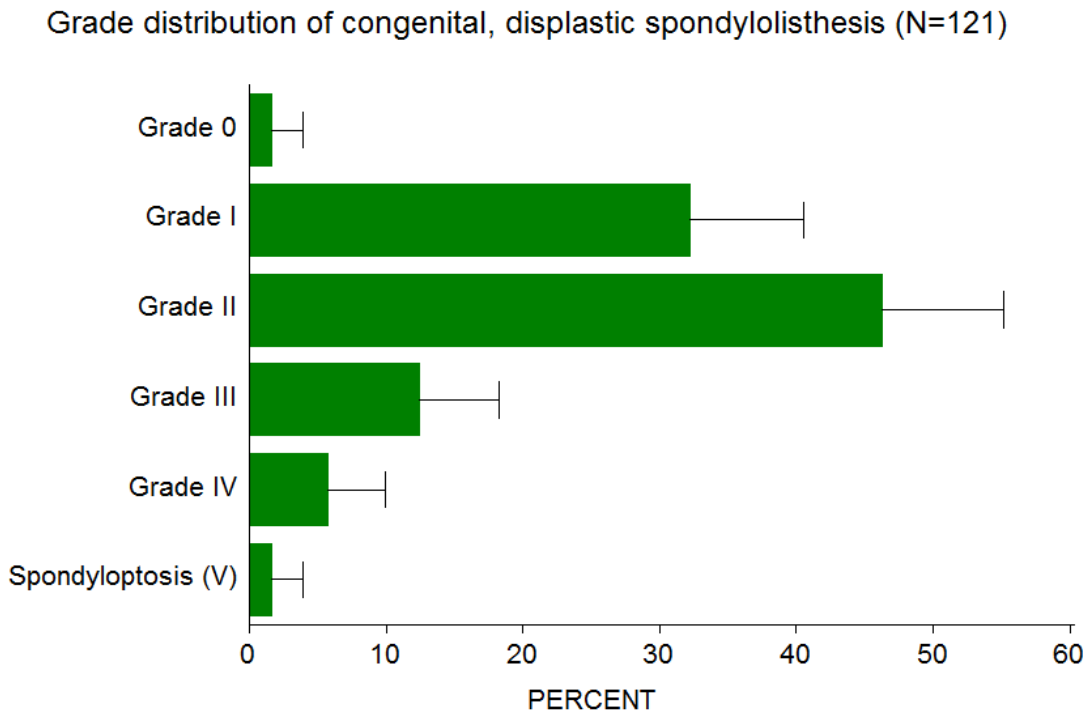


Fig 12: Grade of congenital spondylolisthesis (N=121) (surgery form)

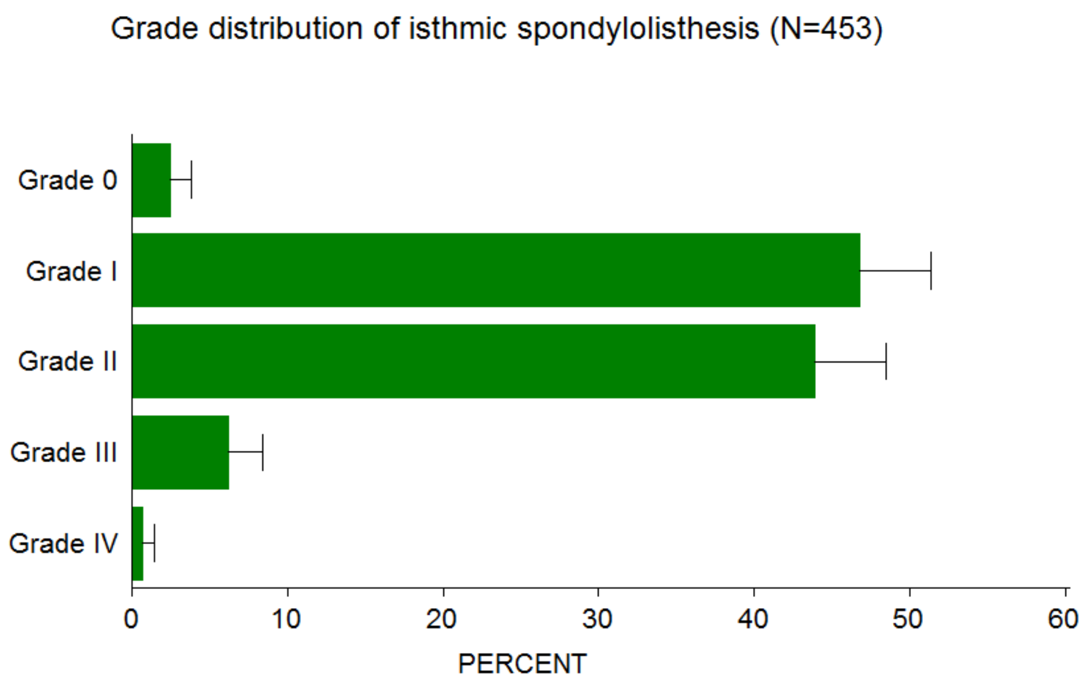
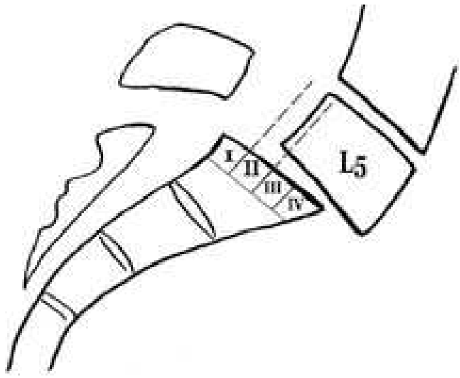


Fig 13: Grade of isthmic spondylolisthesis (N=453) (surgery form)

Tab. 2: Classification of spondylolisthesis according to Meyerding:

Grade 0	Lysis of pars without slip
Grade I	0-25% slip
Grade II	25-50% slip
Grade III	50-75% slip
Grade IV	> 75% slip
Grade V	spondyloptosis



Meyerding classification: now also shown in the new Spine Tango “Dictionary of Terms” on the Spine Tango web page.

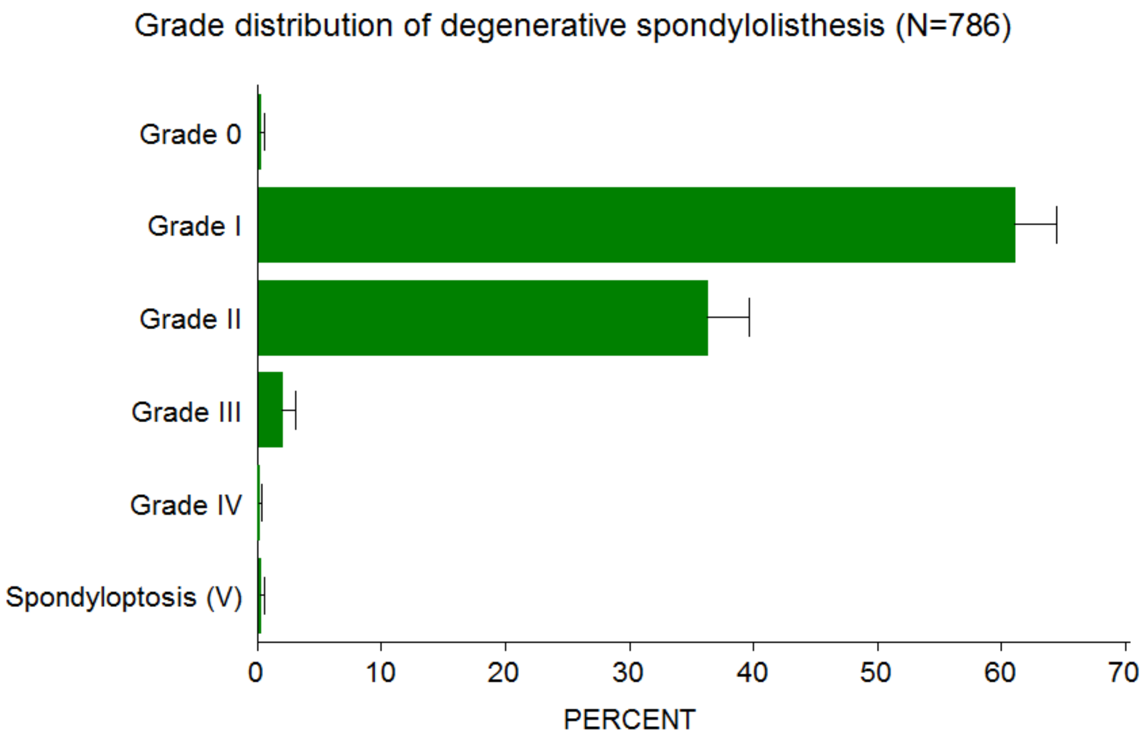


Fig 14: Grade of degenerative spondylolisthesis (N=786) (surgery form)

Different details related to the main pathology (surgery form)

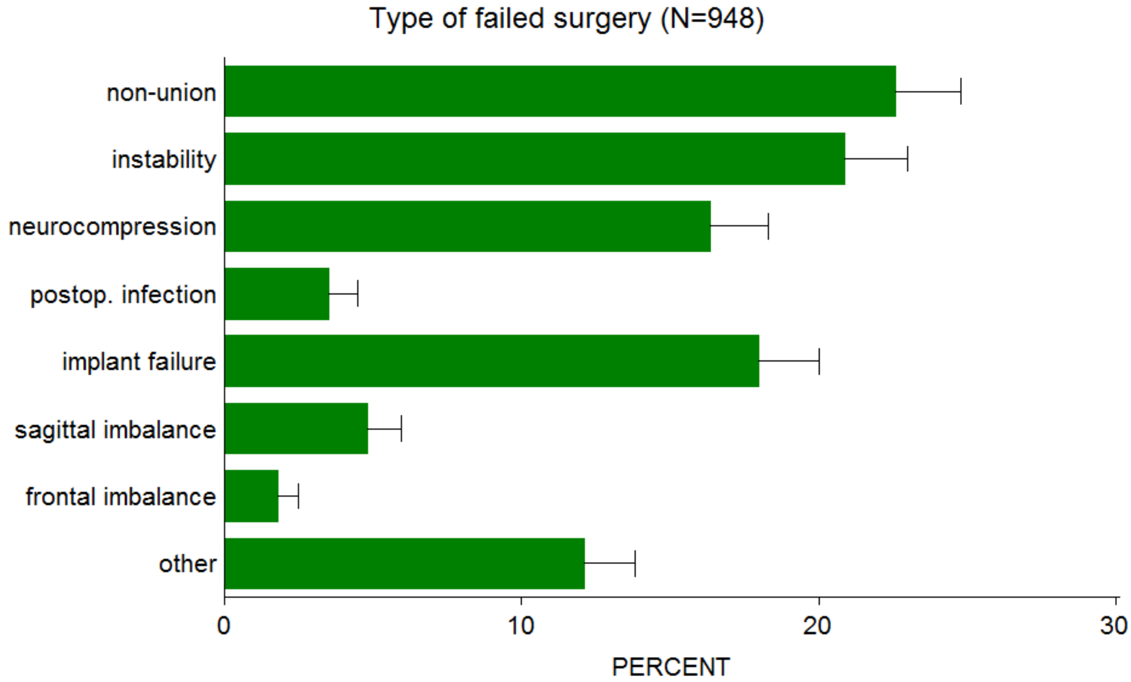


Fig 15: Type of failed surgery (N=948) (surgery form)

948 failed surgeries were documented in the database until the end of 2009. Since this is a multiple choice question the most frequent specifications were non-union (22.6%), instability (20.7%), implant failure (18.0%) and neurocompression (16.3%). Repeat surgeries for postoperative infections were documented in 49 patients (3.5%).

