



International Report 2020

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Statements about Spine Tango

“Spine Tango is the ideal format to collect standardised diagnostic & treatment data as well as PROMs on both conservative and surgical treatments on a national level. Physicians’ forms are sufficiently detailed and COMI is concise enough to enhance response rates. The Spine Society of Belgium has been carefully considering all available options and unanimously decided to collaborate with Spine Tango for its joint-ventures with Belgian Health Authorities.”

Bart Depreitere, Spine Society Belgium (SSBe), Belgium

“We have used Spine Tango since 2011 with over 12,000 patients on the system. We have published research, measured our own performance and changed our practice due to the information we have gained from the system. It is a vital part of our everyday practice.”

Tim Pigott, Consultant Neurosurgeon, Walton Centre for Neurosurgery, United Kingdom

“As an international registry that captures conservative and surgical treatments, EUROSPINE Spine Tango offers unique research opportunities like multinational data and a large network of global and interprofessional collaborations in Europe and beyond.”

Professor M. Nordin, Departments of Orthopedic Surgery and Environmental Medicine, New York University, New York, NY, USA

“Having used Spine Tango and patient outcomes routinely in our secondary care osteopathy service, I believe that the benefits for conservative clinicians are clear. For individual practitioners, the ability to review and analyse your performance in easy steps makes a huge difference to clinical life. Registry participation offers a chance to refine practice based on evidence and performance, and grow as an evidence-based clinician. Once established on the registry, you can publish outcome research and engage with a wider community of spinal clinicians, which makes for a more rewarding career. Yes, there is a commitment in paperwork, but it is less than expected and the benefits are greater.”

Samuel Morris, Calderdale Royal Hospital, MSK department, United Kingdom

“Partnering with Spine Tango is an imperative pillar of our strategy to support clinical research, quality assurance of our spinal treatments and their safety and efficacy outcomes. Access to the registry data via the Spine Tango Subscriber Services provides Medtronic with systematic, aggregated Real World Data on our implants and therapies. This data is used for Research & Development, Quality Assurance and Regulatory Compliance, so our users continue to have access to the highest quality spinal implants available.”

Floris van de Geijn, Director Medical Communication, Medtronic, Tolochenaz, Switzerland

“To qualify and re-qualify for certification, EUROSPINE Surgical Spine Centres of Excellence (SSCoE) are required to monitor their treatment quality by collecting and evaluating pre- and postoperative data on all spine patients. EUROSPINE’s Spine Tango offers powerful generic and customisable registry tools for the documentation and evaluation of spinal treatments. Besides clinical data on surgical interventions, data on implants, clinical scores, patient-reported outcome measures, follow-ups as well as non-surgical treatments can be registered and analysed.”

Thomas R. Blattert, Member of the Surgical Spine Centres of Excellence, Schwarzbach Orthopedic Clinic, Germany

**Everard Munting**

President of
EUROSPINE

**Marco Teli**

President-elect of EUROSPINE
Chair of the ST Registry

Foreword by the President and the Chair of Spine Tango

Despite the enormous challenge presented by the COVID-19 pandemic for both hospitals and for EUROSPINE, the EUROSPINE Spine Tango registry project has continued to expand.

Although growth in case registration was lower in 2020 than in previous years, the Spine Tango team took the opportunity to further develop the registry platform and intensify relationships with hospitals and some national spine societies. Among other features, an in-depth structured implant library was developed using implant specifications from implant manufacturing companies. In 2020 the library included about 167,000 implant specifications from 24 manufactures, who make regular updates. The library allows for the structured documentation of implants based on the article number level, which is required in SIRIS Spine for example.

In 2020 EUROSPINE signed an agreement with the SIRIS Foundation in Switzerland to implement and operate the Swiss Implant Registry for Spine (SIRIS Spine) starting from January 2021.

As always, all our endeavours aim at improving spine treatments for patients and offering high-quality service to our users.

Many thanks to all Spine Tango users and supporters. We are delighted with your interest in Spine Tango and hope you enjoy reading this report.

Kind regards,

Everard Munting and Marco Teli

About Spine Tango

Spine Tango is an international web-based registry that collects and evaluates data on treatment effectiveness, patient safety and best practice for quality assurance and research on all surgical and non-surgical treatments.

The registry was created and is being continually developed to serve individual users and hospitals, groups of hospitals and national societies.

The idea for an international registry to capture data on spine treatments was proposed almost two decades ago in response to a growing demand for outcome measurement and quality assurance. In 2000, development of Spine Tango began under the auspices of EUROSPINE, the Spine Society of Europe and in collaboration with the Institute for Evaluative Research in Orthopaedic Surgery at the University of Bern, Switzerland. The registry has been hosted by NEC Software Solutions (formerly Northgate Public Services) in the UK since May 2019.

The Spine Tango registry was first launched in 2002, while the first web-based version went online in 2004. Today it has grown and expanded with almost 800,000 forms captured by the end of 2020.

Key benefits

Key benefits for individual users

- **Common European approach for registering spinal treatments** (conservative and surgical) as well as **spinal implants** in a structured way to foster a common language (data structure, terms, definitions, outcome measures, implant library, etc.)
- **Personal research database**
- **Access to a variety of valuable functions including** User, hospital and national benchmarking reports comparing data to pooled data from other hospitals as evidence of performance and quality assurance tool
- **Access to the registry data for research purposes** (almost 800,000 forms from five continents) and **participation in an international research network**
- **Access to numerous outcome instruments in various languages** (COMI, ODI, NDI, EQ3D, SF36, SRS30, etc.)
- **Modern and continually-evolving registry platform including:**
 - Compliance with the European General Data Protection Regulation (GDPR)
 - Highest standards in information security (ISO27001)

- **Registry platform as a web-application** (the registry may be accessed from any location via the internet)
- **Electronic outcome collection using ePROMs** (automatically sends forms to patients via email and/or smartphone on a scheduled basis with no administrative burden for hospitals) (*coming soon*)

Key benefits for national spine societies

- **Access to available data, know-how and infrastructure incl. European Implant Library** (make it your own)
- **Data aggregation to produce statistically robust analyses sooner** (e.g. for national surveillance purposes)
- **'Develop once and share' platform features** (access to the European Spine Registry generic services including all existing and future tools and functions at no additional cost)
- **Flexible modular approach** that allows societies to tailor the registry to their individual needs while ensuring a minimal set of common data
- **Ability to create a personalised spine registry** based on Spine Tango content and infrastructure (optional)
- **Quality assurance and research tool** as well as proof of performance
- **Opportunity to develop national best practice standards** in spine care
- **Continuous collaborative development of the registry approach** in accordance with society needs
- **A full voting position on the Spine Tango Task Force** (Spine Tango steering committee responsible for further development of the registry)
- **Innovative financial model** based on subscription funding from industry reporting that applies certain income to reduce registry costs, registration costs and/or yield shared profits, after fixed costs have been covered

Governance

The Spine Tango Task Force (STTF) acts as the registry steering committee and as an advisory group for clinical and methodological questions related to improvements in data collection, development of new forms, reports and all new and ongoing research projects of participating clinics.

The objectives of the internationally-composed STTF are to develop and implement strategies to further develop the registry, increase its value for the users and stakeholders: patients, insurance companies, MedTech companies and health authorities.

STTF members: Marco Teli (chair, surgery, UK), Emin Aghayev (registries, CH), Bart Depreitere (surgery, BE), Jiří Dvořák (sport medicine, CH), Josef G. Grohs (surgery, AT), Beat Leimbacher (delegate of ExCom, CH), Andrea Luca (surgery, IT), Samuel Morris (osteopathy, UK), and Pedro dos Santos (surgery, PT).

Data host

Technical and analytical support for the registry is provided by a dedicated team at NEC Software Solutions (formerly Northgate Public Services). The project team is based in the UK and provides expertise in registry development, methodology, epidemiological analysis, statistics, and data linkage.

NEC has been the technology and implementation service provider for the National Joint Registry (NJR) in the UK for over 16 years. The NJR is probably the largest orthopaedics registry in the world with more than 3 million patient records. NPS hosts a number of other medical registries such as the National Vascular Registry (NVR) and the Indian Joint Registry (IJR) – all of which collect data to help clinicians, regulators and industry deliver evidence-based treatments for patients.

For more information, please visit:

- [News: Evidence to improve outcomes for spinal patients with EUROSPINE registry](#)
- [Registries for the best healthcare insight - NEC Software Solutions \(necsws.com\)](#)

How to join

The Spine Tango registry is a EUROSPINE member benefit. If you are not currently a member and your department or hospital does not have a EUROSPINE member on staff, you may still use Spine Tango provided that you or one staff member of your department or hospital become a EUROSPINE member within one year of your Spine Tango registration.

Individual users and hospitals can join the registry in 3 steps:

Step 1



Step 2



Step 3



Download and complete the Hospital/User Registration Form	Download, read, complete and sign the General Terms & Conditions (see help for assistance).	Send both completed forms to spinetango@eurospine.org .
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Once EUROSPINE has received your registration request, EUROSPINE will approve it and provide you (and your colleagues in the case of multiple users) with your account details. Then you can start using the registry.