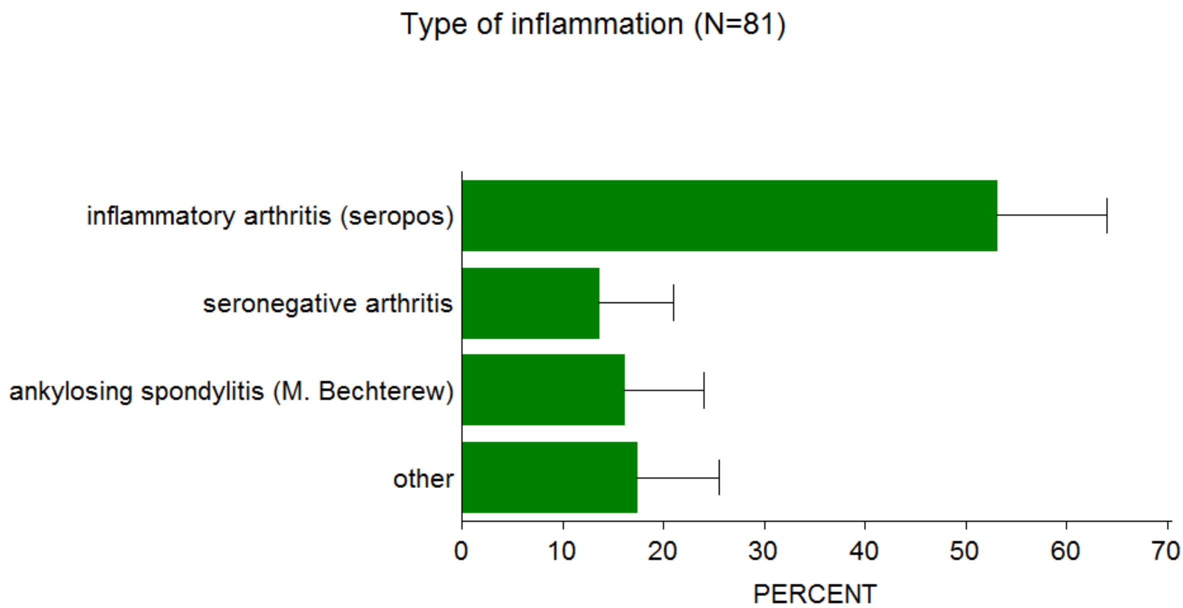


Fig 16: Type of inflammation/infection (N=81) (surgery form)

The most frequently affected structures with infection as main pathology are spondylodiscitis (71.7%). Discitis occurred in 10.05%, spondylitis in 18.3%.

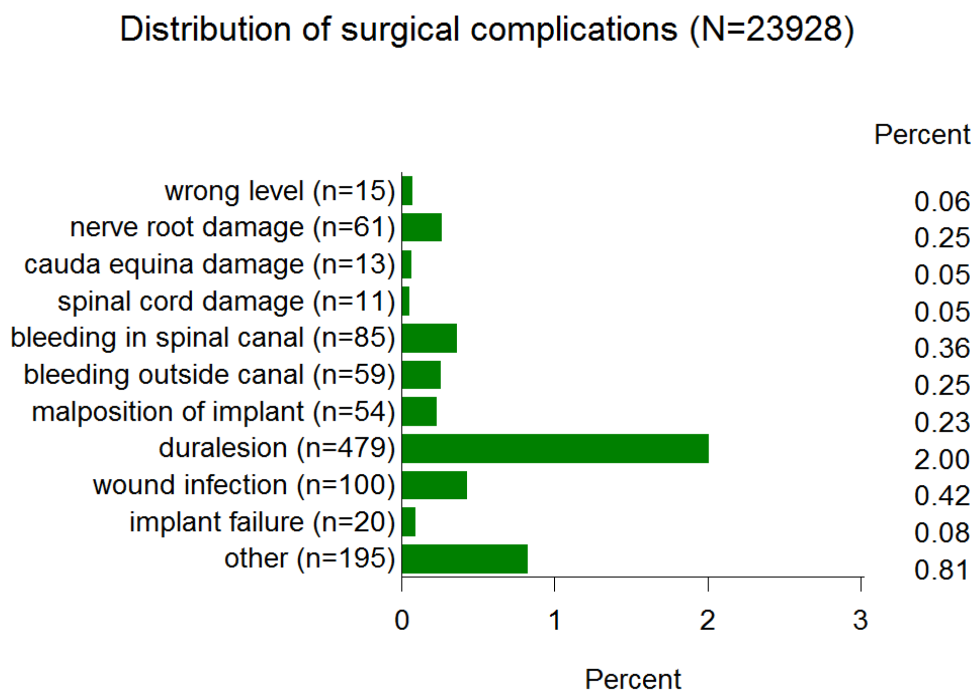


Fig17: Surgical complications (of 23928 patients), excluded was answer "none" (surgery form)

Figures17 and 18 show the distribution of surgical and general complications, excluding the answer "none". 95.5% of the 23928 patients had no surgical complications, 97.2% (of 23472 patients) had no general complications. The most frequent surgical complication was a dura lesion with 2%.

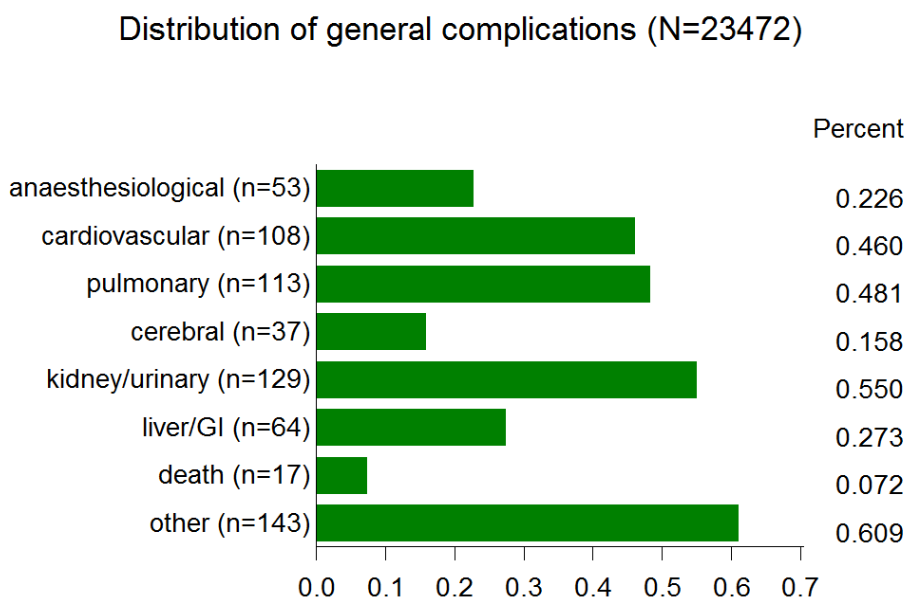


Fig 18: General complications (of 23472 patients , excluded was answer "none" (surgery form))

Data from the followup form

Distribution of followup interval / overall outcome

In figure 19 the distribution of the interval of 14943 followups is shown.
59.7 % of the follow ups were recorded 6 weeks or 3 months after surgery, only 19.6% at 1 year or later after surgery.

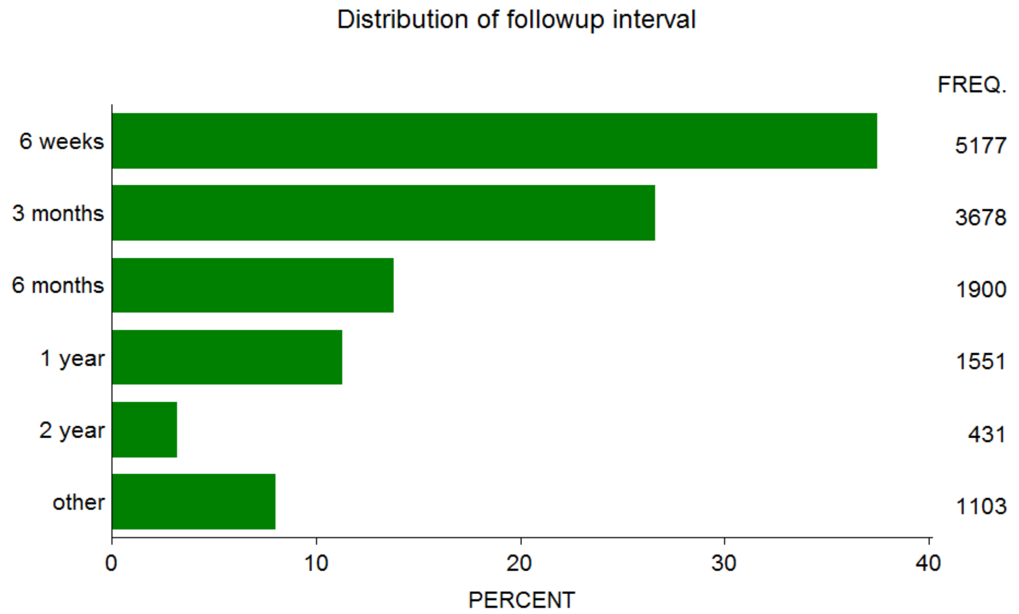


Fig 19: Distribution of followup interval (followup form)

The distribution of the overall outcome from the surgeon`s point of view shows that the percentage of excellent results rises over time, at the expense of mainly good results. Fair results stay quite stable, whereas poor results slightly increase with longer followup intervals.

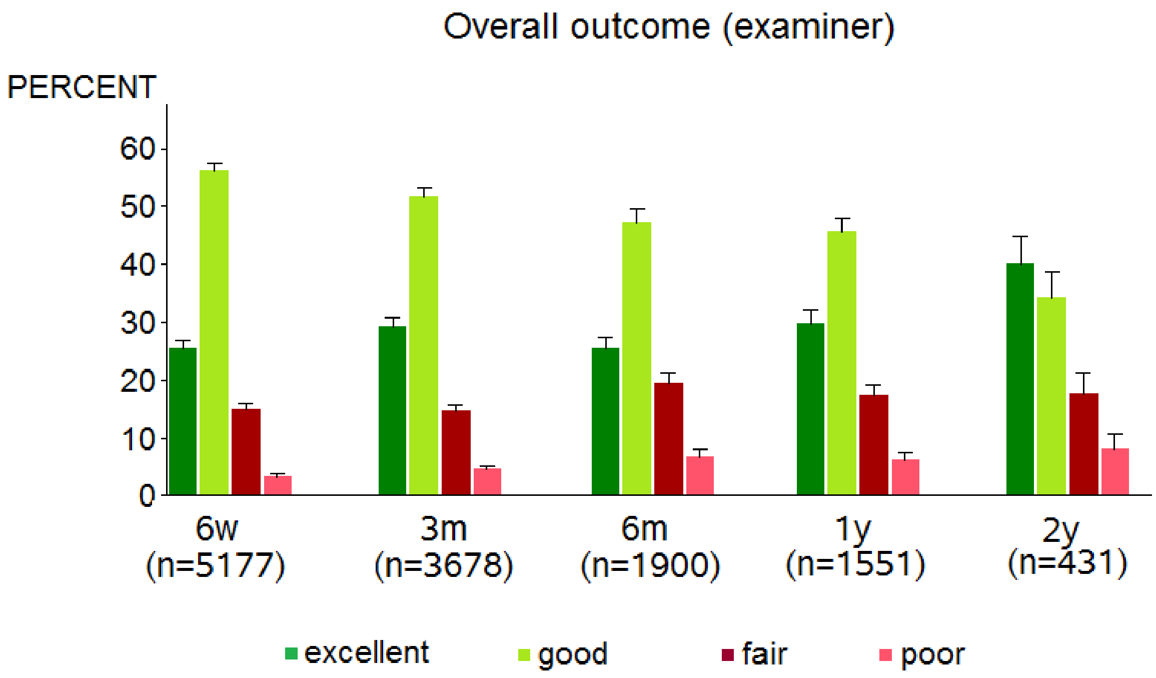


Fig 20: Overall outcome, examiner (followup form)

Achievement of surgical goals
(followup form)

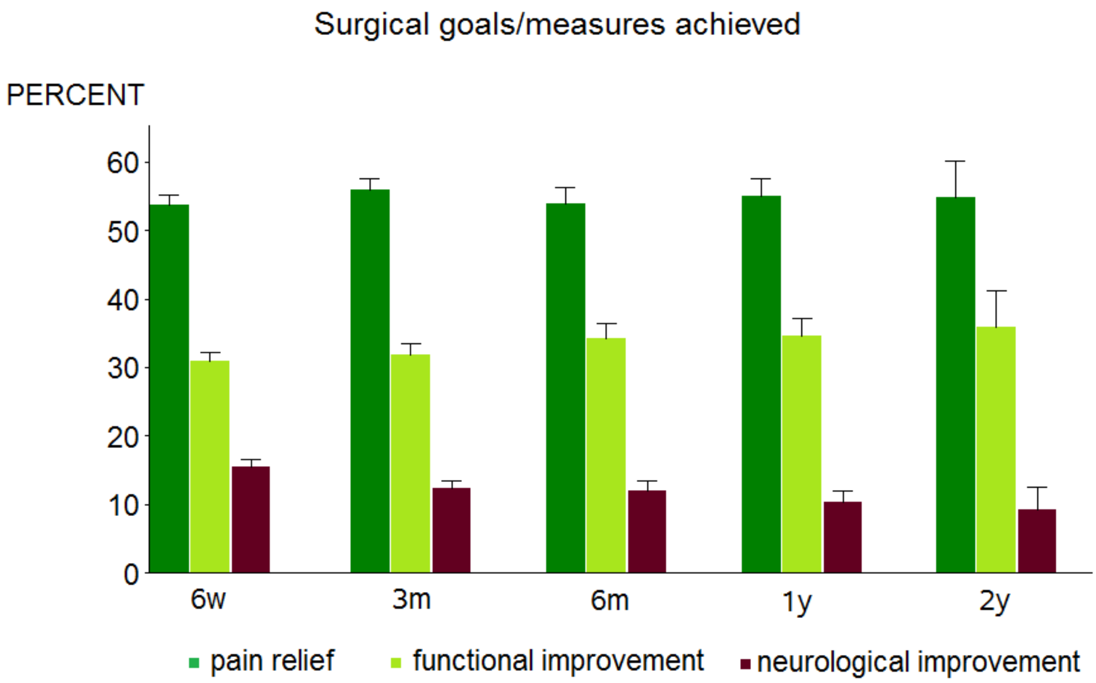


Fig 21: Surgical goals /measures achieved (followup form)

Figure 21 shows the distribution of achieved surgical goals/ measures from 13gg840 followups, stratified by followup interval. The first group of follow-ups is analysed without reference to the indicated surgical goals of the index surgery (figures 21-23), the second group with reference to the index surgery (figures 24-26).

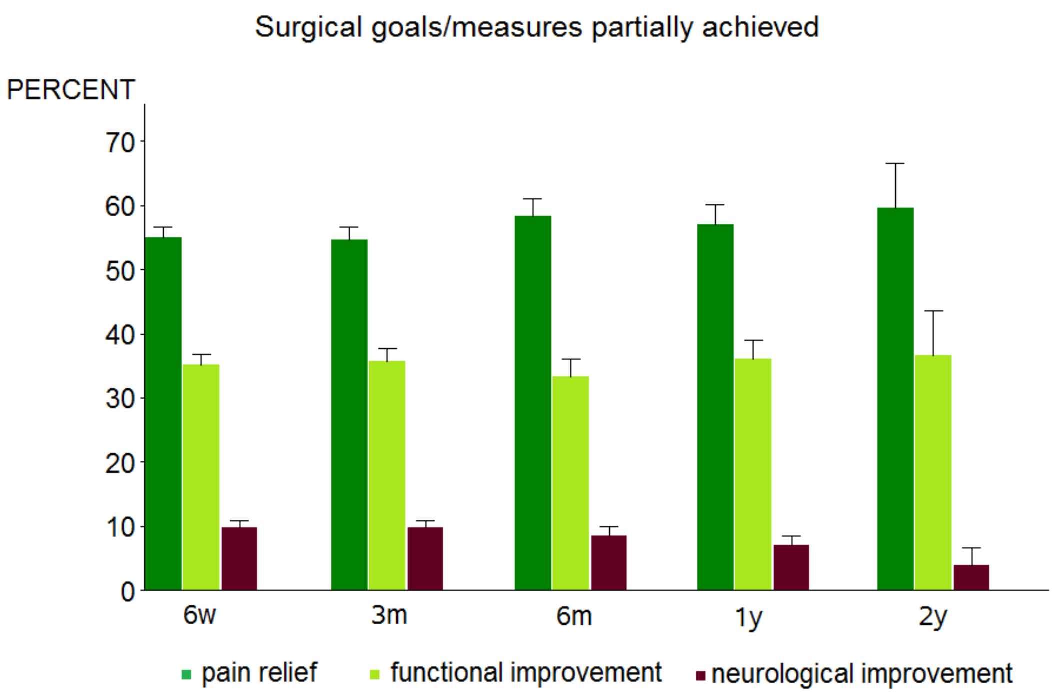


Fig 22: Surgical goals /measures partially achieved (followup form)

Achievement of surgical goals (followup form)

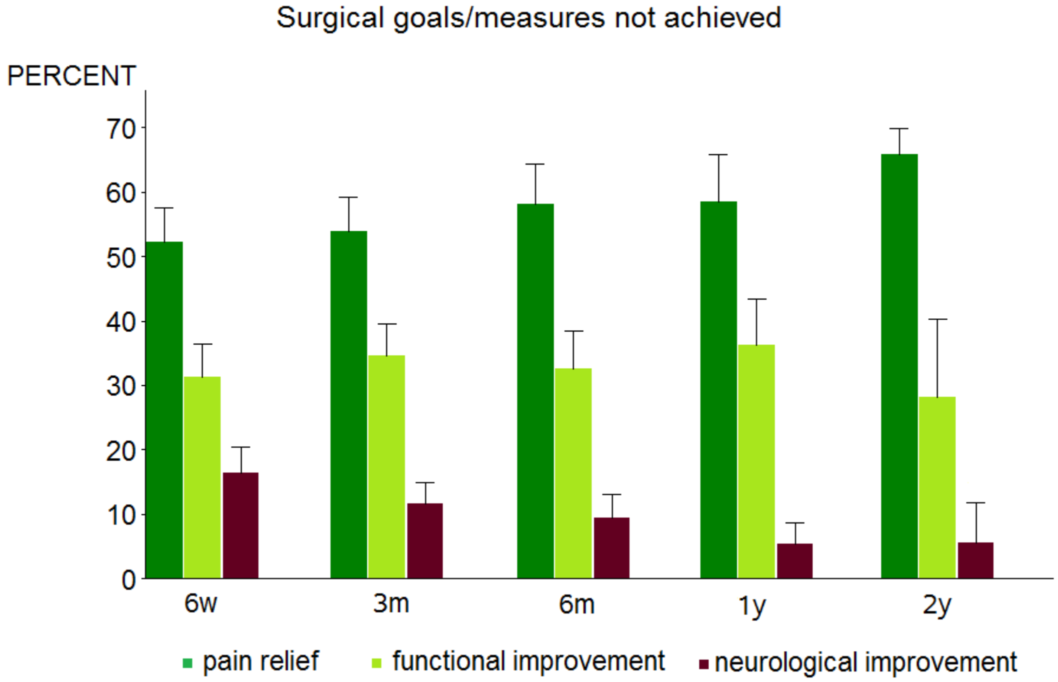


Fig 23: Surgical goals /measures not achieved (followup form)

Looking at non-achieved surgical goals, pain relief slightly decreases over time as the most prominent problem. In contrast, neurological problems seem to improve with delay in some cases since the early rates of non-achieved neurological problems are more than halfened after two years.