For more information, please visit [EUROSPINE - New Users](#)

Participation

The underlying principles for participation in the Spine Tango registry are described in the [General Terms & Conditions](#).

Information security and data protection

The secure and confidential handling of patient and clinical data is a fundamental part of the Spine Tango service provided by NEC. In delivering services to their clients, NEC manages confidential data relating to millions of citizens and patients in the UK and overseas. This not only involves technical solutions to protect the data, but also robust processes and procedures surrounding data access, based upon legislation and industry best practice. Given the nature of the data processed by NPS, security and governance are afforded the highest priority.

Spine Tango is compliant with the *European General Data Protection Regulation* (GDPR) with the highest standards in information security applied (ISO27001).

In certain instances, personal health information may be provided to organisations in some countries where the GDPR does not apply. Where this is the case, EUROSPINE will enter into individual data-sharing agreements based on the requirements of the GDPR. This will ensure that the data are afforded the necessary levels of information governance and security.

Furthermore, it is the responsibility of the individual or organisation (the 'Participant') to ensure that all necessary agreements are obtained from their institution (and can be made available on demand) in respect to any local laws, guidelines, 'best practice', ethical requirements, etc. In particular, the Participant is explicitly responsible for obtaining and documenting each patient's informed consent for the use of the patient's data for the purposes of research and quality assurance in the registry. The participant must also warrant that all necessary consents and approvals required for processing all information relating to an identified or identifiable natural person to be processed under this agreement have been obtained.

Upon registration of a new patient, the registry platform requires a confirmation that informed patient consent has been obtained.

For more detailed information on data security please read the [FAQs on Data Protection and Information Security](#).

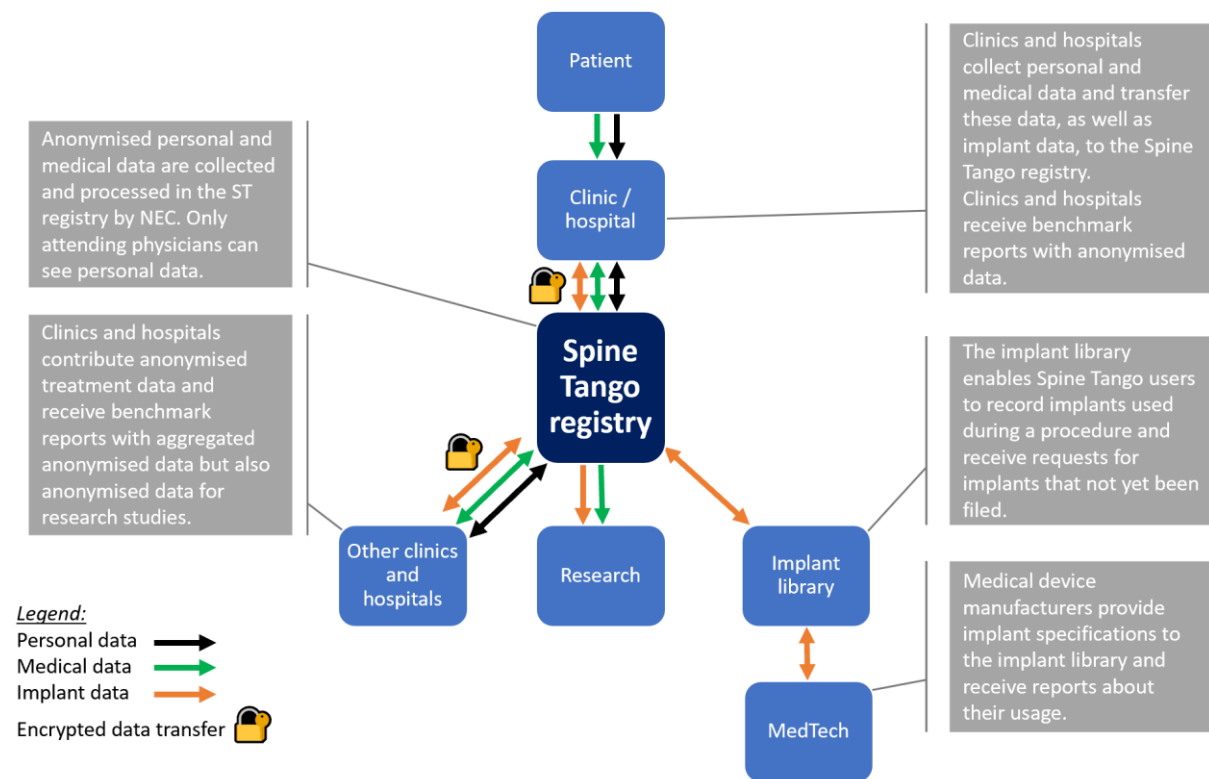


Figure 1. Spine Tango data streams

Data capture

The goal of generating a comprehensive database is achieved by collecting both patient data and clinical / physicians' data.

The four following data entry methods (or combinations thereof) are currently used for Spine Tango (Figure 2):

1. Online data entry via web-interface (no software installation required)
2. OMR (Optical Mark Reader) scanner-assisted entry of paper forms on-site
3. Data push using web-service
4. Online implant data capture with handheld barcode scanner

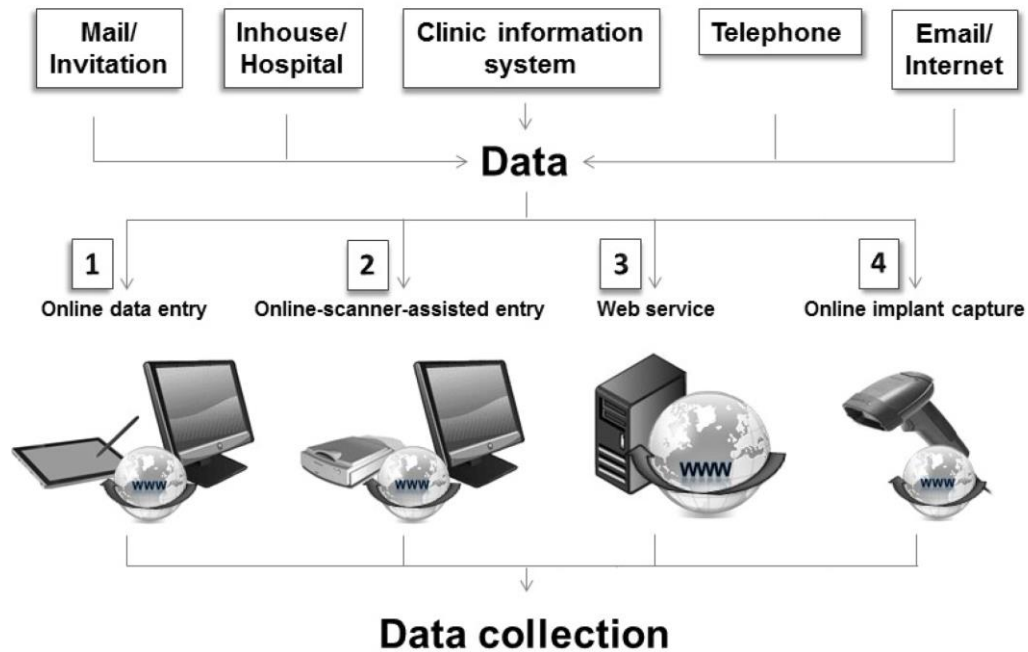


Figure 2. Methods of data entry

A complete case

The result of a surgical intervention should be recorded when the outcome can be considered definitive. In most spinal surgery cases, assessment three months after surgery predicts outcomes well at later follow-up¹. Figure 3 and Figure 4 illustrate the steps leading to the capture of a fully-documented treatment².

¹ Mannion AF, Porchet F, Kleinstück FS, Lattig F, Jeszenszky D, Bartanusz V, et al. The quality of spine surgery from the patient's perspective. Part 1: The Core Outcome Measures Index in clinical practice. *Eur Spine J.* 2009;18(Suppl 3):S367–73.

² Zweig T, Mannion AF, Grob D, Melloh M, Munting E, Tuschel A, et al. How to Tango: A manual for implementing Spine Tango. *Eur Spine J.* 2009;18(Suppl 3):312–20.