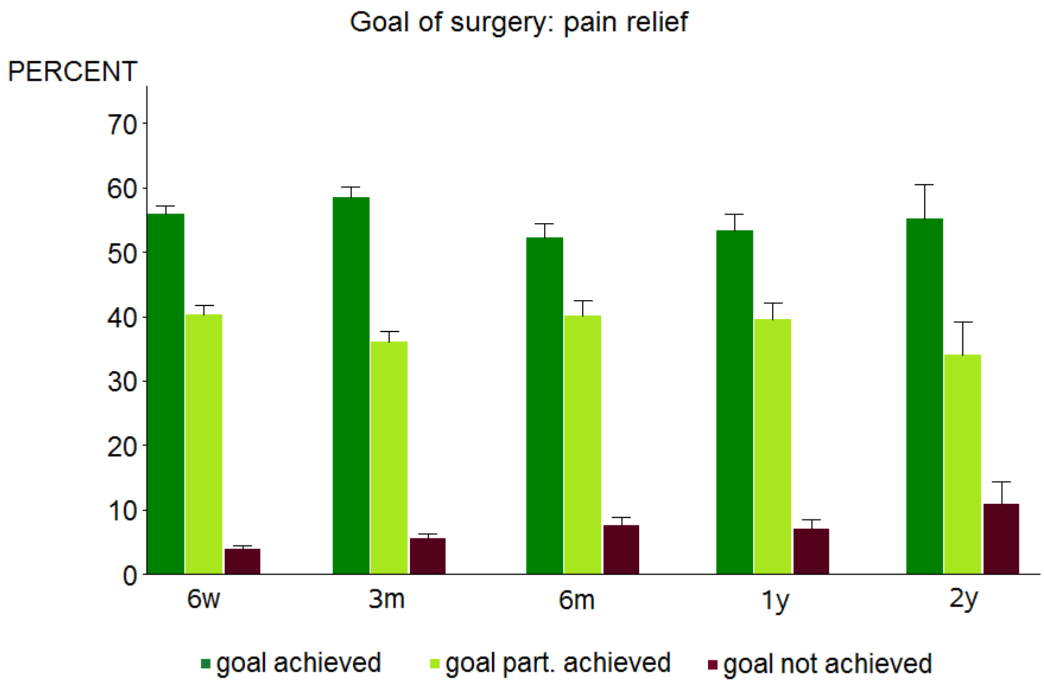


Fig 24: Goal of surgery: pain relief

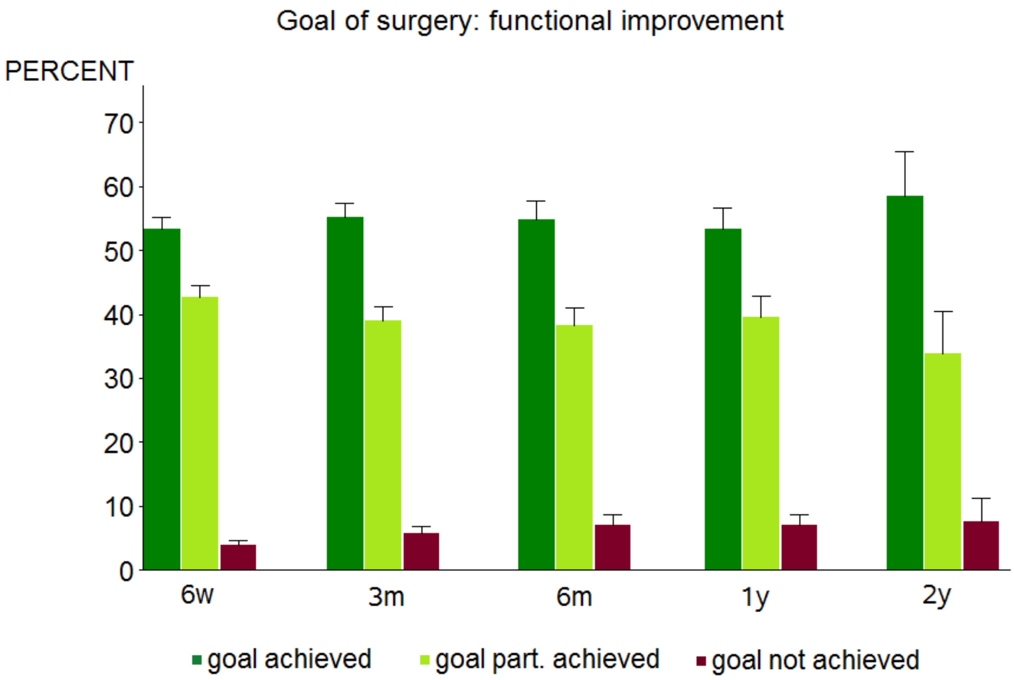


Fig 25: Goal of surgery: functional improvement

The evaluation of pain relief, functional improvement and neurological improvement as outcome in relation to the preoperatively determined goals shows a stable distribution over time for each parameter.

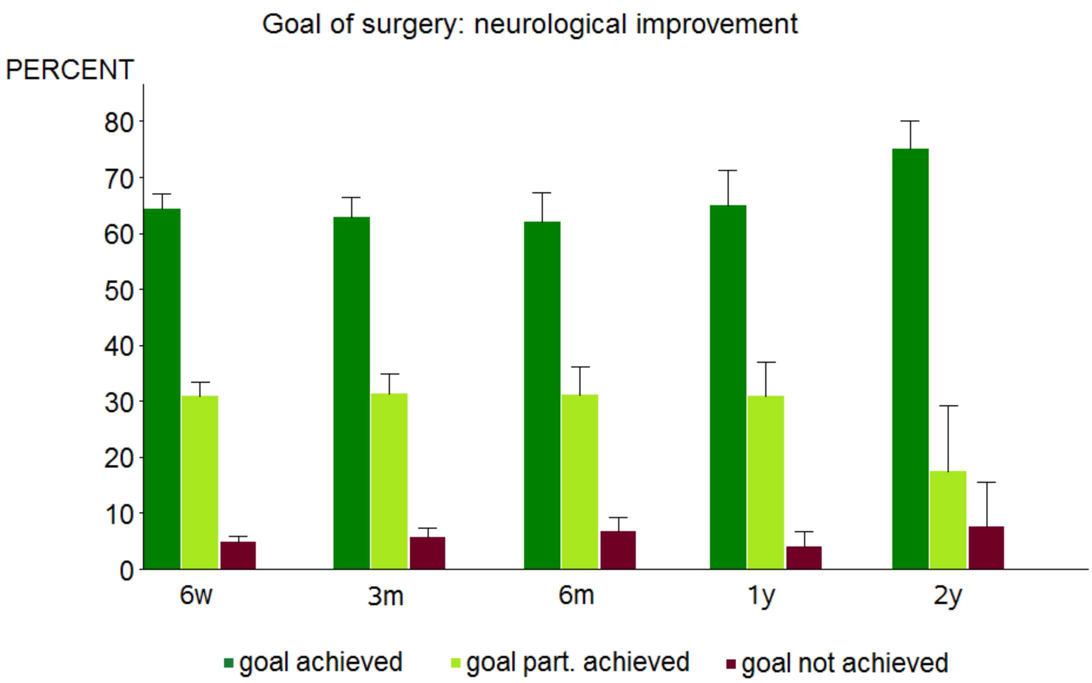


Fig 26: Goal of surgery: neurological improvement

An exemplary analysis of **Disc Replacement** using the Spine Tango data pool

In the management of discogenic back pain total disc replacement was introduced for preventing degenerative changes which occur in segments adjacent to fusions. It aims at maintaining segmental motion and eliminating pain (7). For achieving these goals the indications and contraindications have to be strictly respected.

By the end of 2009 we could identify 794 documented total disc replacements in the Spine Tango data pool. In the following part we show a short analysis of these interventions and some important outcome parameters.

As visible in figure 27 we stratified patients into two groups depending on the location of the operation. The cervical group (blue) counts 529 disc arthroplasties where nearly all (96.2%) are located in the mid-lower C-spine. The lumbar group (yellow) includes 265 disc arthroplasties with 44.5% located between L1-L5 and 54.0% in L5/S1.

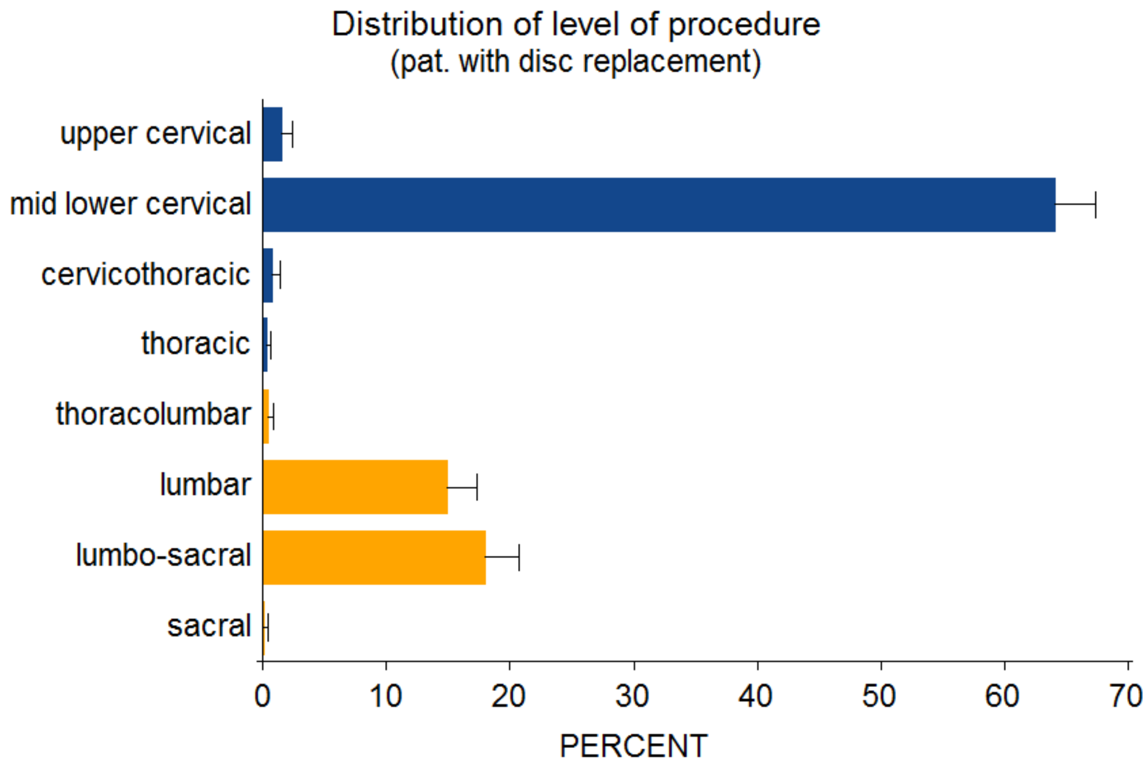


Fig. 27: Distribution of age (patients with disc replacement)

7: D.Grob (2009): Lumbar total disc replacement,
Der Orthopäde; 38(1):93-9

Demographic data
(patients with Disc Replacement)

The age and gender distribution of the cervical and lumbar group is given in figures 28 and 29. The mean age for the patients with cervical disc arthroplasty is 47.7 years, for the lumbar disc arthroplasty 42.7 years. In the cervical group 53.7% of patients are female, in the lumbar group 47.2%.

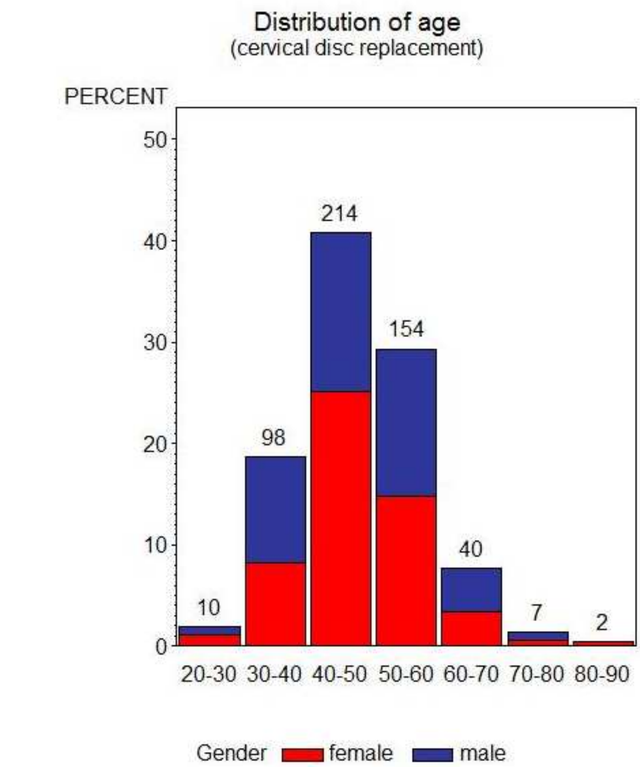


Fig. 28: Demographic data (patients with cervical disc replacement)

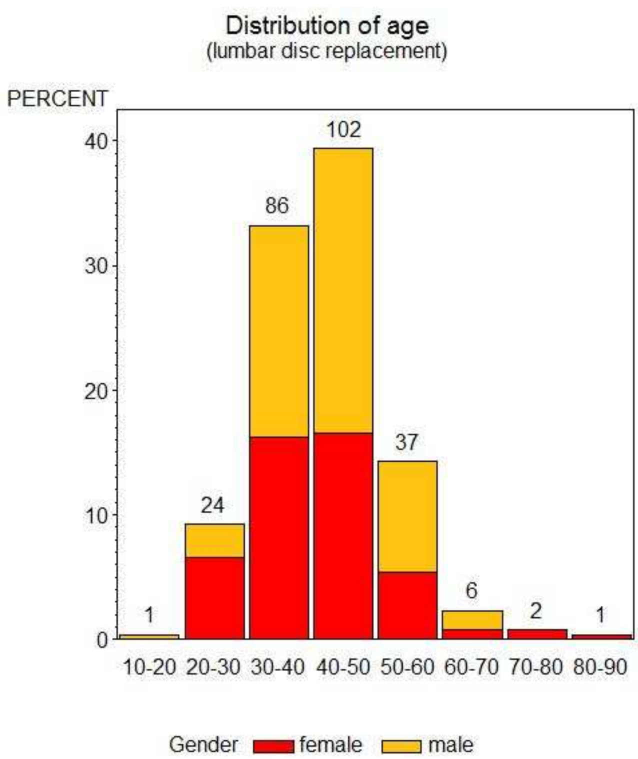


Fig. 29: Demographic data (patients with lumbar disc replacement)

Type of degeneration

(exemplary analysis for Disc Replacement)

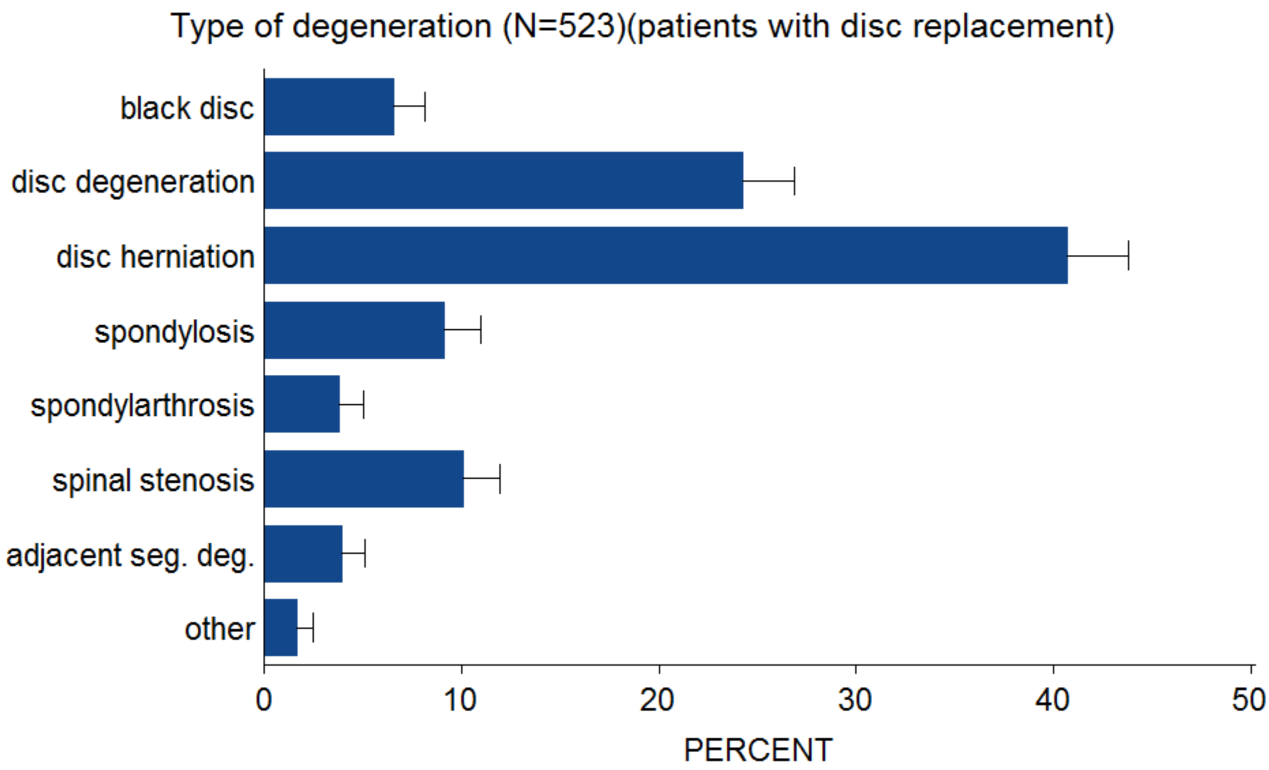


Fig. 30: Type of degeneration for patients with cervical disc replacement (N=523)

The specification of degenerative disease in patients with total disc replacement showed a predominance of disc herniation and disc degeneration in the cervical group (N=523).