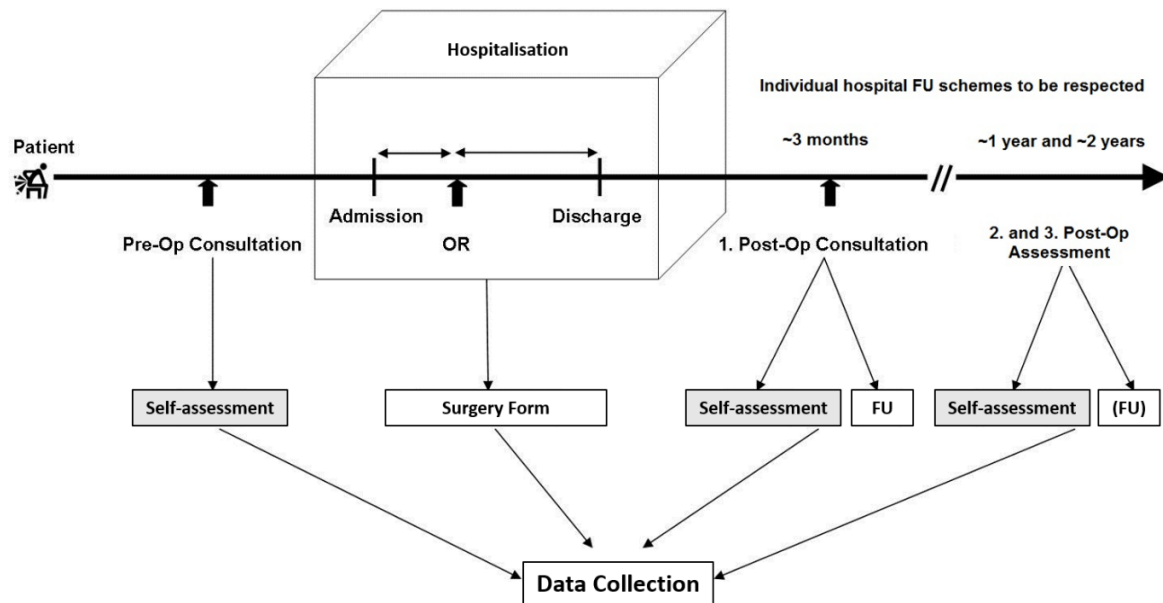


Figure 3. Timing of data collection for a complete Spine Tango case

EUROSPINE encourages one physician- and one patient-reported follow-up in the first year after surgery, ideally more than three months after surgery. Further patient follow-ups at one and two years after surgery are strongly encouraged with documentation of complications possible at any time during the postoperative period.

Patient reported outcomes captured both pre- and post-operatively with the Spine Tango Patient Self-Assessment form, which includes the Core Outcome Measure Index (COMI) for neck and back problems, have become an essential part of the Spine Tango documentation³.

³ Mannion AF, Elfering A, Staerkle R, Junge A, Grob D, Semmer NK, et al. Outcome assessment in low back pain: how low can you go? *Eur Spine J.* 2005;14:1014–26.



How does it work?



Figure 4. Process of data collection from the spinal surgery to the reports

Data analysis and research

Spine Tango supports meaningful data analysis to further scientific knowledge and improve the quality of patient care. To this end, all users have access to epidemiological and statistical expertise from our data host, NEC. The utility of the data is evident in the high-quality scientific output and increasing interest in using Spine Tango as a model for national spine registries.

Scientific articles using Spine Tango data are increasingly being published and cited in peer-reviewed literature and recognised as outstanding contributions to scientific knowledge⁴. Various statistical methods are utilised in Spine Tango research, including descriptive analyses for data exploration, parametric and non-parametric tests, uni- and multi-variate linear and logistic regression analyses^{5,6,7,8,9} and inverse probability of treatment weighting using the propensity score¹⁰. Comparative effectiveness of research studies across different spine registries have also been published^{11,12}. In addition to clinical studies, a multitude of reliability

⁴ Staub LP, Ryser C, Röder C, Mannion AF, Jarvik JG, Aebi M, et al. Total disc arthroplasty versus anterior cervical interbody fusion: use of the Spine Tango registry to supplement the evidence from randomized control trials. *Spine J.* 2016;16(2):136–45.

⁵ Aghayev E, Mannion AF, Fekete TF, Janssen S, Goodwin K, Zwahlen M, Berlemann U, Lorenz T; [Risk Factors for Negative Global Treatment Outcomes in Lumbar Spinal Stenosis Surgery: A Mixed Effects Model Analysis of Data from an International Spine Registry](#). *Spine Tango Registry Group. World Neurosurg.* 2020 Apr;136:e270-e283. doi: 10.1016/j.wneu.2019.12.147. Epub 2019 Dec 31. PMID: 31899404

⁶ Sobottke R, Aghayev E, Röder C, Peer E, Delank SK, Zweig T. Predictors of surgical, general and follow-up complications in lumbar spinal stenosis relative to patient age as emerged from the Spine Tango Registry. *Eur Spine J.* 2012;21:411–7.

⁷ Kleinstueck FS, Fekete T, Jeszenszky D, Mannion AF, Grob D, Lattig F, et al. The outcome of decompression surgery for lumbar herniated disc is influenced by the level of concomitant preoperative low back pain. *Eur Spine J.* 2011;20:1166–73.

⁸ Lattig F, Grob D, Kleinstueck FS, Porchet F, Dezsö A, Ae J, et al. 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;18(Suppl 3):S386–94.

⁹ Kleinstück FS, Grob D, Lattig F, Bartanusz V, Porchet F, Jeszenszky D, et al. The Influence of Preoperative Back Pain on the Outcome of Lumbar Decompression Surgery. *Spine (Phila Pa 1976).* 2009;3434(11):1198–203.

¹⁰ Munting E, Röder C, Sobottke R, Dietrich D, Aghayev E. Patient outcomes after laminotomy, hemilaminectomy, laminectomy and laminectomy with instrumented fusion for spinal canal stenosis: a propensity score-based study from the Spine Tango registry. *Eur Spine J.* 2015;24:358–68.

¹¹ Burkhardt J-K, Mannion AF, Marbacher S, Dolp PA, Fekete TF, Jeszenszky D, et al. A comparative effectiveness study of patient-rated and radiographic outcome after 2 types of decompression with fusion for spondylosic myelopathy: anterior cervical discectomy versus corpectomy. *Neurosurg Focus.* 2013;35(1):E4.

¹² Aghayev E, Henning J, Munting E, Diel P, Moulin P, Röder @bullet C. Comparative effectiveness research across two spine registries On behalf of the SWISSpine and Spine Tango Registry groups. *Eur Spine J.* 2012;21:1640–7.

and validation studies of the patient Core Outcome Measures Index (COMI) in different languages have been performed and published in the last decade^{13,14,15,16,17,18,19,20}.

The comprehensive assessment of the performance of an implant or treatment in spine surgery requires the evaluation of several outcomes as well as an adjustment for the case mix. Depending on the scientific question, outcomes of interest could include those related to safety (complications and reoperations), the patient's perspective (pain, satisfaction, quality of life), the physician's follow-up (achievement of treatment goals), or an economic perspective (length of hospital stay, surgery time). Variables used to adjust for case mix can include age, sex, BMI, duration of symptoms, previous treatment, and any co-morbidity. Clearly formulated goals for data analysis defined in a detailed study plan, and a consensus among registry stakeholders are all required.

Advances and Achievements in 2020

Cooperation with Swiss Implant Registry (SIRIS) Foundation

In May 2020, EUROSPINE signed an agreement with the SIRIS Foundation in Switzerland to implement and operate the Swiss Implant Registry for Spine (SIRIS Spine) starting from January 2021. The SIRIS Spine registry shall comprise spine operation registration from approximately 100 hospitals. Preliminary work on the implementation of SIRIS Spine began in summer 2020 and culminated in a three-month pilot in autumn 2020. The results of the pilot were successful and the national roll-out was prepared for January 2021.

¹³ Genevay S, Marty M, Courvoisier DS, Foltz V, Mahieu G, Demoulin C, et al. Validity of the French version of the Core Outcome Measures Index for low back pain patients: a prospective cohort study. *Eur spine J.* 2014;23(10):2097–104.

¹⁴ Storheim K, Brox JI, Løchting I, Werner EL, Grotle M. Cross-cultural adaptation and validation of the Norwegian version of the Core Outcome Measures Index for low back pain. *Eur spine J.* 2012;21(12):2539–49.

¹⁵ Miekisiak G, Banach M, Kiwic G, Kubaszewski L, Kaczmarczyk J, Sulewski A, et al. Reliability and validity of the Polish version of the Core Outcome Measures Index for the neck. *Eur spine J.* 2014;23(4):898–903.

¹⁶ Qiao J, Zhu F, Zhu Z, Xu L, Wang B, Yu Y, et al. Validation of the Simplified Chinese version of the Core Outcome Measures Index (COMI). *Eur spine J.* 2013;22(12):2821–6.

¹⁷ Klemencsics I, Lazary A, Valasek T, Szoverfi Z, Bozsodi A, Eltes P, et al. Cross-cultural adaptation and validation of the Hungarian version of the Core Outcome Measures Index for the back (COMI Back). *Eur spine J.* 2016;25(1):257–64.

¹⁸ Nakhostin Ansari N, Naghdi S, Eskandari Z, Salsabili N, Kordi R, Hasson S. Reliability and validity of the Persian adaptation of the Core Outcome Measure Index in patients with chronic low back pain. *J Orthop Sci.* 2016;21(6):723–6.

¹⁹ Van Lerbeirghe J, Van Lerbeirghe J, Van Schaeybroeck P, Robijn H, Rasschaert R, Sys J, Parlevliet T, Hallaert G, Van Wambeke P, Depreitere B. Cross-cultural adaptation and validation of the Dutch version of the core outcome measures index for low back pain. *Eur Spine J.* 2018 Jan;27(1):76-82.

²⁰ Mohammadi HR, Azimi P, Zali A, Montazeri A. An outcome measure of functionality and pain in patients with low back disorder: A validation study of the Iranian version of Core Outcome Measures Index. *Asian J Neurosurg.* 2015;10(1):46.