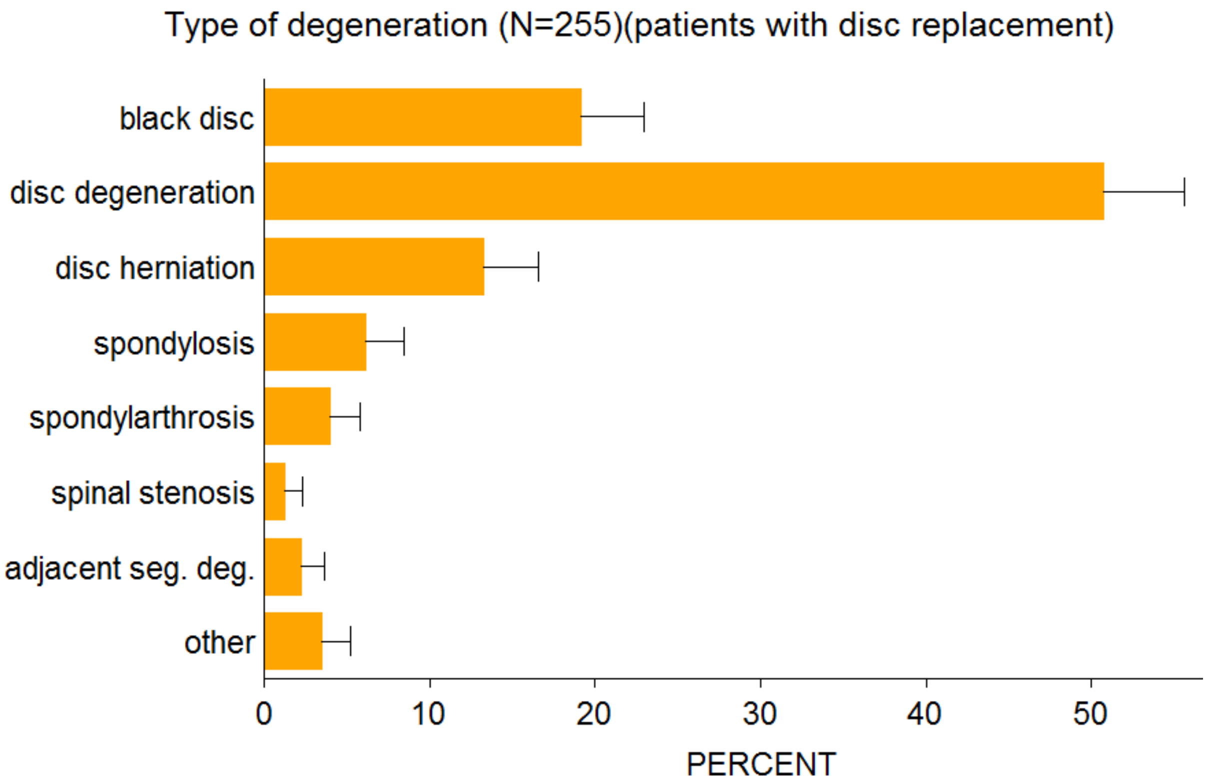


Fig. 31: Type of degeneration for patients with lumbar disc replacement (N=255)

In contrast to cervical disc replacement, in the lumbar group the main specification of degenerative disease was disc degeneration with 81.2%. In accordance with treatment recommendations, lumbar disc herniation as underlying disease was less frequently documented.

Outcome (COMI)
(Disc Replacement)

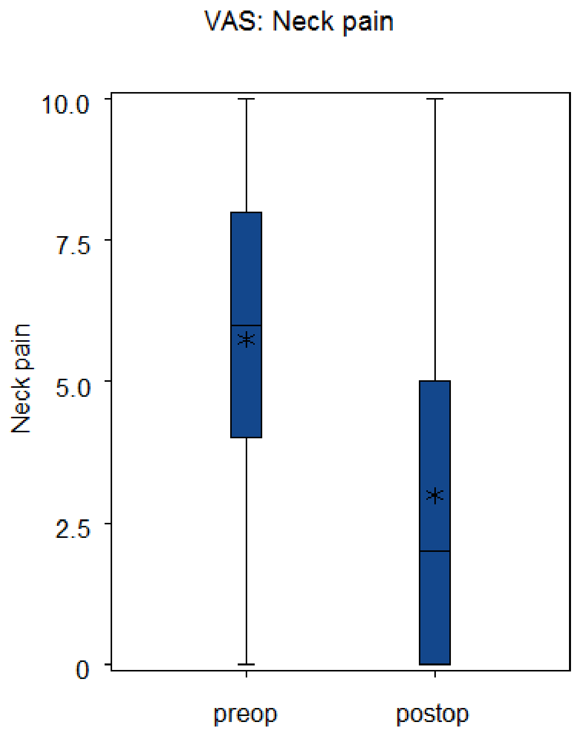


Fig 32: Pre- and postoperative VAS scores for neck pain, cervical group (patients with TDA)

In the cervical group (blue) there is a pain score reduction from 5.7 to 3.0 points in neck and from 6.8 to 2.9 points in arm pain. The mean followup time was 160 days.

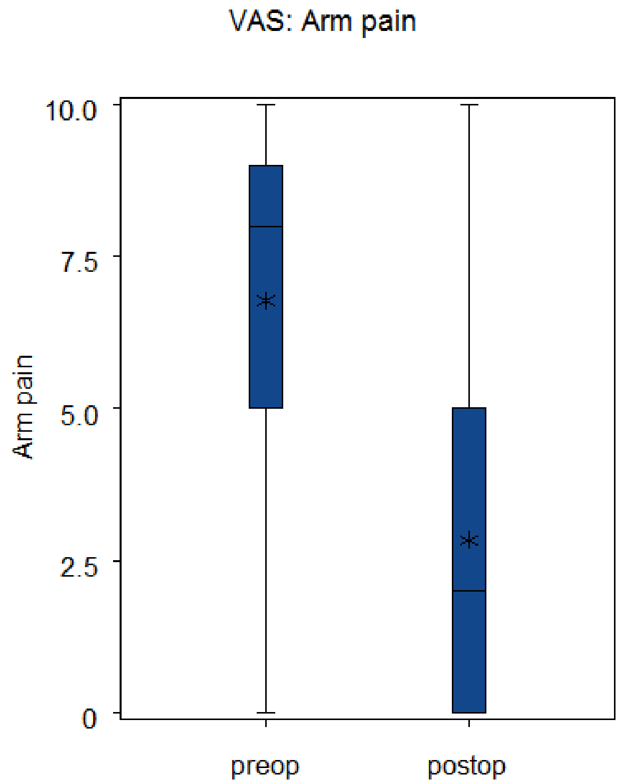


Fig 33: Pre- and postoperative VAS scores for arm pain, cervical group (patients with TDA)

Tab 3: Pre- and postoperative VAS scores for neck and arm pain, cervical group (patients with TDA)

Cervical group (COMI)			
Neck pain	N	Mean	Median
preop	274	5.7	6.0
postop	216	3.0	2.0
Arm pain	N	Mean	Median
preop	274	6.8	7.5
postop	216	2.9	2.0

In the lumbar group (orange) there is a pain score reduction from 6.7 to 4.0 points in back and from 5.0 to 3.2 points in leg pain. The mean followup time was 212 days.

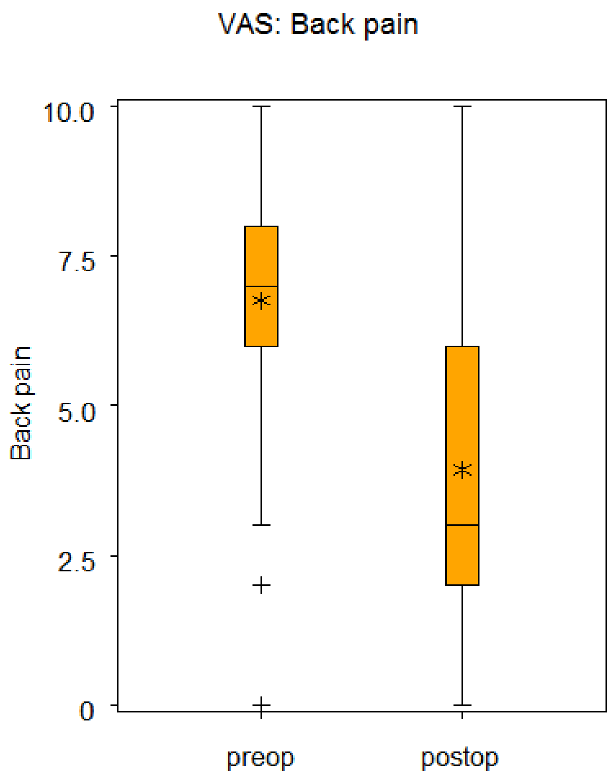


Fig 34: Pre- and postoperative VAS scores for leg pain, lumbar group (patients with TDA)

Tab 4: Pre- and postoperative VAS scores for back and leg pain, lumbar group (patients with TDA)

Lumbar group			
Back pain	N	Mean	Median
preop	87	6.7	7.0
postop	59	4.0	3.0
Leg pain	N	Mean	Median
preop	87	5.0	5.0
postop	59	3.2	3.0

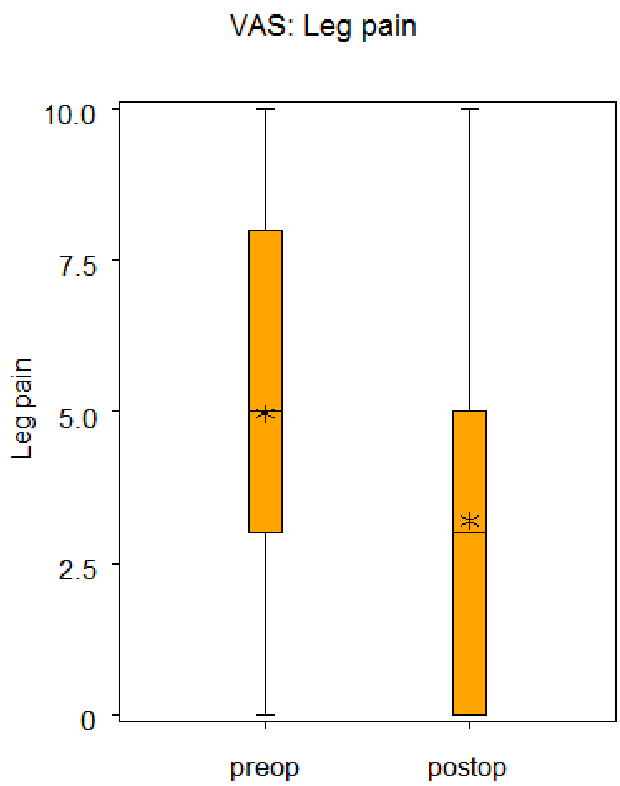


Fig 35: VAS scores pre- and postoperative for back pain, lumbar group (patients with TDA)

PARTICIPANTS/ MODULE ANALYSIS

Figure 36 displays the growth curves of the various national modules. The different starting dates of the modules need to be considered (Swiss/International: 2005, Austrian 2005, German: 2006, North American: 2007, Brazilian/ South American: 2008; Italian: 2008; Mexican: 2008)
The latest newcomers are an Australian and British module. Both are not yet available via www.Eurospine.org, but already have clinics entering data.

Figure 37 shows an overview of the Spine Tango participating clinics and their country of origin till the end of 2009. The current numbers show the ongoing growth with e.g.17 clinics in Germany, 13 in Switzerland, 3 in South America etc. (status quo July 2010)

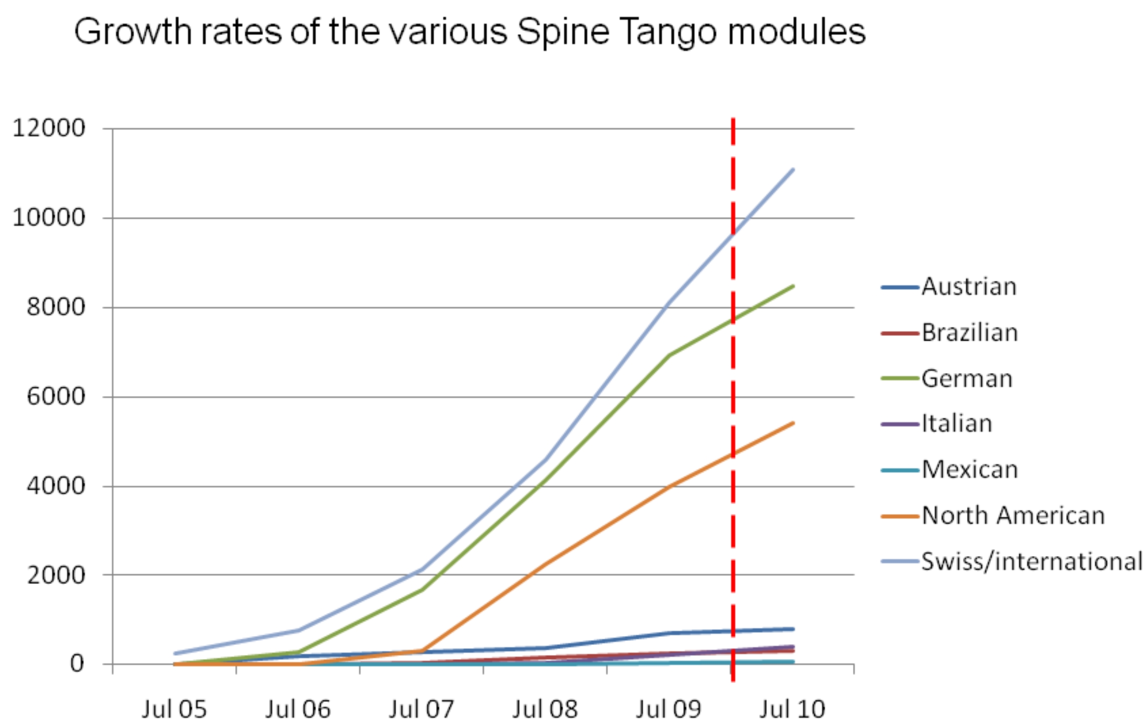


Fig 36: Growth curve (number of cases of the single Spine Tango modules over the years)

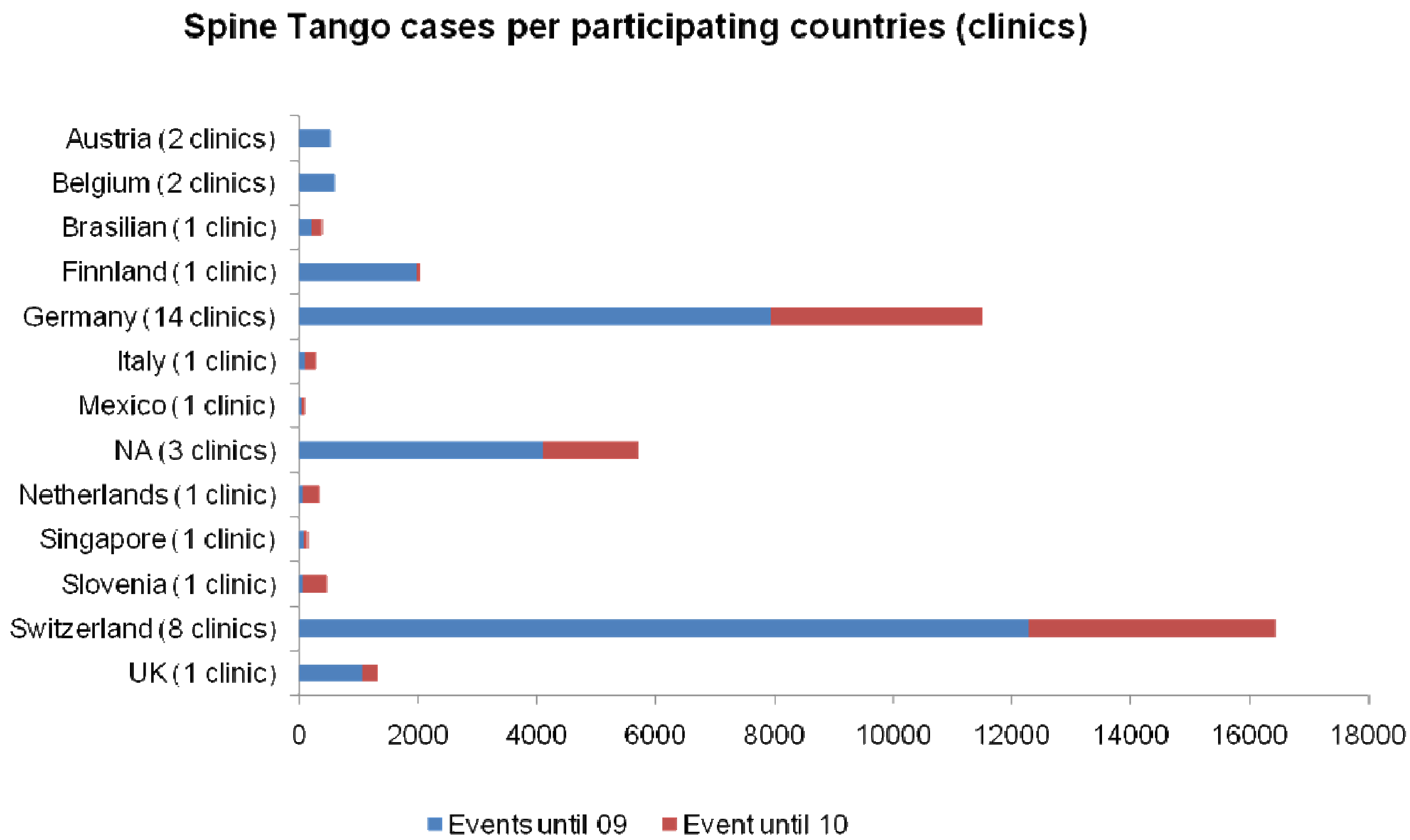
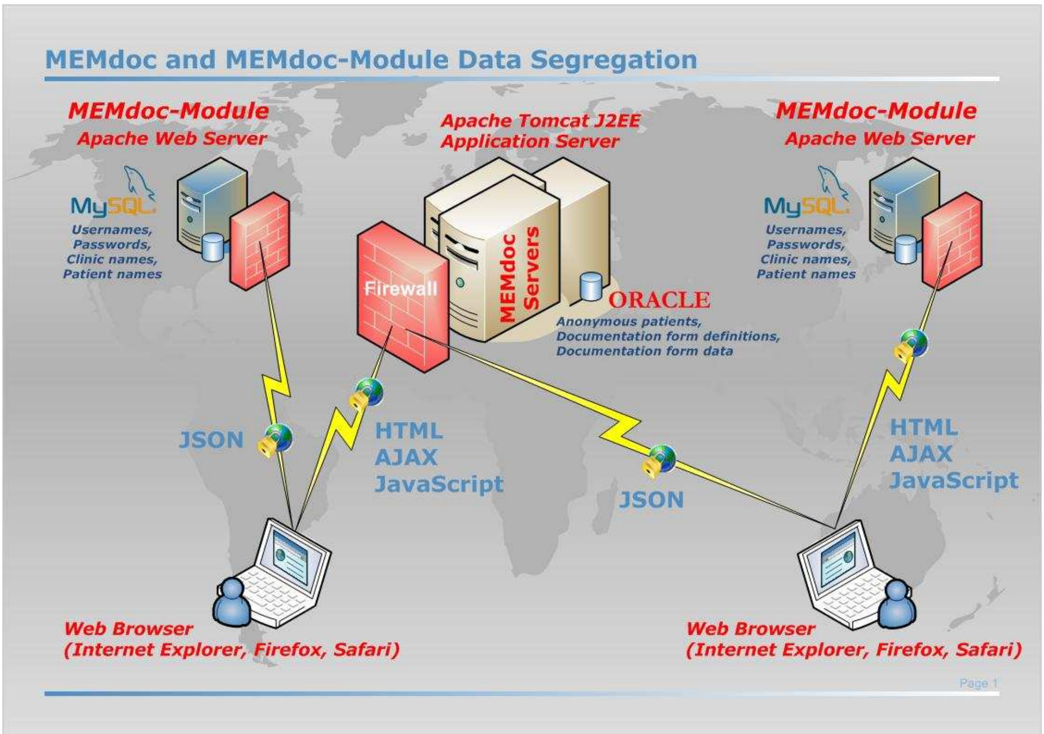


Fig. 37: Overview of the Spine Tango participating clinics according to their country of origin with case

SECURITY

The model of the MEMdoc and MEMdoc-Module system is designed around the principle of data separation. The MEMdoc central server, housed at the MEMcenter in Bern, hosts the main application and the central database containing all study definitions and clinical study data. Satellite MEMdoc-Module servers located throughout the world to store all personal data about users, institutions and patients. At the core of the system is an innovative and patent-pending architecture in which the web browser of the client is used as a hub to seamlessly segregate and integrate the data between the MEMdoc-Module and the MEMdoc central server. This design provides tightly integrated communication between the servers while increasing the security and privacy of both systems. This has been accomplished using a light weight JSON server and incorporation of SSL encryption on each module. Flexible data sharing options have been designed to restrict or expand data access to suit individual needs. Finally, data consistency is controlled through systematic validation of received data and a rollback in case of errors.

Each module server contains 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.



All users from every MEMdoc-Module make their initial connection to the MEMdoc central server that houses the core MEMdoc application as well as all clinical study definitions. The MEMdoc application then recognizes the URL of the connection to determine which MEMdoc-Module to utilize and delivers the appropriate custom module application to the user's web browser. Each time a user requests data the application contacts both the local MEMdoc-Module and MEMdoc central database (Oracle) to seamlessly integrate the data from each for display. Newly entered data is likewise split so that only internal numeric identifiers for the user, patient, clinic, department and module are stored on the MEMdoc central database. All medical data is retrieved from and stored directly to the MEMdoc central server and linked to the module by these internal identifiers. Medical data never passes through the MEMdoc-Module server and is never stored on the MEMdoc-Module server. The birth year and gender of each patient are the only pieces of personal information stored on the MEMdoc central data for performing pooled statistics.