Cooperation with national spine societies in other countries

Collaboration with national spine societies in other countries was pursued but did not progress due to the COVID epidemic and related uncertainties. Nevertheless, ideas for possible future collaborations were fostered and formed.

Cooperation with hospitals

The number of active hospitals remained unchanged through 2020 despite the pandemic, although the number of registered cases decreased in comparison to previous years. This was at least partially due to COVID measures such as surgery stops.

A new generation of detailed hospital benchmarking reports was developed in collaboration with various stakeholders (view [sample report](#)). These reports include information on hospitals' activity, describe preoperative characteristics of treated patients and undertaken treatments, and evaluate the treatment outcome including complication types, revisions, and several patient-reported outcomes (PRO).

New medical device regulation and cooperation with the MedTech industry

The Spine Tango implant library was launched in spring 2020. Medical device manufacturers upload and regularly update their implant specifications. Spine Tango implant registration is currently based on structured implant data. Registry users can either scan the barcode or QR-code of the implant, search for the implant in the library or add the implant from their favourites list.

Collecting structured implant data by article number opens new opportunities for accurate evaluation and reporting of implant-based surgery. Furthermore, the accurate registration of implants enables registries to disseminate information to hospitals on potential recalls of medical devices.

Several medical device manufacturers have subscribed for regular implant reporting. Soon anonymised implant data should also be made available to manufacturers via a separate online platform.

For more information for medical device manufacturers can be found on our dedicated site [EUROSPINE - Implant Supplier](#).

Additional features

In June 2020, a Spine Tango user survey was conducted. Based on feedback, user requirements and wishes have been prioritised and are now being implemented step-by-step by the registry's host, NEC Software Solutions (formerly known as Northgate Public Services).

User support and user documents

Multiple video tutorials were created and are available on our webpage to facilitate usage of the registry [EUROSPINE - Video Tutorials](#).

Information portfolios for [hospitals](#) and [implant manufacturers](#) have been developed.

[FAQs on data protection and information security](#) have been produced.

An [information leaflet for patients](#), which informs patients about the Spine Tango registry has been published.

Today, Spine Tango has more presence than ever on LinkedIn, YouTube, and Twitter to reach a broader audience.

Acknowledgment

We wish to thank Spine Tango registry participants for their unwavering support in spite of the pandemic. It is these contributions that make it possible to reflect the daily practice of spinal care through quality assurance and research.

Outlook

In 2021 we plan to implement a multilingual platform (more accessible to those who are not native English speakers), newly-developed online statistics and electronic PROMs.

We also plan to assess the surgery form and dictionary of terms for any needed updates.

Selected statistics

World map

The Spine Tango registry and the majority of participating hospitals are based in Europe. Hospitals from many other countries are also currently participating (or have previously participated) in the registry, as illustrated in the following three maps. This international distribution demonstrates the need for a common language in the registration of spinal treatments and their outcomes, which in turn will lead to the standardisation of spinal care and improved efficiency.

All following maps are based on registry data collected up to 31 December 2020.

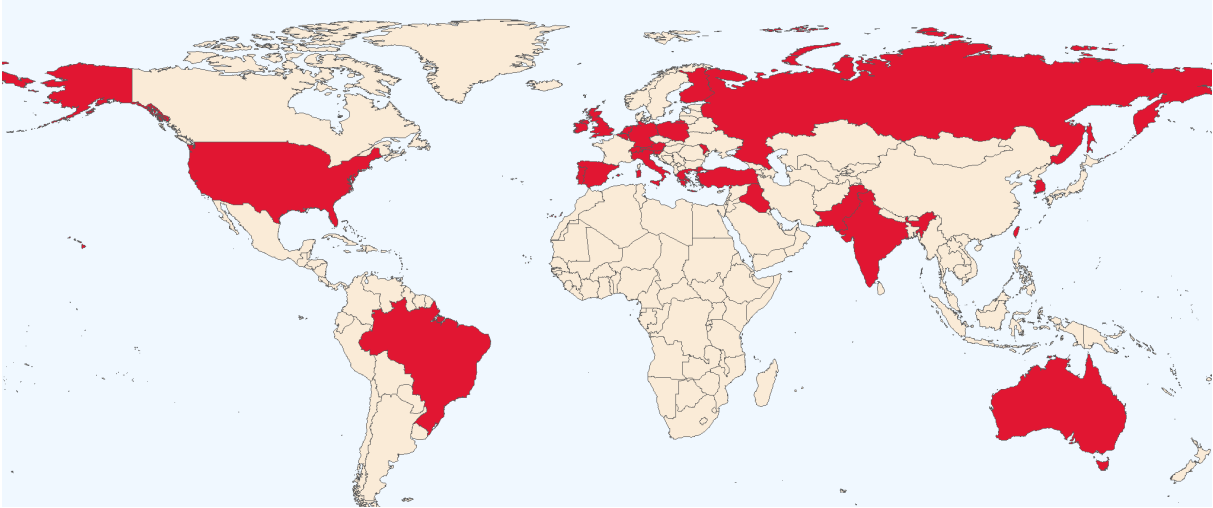


Figure 5. Global overview of origin of participants in the registry

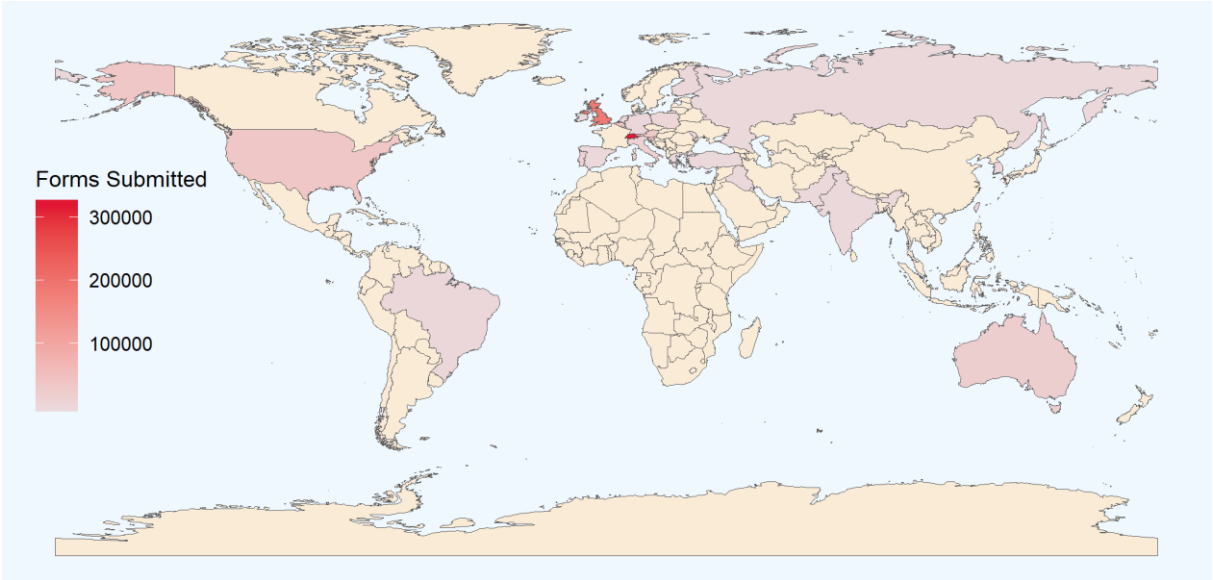


Figure 6. Global overview of submitted forms by country

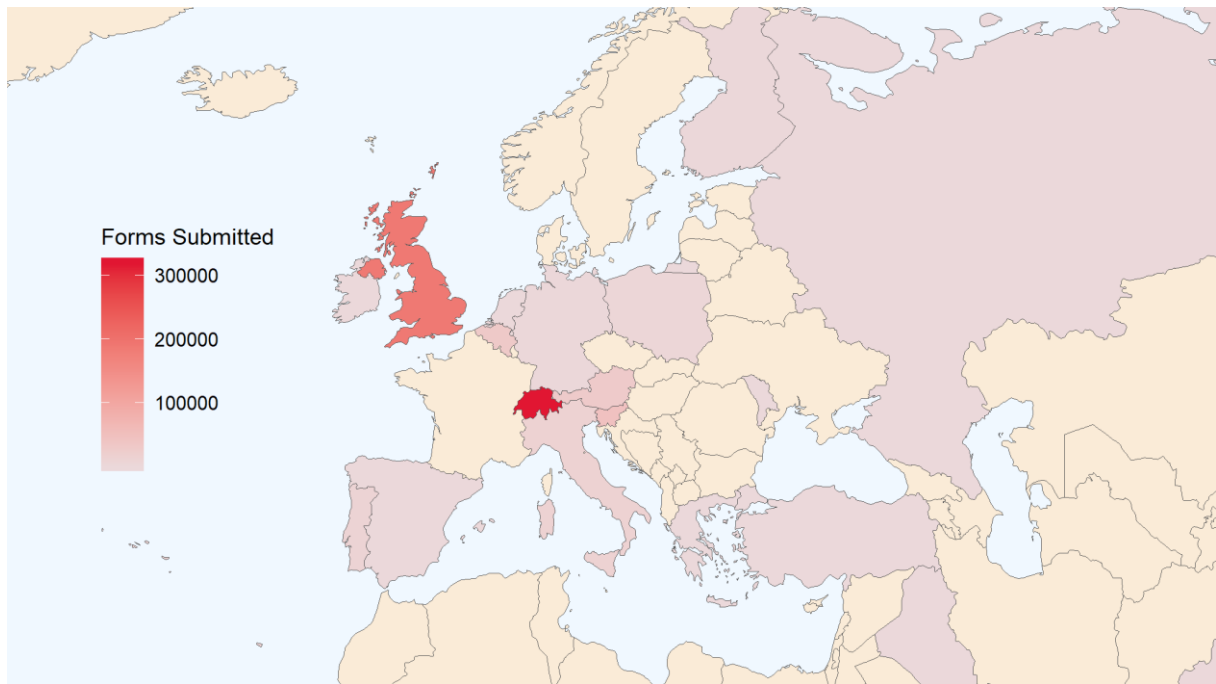


Figure 7. Overview of submitted forms of the participants by country in Europe

Overall data growth by form type

The number of documented forms in the registry increases each year. The number of forms in 2020 was visibly lower than in previous years. This is probably related to the change of host and the transition phase, which led to the loss of some participants.

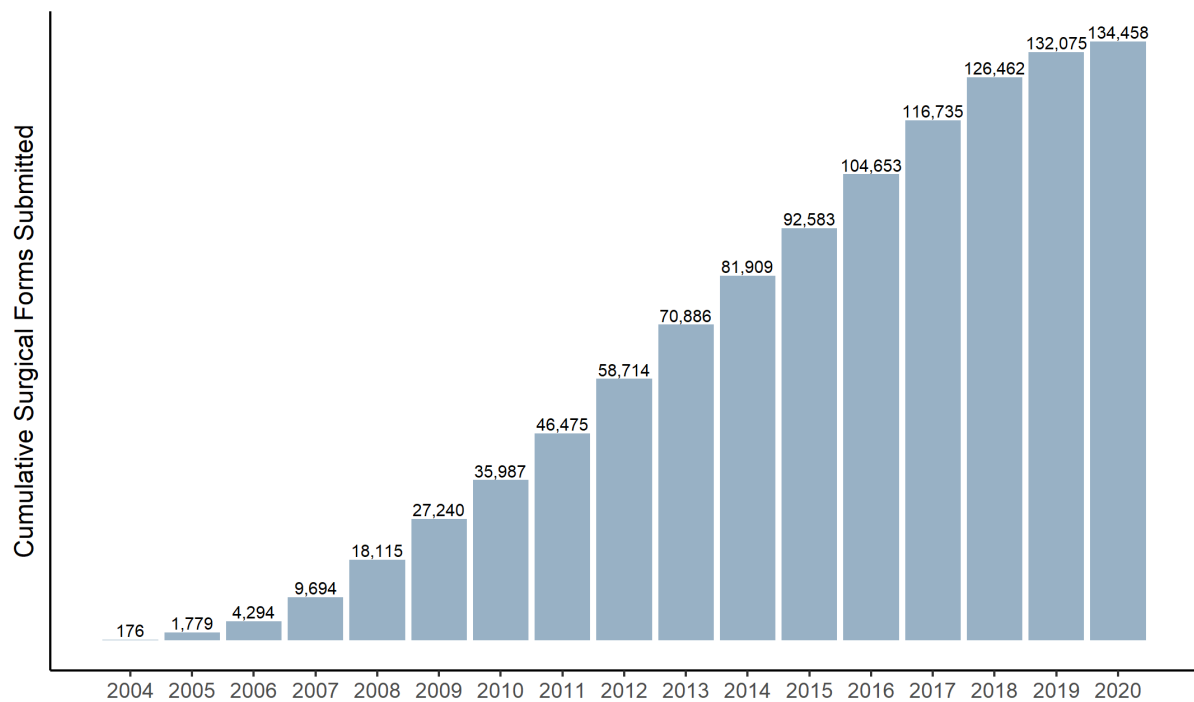


Figure 8. Surgery forms

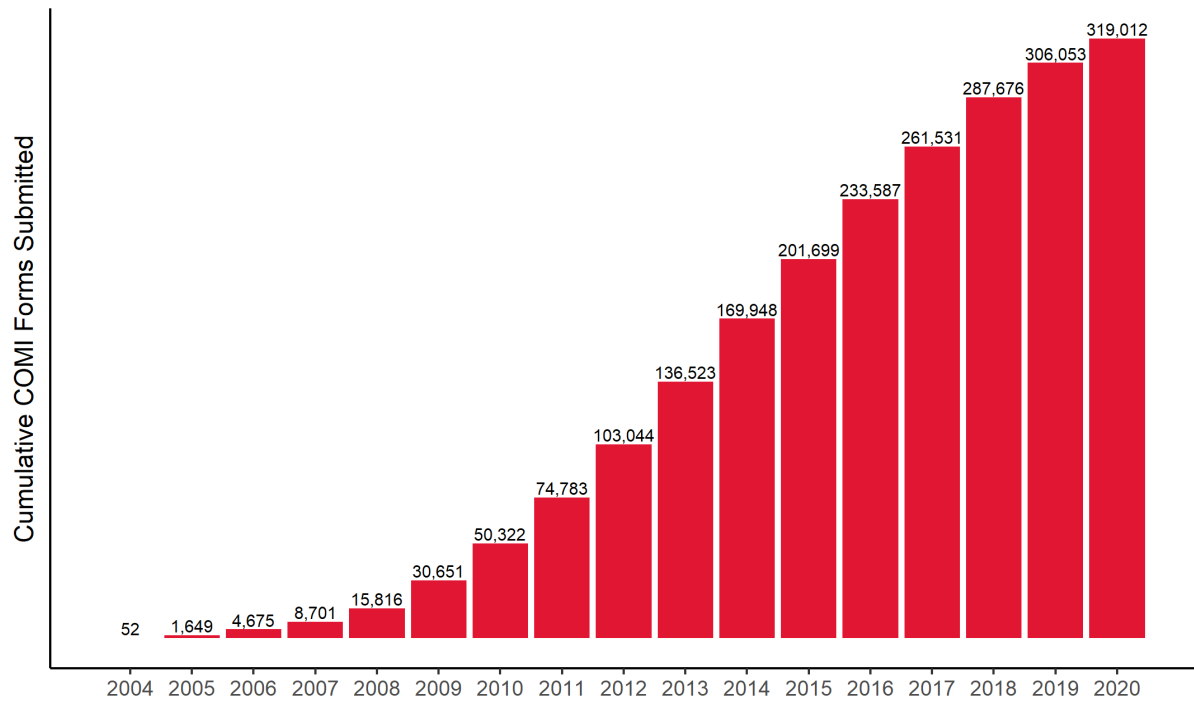


Figure 9. COMI forms (both surgery and conservative COMI)