The physical and network security of all the MEMdoc servers is maintained by IEFM (Institute for Evaluative Research in Medicine) at the MEM Research Center. This includes the MEMdoc central (web) server and the MEMdoc database server. 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). Web security is controlled by a DigiCert certified SSL web server certificate with 256-bit encryption. Each server is continuously monitored to log all connections and to detect any suspicious activity. Additionally, any modules that are hosted within IEFM fall within the same security parameters.

The following hardware is recommended for a MEMdoc-Module:

· Midrange Tower- or 19” Rack server
· CPU Intel Quad Core, Xeon or AMD Opteron
· RAM > 2 GB
· Hardware RAID 1 or 5
· Linux (Debian 5)

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AVAILABLE QUESTIONNAIRES

Table 5: Available questionnaires in the SSE Spine Tango registry (01.01.2010)

Forms used in the SSE Spine Tango registry 01.01.2010		implemented	in process	mandatory	multilingual	online available: english	online available: german	online available: french	online available: italian	online available: spanish	OMR paper forms: english	OMR paper forms: german	OMR paper forms: french	OMR paper forms: italian	OMR paper forms: spanish	OMR paper forms: portugese	OMR paper forms: danish
SSE SPINE TANGO	Surgery 2006	✓			✓	✓					✓	✓	✓	✓	✓		
SSE SPINE TANGO	Surgery staged 2006	✓			✓	✓					✓	✓	✓	IP	✓		
SSE SPINE TANGO	Follow-up 2006	✓			✓	✓					✓	✓	✓	IP	✓		
SSE SPINE TANGO	conservative 2009	✓			✓	✓	✓				✓	✓					
SSE SPINE TANGO	COMI patient assessment neck	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
SSE SPINE TANGO	COMI patient assessment back	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
SSE SPINE TANGO	Oswestry 2.1	✓			✓	✓	✓	✓	✓		✓	✓	✓		✓		
SSE SPINE TANGO	SRS-22 Scoliosis Patient Questionnaire	✓			✓	✓					✓	✓					
SSE SPINE TANGO	EuroQol EQ-5D	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SSE SPINE TANGO	SF-36 Health Survey	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

IP = in process

PUBLICATIONS

Papers in peer reviewed journals

Grob D, Porchet F, Kleinstück FS, Lattig F, Jeszenszky D, Luca A, Mutter U, Mannion AF. A comparison of outcomes of cervical disc arthroplasty and fusion in everyday clinical practice: surgical and methodological aspects. Eur Spine J. 2010 Feb;19(2):297-306. Epub 2009 Oct 31.

Grob D, Bartanusz V, Jeszenszky D, Kleinstück FS, Lattig F, O'Riordan D, Mannion AF. A prospective, cohort study comparing translaminar screw fixation with transforaminal lumbar interbody fusion and pedicle screw fixation for fusion of the degenerative lumbar spine. J Bone Joint Surg Br. 2009 Oct;91(10):1347-53.

Röder C, Staub L, Dietrich D, Zweig T, Melloh M, Aebi M. Benchmarking with Spine Tango: potentials and pitfalls. Eur Spine J. 2009 Aug;18 Suppl 3:305-11.

Grob D, Mannion AF. The patient's perspective on complications after spine surgery. Eur Spine J. 2009 Aug;18 Suppl 3:380-5.

Lattig F, Grob D, Kleinstueck FS, Porchet F, Jeszenszky D, Bartanusz V, O'Riordan D, Mannion AF. Ratings of global outcome at the first post-operative assessment after spinal surgery: how often do the surgeon and patient agree? Eur Spine J. 2009 Aug;18 Suppl 3:386-94. Epub 2009 May 22.

Zweig T, Mannion AF, Grob D, Melloh M, Munting E, Tuschel A, Aebi M, Röder C. How to Tango: a manual for implementing Spine Tango. Eur Spine J. 2009 Aug;18 Suppl 3:312-20. Epub 2009 Jun 28. Review.

Porchet F, Bartanusz V, Kleinstueck FS, Lattig F, Jeszenszky D, Grob D, Mannion AF. Microdiscectomy compared with standard discectomy: an old problem revisited with new outcome measures within the framework of a spine surgical registry. Eur Spine J. 2009 Aug;18 Suppl 3:360-6. Epub 2009 Mar 3. Review.

Kleinstück FS, Grob D, Lattig F, Bartanusz V, Porchet F, Jeszenszky D, O'Riordan D, Mannion AF. The influence of preoperative back pain on the outcome of lumbar decompression surgery. Spine (Phila Pa 1976). 2009 May 15;34(11):1198-203.

Oral presentations

Zweig T, Aghayev E, Melloh M, Sobottke R, Aebi M, Roeder C. Comparison of physician based vs patient based outcome after posterior lumbar fusion, EuroSpine 2009, Warsaw, Poland, 21-24 October 2009

Melloh M, Zweig T, Aghayev E, Röder C, Theis JC. Evaluative comparison of physician-based vs. patient-based outcomes in posterior lumbar fusion. NZOA Annual Scientific Meeting, Wellington, 18-21 October 2009

Zweig T, Aebi M, Aghayev E, Domanja S, Melloh M, Röder C, Predictors of dural tears in posterior spinal fusion in the lumbar spine - an analysis based on data of spine tango EFORT, 10th Congress, Vienna, Austria, 3-6 June 2009

Aghayev E, Zweig T, Aebi M, Aghayev E, Melloh M, Staub L, Röder C, Evaluative comparison of patient based versus physician based outcome in posterior lumbar fusion - an analysis based on the "Spine Tango" registry. EFORT, 10th Congress, Vienna, Austria, 3-6 June 2009

Sobottke R, Csecsei G, Delank K, Eysel P, Aghayev E, Zweig T, Röder C, How risky is spinal surgery in the elderly? International Society for the Study of the Lumbar Spine (ISSLS) 36th Annual Meeting, Miami/Florida, USA, 4-8 May 2009

Zweig T, Aghayev E, Melloh M, Sobottke R, Galbusera F, Aebi M, Röder C, An analysis of the surgical treatment of lumbar spinal stenosis (LSS) – Procedures, outcomes, influential factors. International Society for the Study of the Lumbar Spine (ISSLS) 36th Annual Meeting, Miami/Florida, USA, 4-8 May 2009

Zweig T, Aghayev E, Melloh M, Röder C, Physician- vs. patient based outcome after posterior lumbar fusion in the Spine Tango Registry. International Society for the Study of the Lumbar Spine (ISSLS) 36th Annual Meeting, Miami/Florida, USA, 4-8 May 2009

Zweig T, Medical registries: A tool for clinical evaluation for medical devices, focus on Spine Tango. Medical Device Clinical Congress (MDCC), Köln, 29 April 2009

Melloh M, Aghayev E, Staub LP, Zweig T, Röder C, Barz T, Rieger PS, Theis JC. Predictive Factors of Physician-based Outcomes after Posterior Lumbar Fusion. . Spine Society of Australia Annual Scientific Meeting, Brisbane, 17 – 19 April 2009

Melloh M, Staub LP, Röder C, Aghayev E, Zweig T, Barz T, Rieger PS, Theis JC. Co-variates of Length of Hospital Stay in Posterior Spinal Fusion. . Spine Society of Australia Annual Scientific Meeting, Brisbane, 17 – 19 April 2009

Zweig T, Aebi M. Wirbelsäulenregister der EuroSpine, Nutzen und Chancen für die Wirbelsäulen- und Alterschirurgie. 3. Alterstrauma-Kongress der DGU, Münster, 3-4 April 2009

Posters

Zweig T, Aghayev E, Melloh, Domanja S, Sobottke R, Aebi M, Roeder C. Predictors of dura lesions in posterior fusion of the lumbar spine - a study based on data of international „Spine Tango“ registry, EuroSpine 2009, Warsaw, Poland, 21-24 October 2009

Melloh M, Staub L, Röder C, Aghayev E, Zweig T, Theis JC, Challenges in establishing an international spine registry. International Society for the Study of the Lumbar Spine (ISSLS) 36th Annual Meeting, Miami/Florida, USA, 4-8 May 2009

Melloh M, Aghayev E, Staub L, Zweig T, Barz T, Theiss JC, Predictive factors for in physician based outcomes after posterior lumbar fusion.International Society for the Study of the Lumbar Spine (ISSLS) 36th Annual Meeting, Miami/Florida, USA, 4-8 May 2009

Melloh M, Staub L, Röder C, Aghayev E, Zweig T, Theis JC, Benchmarking in spinal surgery. International Society for the Study of the Lumbar Spine (ISSLS) 36th Annual Meeting, Miami/Florida, USA, 4-8 May 2009

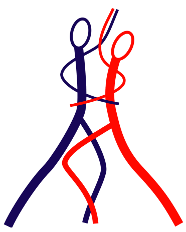
Melloh M, Staub L, Röder C, Aghayev E, Zweig T, Theis JC, Co-variates of length of hospital stay in posterior spinal fusion. International Society for the Study of the Lumbar Spine (ISSLS) 36th Annual Meeting, Miami/Florida, USA, 4-8 May 2009

Zweig T, Aghayev E, Melloh M, Sobottke R, Galbusera F, Aebi M, Röder C, Predictors of dura lesions in posterior lumbar fusion – A study based on data of the International Spine Tango Registry. International Society for the Study of the Lumbar Spine (ISSLS) 36th Annual Meeting, Miami/Florida, USA, 4-8 May 2009

Awards

Best Poster Award

Sobottke R, Zweig T, Röder C, Eysel P; Delank KS, Aghayev E
Wirbelsäulenchirurgie im Alter: Wie riskant ist die operative Therapie der lumbalen Spinalkanalstenose (LSS) in Abhängigkeit vom Patientenalter.
[Spine Surgery in elderly patients: how risky is the operative treatment of lumbar spinal stenosis depending on patient age.]
4th Annual Conference, DWG (German Spine Society), Munich 2009



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