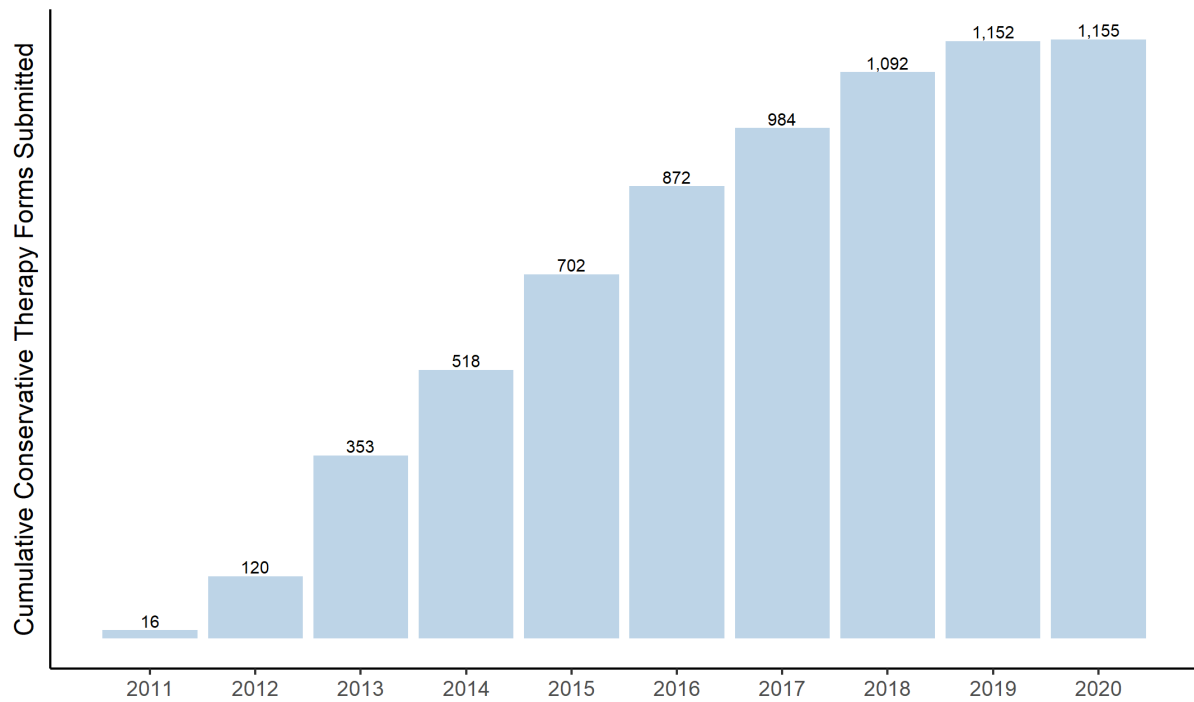


Figure 10. Conservative treatment forms

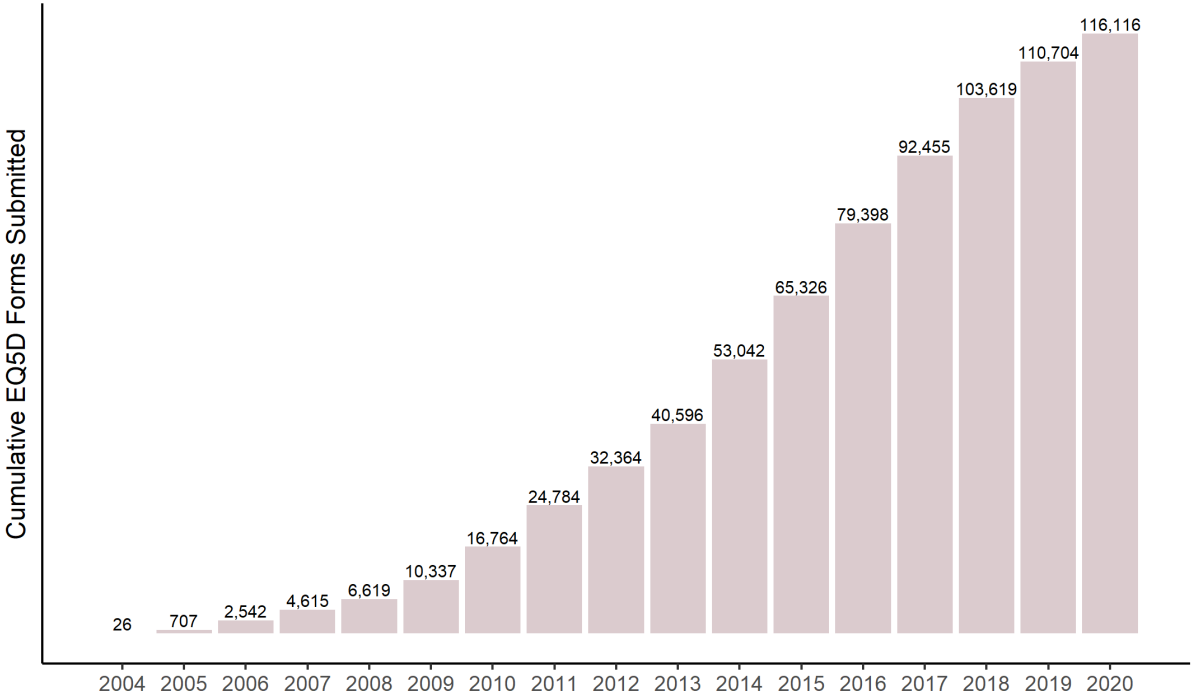


Figure 11. EQ3D forms

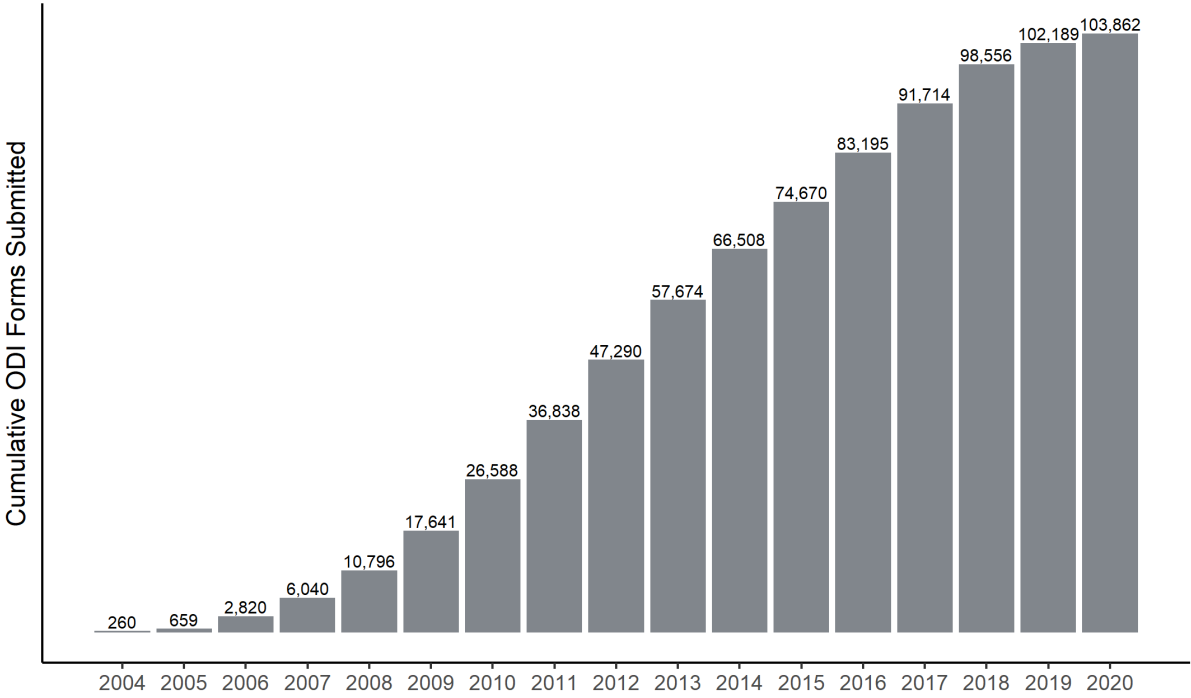


Figure 12. ODI forms

Patient characteristics

The figures presented in the following tables are based on 134,458 surgeries documented up to 31 December 2020.

Characteristic	Subgroup	Percent
Age	< 40	15.6%
	40-50	17.2%
	50-60	20.6%
	60-80	39.8%
	> 80	6.8%
Gender	Male	48.4%
	Female	51.6%
Smoker*	No	48.2%
	Yes	34.5%
	Unknown	17.3%
BMI*	< 20	4.4%
	20-25	26.8%
	26-30	33.2%
	31-35	15.9%
	> 35	6.5%
	Unknown	13.1%
Number of Segments Affected	1	60.6%
	2	26.2%
	3	6.9%
	> 3	6.1%
	Unknown	0.2%
Number of Previous Surgeries (any level)	0	70.9%
	1	18.9%
	> 1	9.7%
	Unknown	0.5%

Table 1. Patient characteristics overview (*these characteristics were documented in the 2011 and 2017 forms only and their proportions are calculated based on the number of those 85,207 forms.)

Main pathologies

The most frequent pathology seen in the registry is degenerative disease with around four fifth of the surgeries, followed by repeat surgery with 4.1% and other less frequent pathologies.

Pathology	Percent	Count
Degenerative Disease	77.4%	104,096
Repeat Surgery	4.1%	5,491
Fracture / Trauma	3.7%	5,020
Spondylolisthesis (Non-Degenerative)	3.1%	4,192
Non-Degenerative Deformity	2.6%	3,541
Pathological Fracture	2.4%	3,251
Tumour	2.4%	3,222
Failed Surgery	1.5%	1,983
Infection	1.0%	1,300
Inflammation	0.2%	243
Other	1.0%	1,357
Unknown	0.6%	762
TOTAL	100.0%	134,458

Table 2. Main pathologies tabular overview

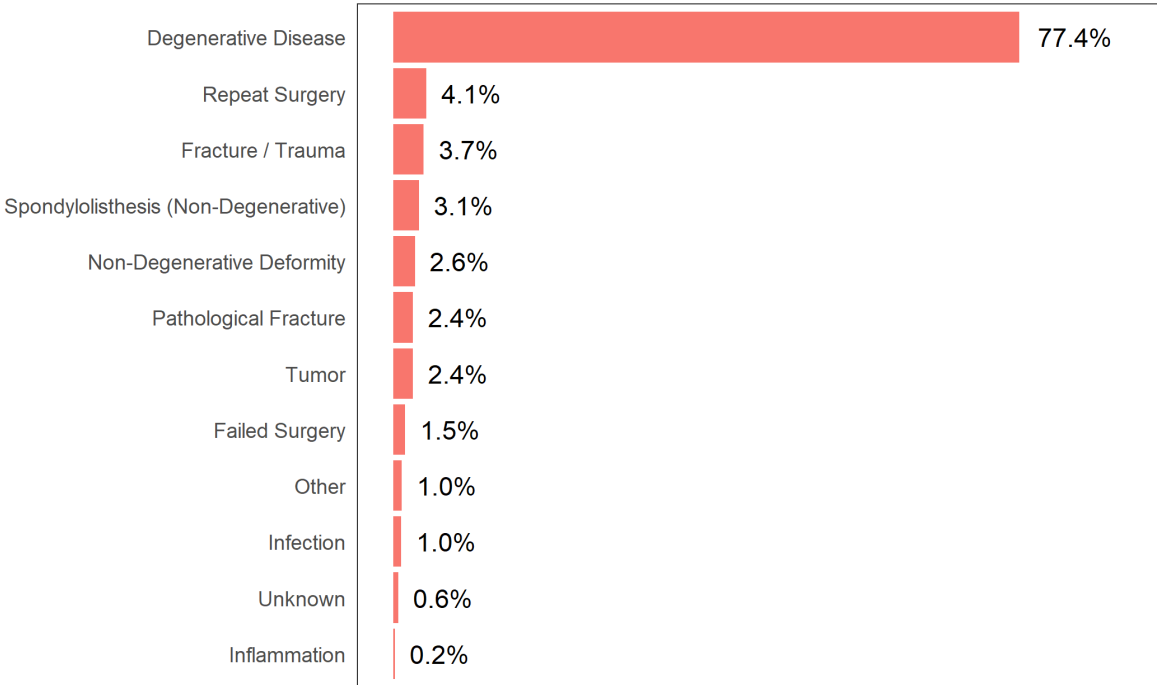


Figure 13. Main pathologies bar chart overview

Regarding the levels of intervention, the majority of the cervical surgeries take place at C5 (6.5%), followed by C6 (4.4%). Thoracic levels are rather rare with Th12 as the most frequent thoracic level at 1.6%. The three most treated levels are L4 (31.3%) followed by L5 (21.4%) and L3 (12.1%).

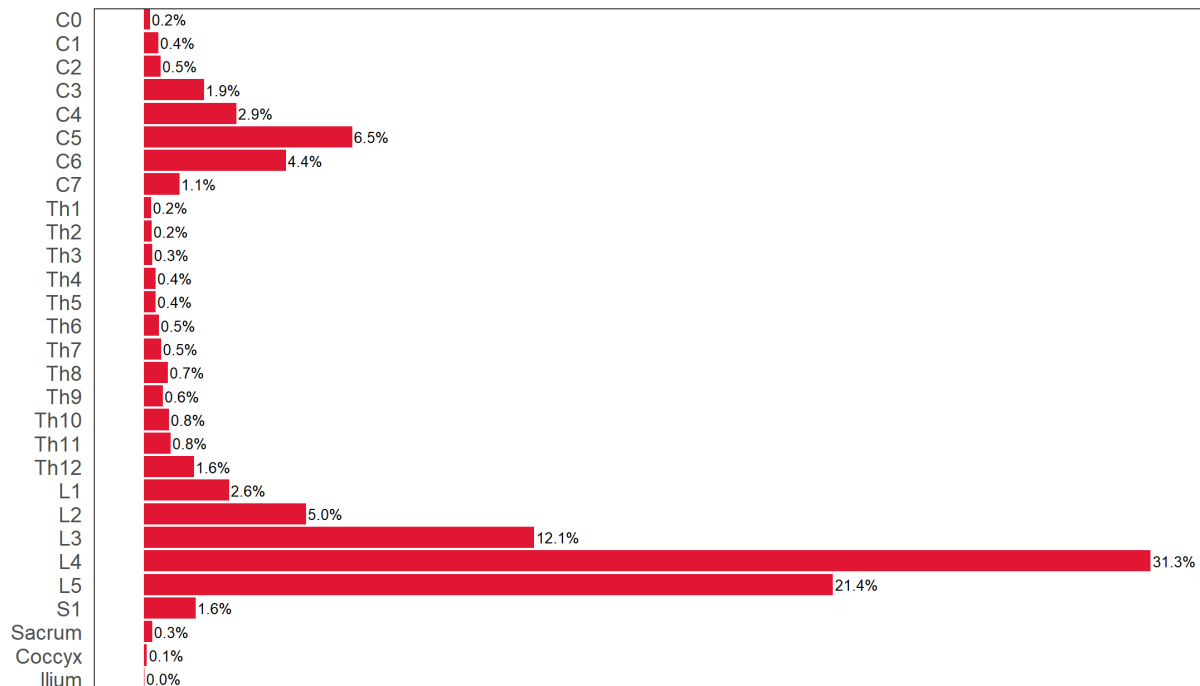


Figure 14. Levels of intervention

Descriptive analysis of selected pathologies

The authors of this annual report elected to describe some key characteristics of patient groups undergoing surgical treatment for one of the two most frequent pathologies: disc herniation and spinal stenosis.

Disc herniation

40.2% of all documented surgeries in Spine Tango (N=54,082) were related to the treatment of disc herniation. The following Table 3 describes characteristics of this patient population.

Patient characteristics

Age		
< 40	22.4%	12,118
40-50	25.7%	13,923
50-60	22.7%	12,299
60-80	26.1%	14,123
> 80	3.0%	1,610
Gender		
Male	52.4%	28,314
Female	47.6%	25,766
Smoker		
No	42.1%	15,567
Yes	14.4%	5,342
Unknown	43.4%	16,065
BMI		
< 20	3.8%	1,165
20-25	27.0%	8,293
26-30	33.3%	9,937
31-35	14.8%	4,234
> 35	6.5%	1,729
Unknown	14.6%	3,930
Number of Segments Affected		
1	76.9%	41,567
2	18.5%	9,995
3	3.3%	1,760
> 3	1.4%	758
Number of Previous Surgeries		
0	78.1%	42,235
1	16.2%	8,788
> 1	5.7%	3,059

Table 3. Patient characteristics disc herniation

Surgical measures

The following Figure 15 demonstrates proportions of key surgical measures over a time period of 16 years between 2005 and 2020. The distribution of the individual surgical measures remained rather stable over this time period with a slight but visible reduction of motion preserving stabilisation in the last seven years.

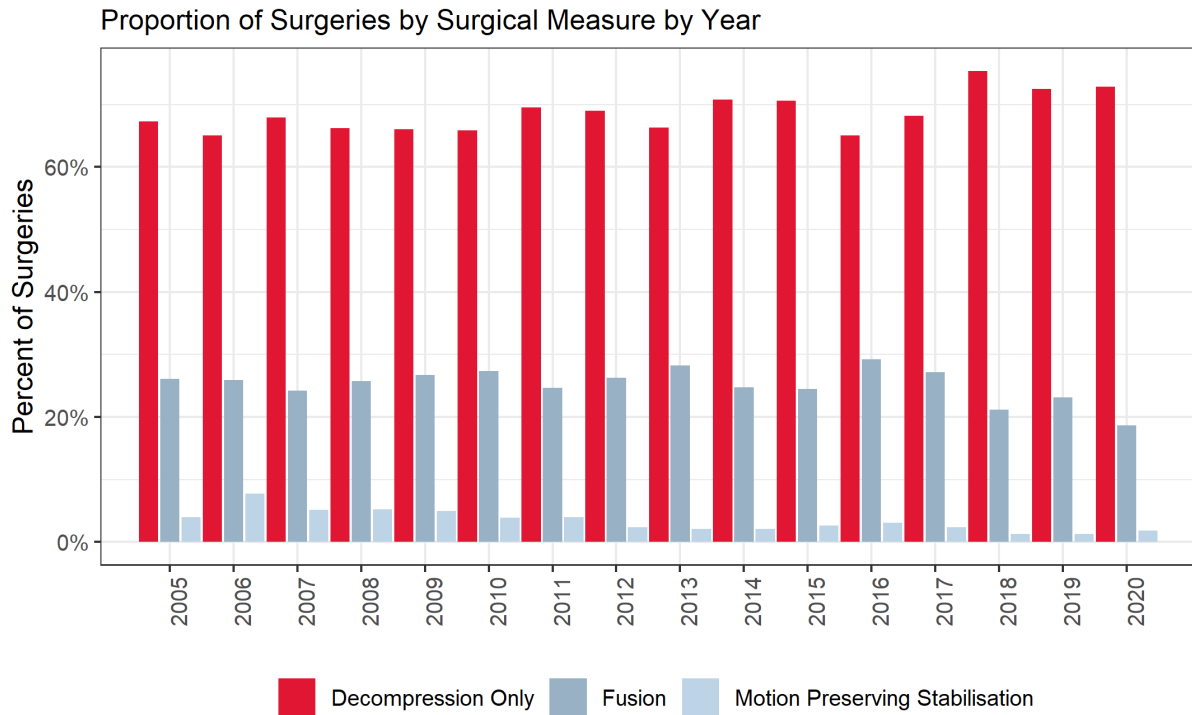


Figure 15. Proportion of surgeries by surgical measure by year

Complications

General complications were rather rare with the leading complication of kidney and urinary tract in 0.25% of the surgeries (Figure 16).

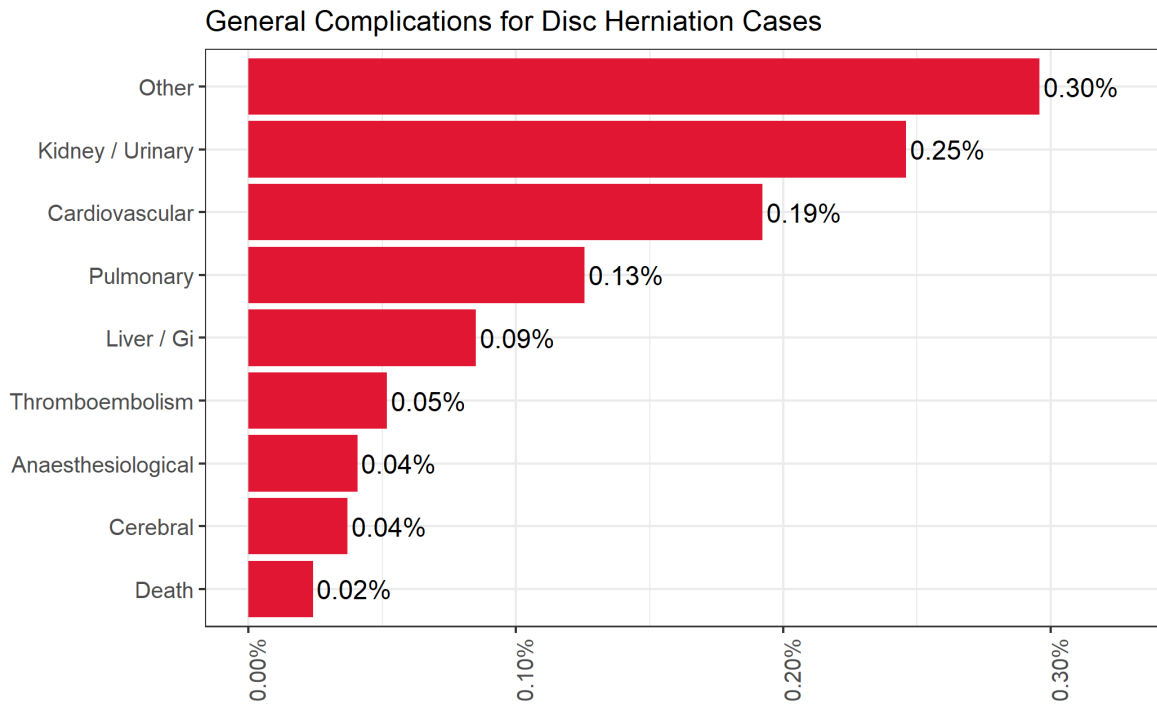


Figure 16. General complications for herniated disc cases

Surgical complications were more frequent with dural lesions documented in 2.83% of the surgeries (Figure 17). The next most frequent complications were neurological with motor dysfunction, radiculopathy and sensory dysfunction in 0.37%, 0.31% and 0.31%, respectively.

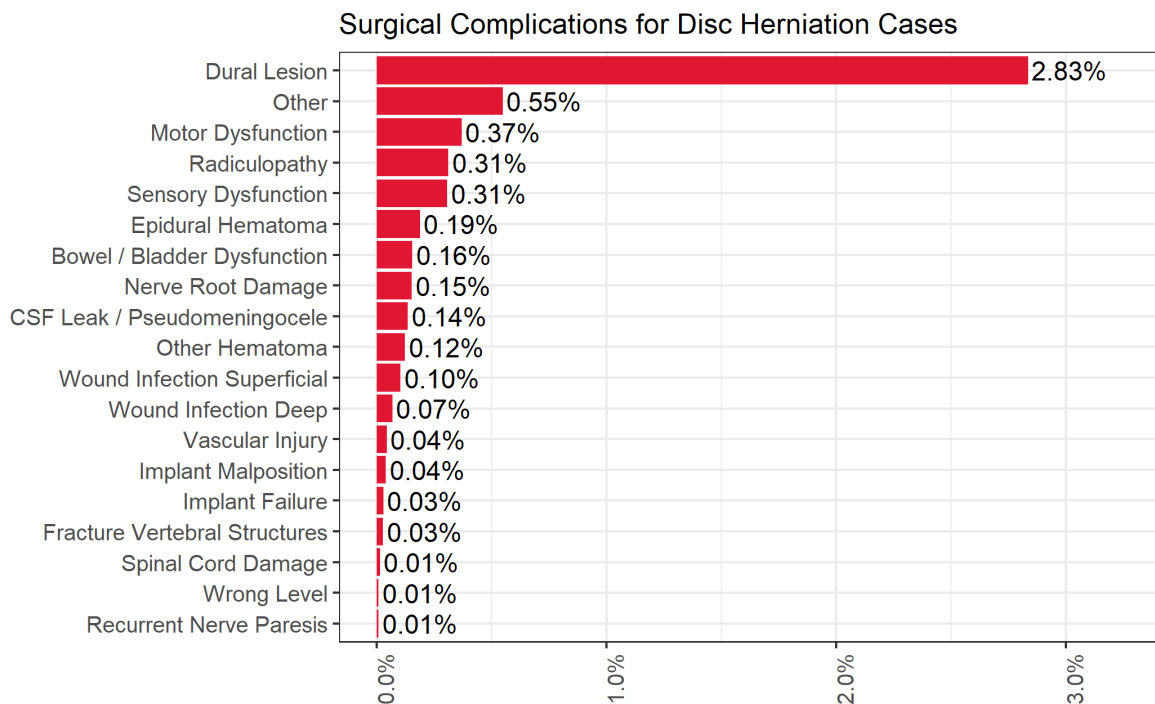


Figure 17. Surgical complications for herniated disc cases

Outcomes - COMI

In 36% of all patients a baseline COMI form and a 3-month postoperative or later COMI form were documented. The following Figure 18 to Figure 20 demonstrates the average preoperative and postoperative axial and peripheral pain levels as well as COMI score with 95% confidence intervals over the last 16 years. The curves were not adjusted by patient characteristics, surgical measures and follow-up interval, which are assumed to be relatively stable. Nevertheless, the figures have a descriptive character only and a conclusive interpretation requires more granular investigations.

Over this time period the preoperative axial pain has steadily increased from about 5 points to 6.5 points, while the postoperative axial pain has steadily increased from 3 to 4 points. This finding of increasing preoperative axial pain points to a stable but steadily improving treatment indication. This is very positive. The increasing postoperative axial pain over the years demonstrates, however, that a better treatment indication does not necessarily result in a better postoperative axial pain level. Nevertheless, a trend for slightly higher pain relief is still seen in the last years.

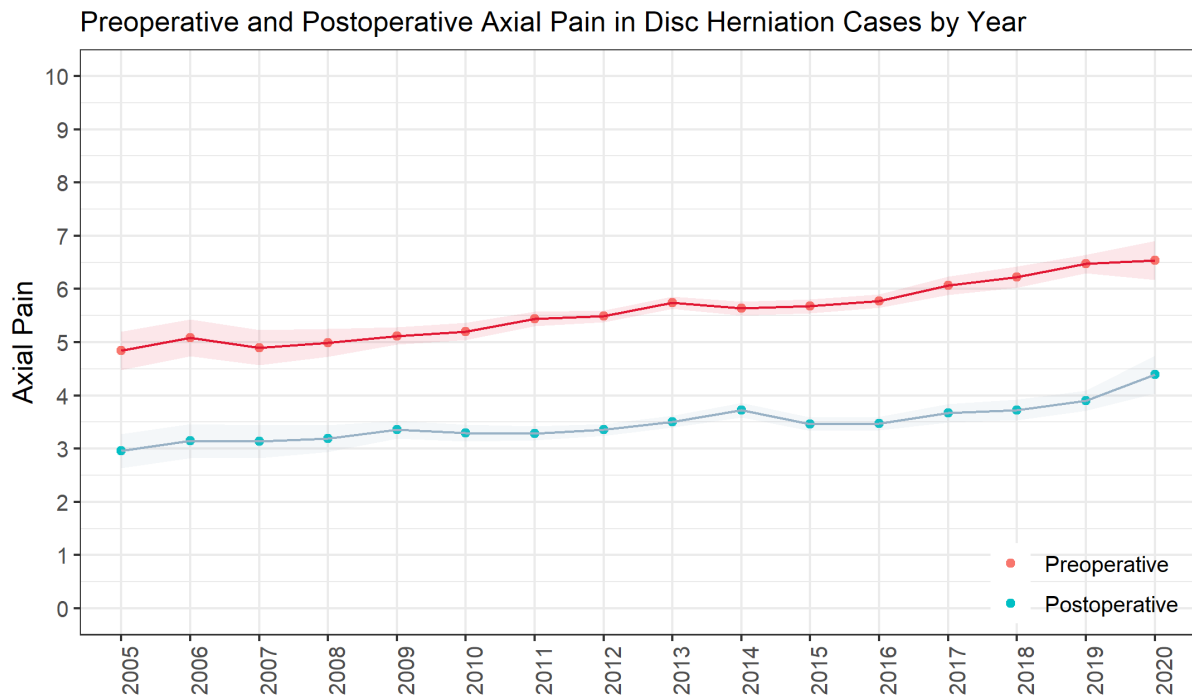


Figure 18. Preoperative and postoperative axial pain in disc herniation cases by year

Over this time period the preoperative peripheral pain has steadily increased from about 6.7 points to 7.6 points, while the postoperative peripheral pain has steadily increased from 2.5 to 4 points. This finding of increasing preoperative peripheral pain points also to a stable but steadily improving treatment indication, which is very positive. The increasing postoperative peripheral pain over the years demonstrates again that a better treatment indication does not necessarily result in a better postoperative peripheral pain level.

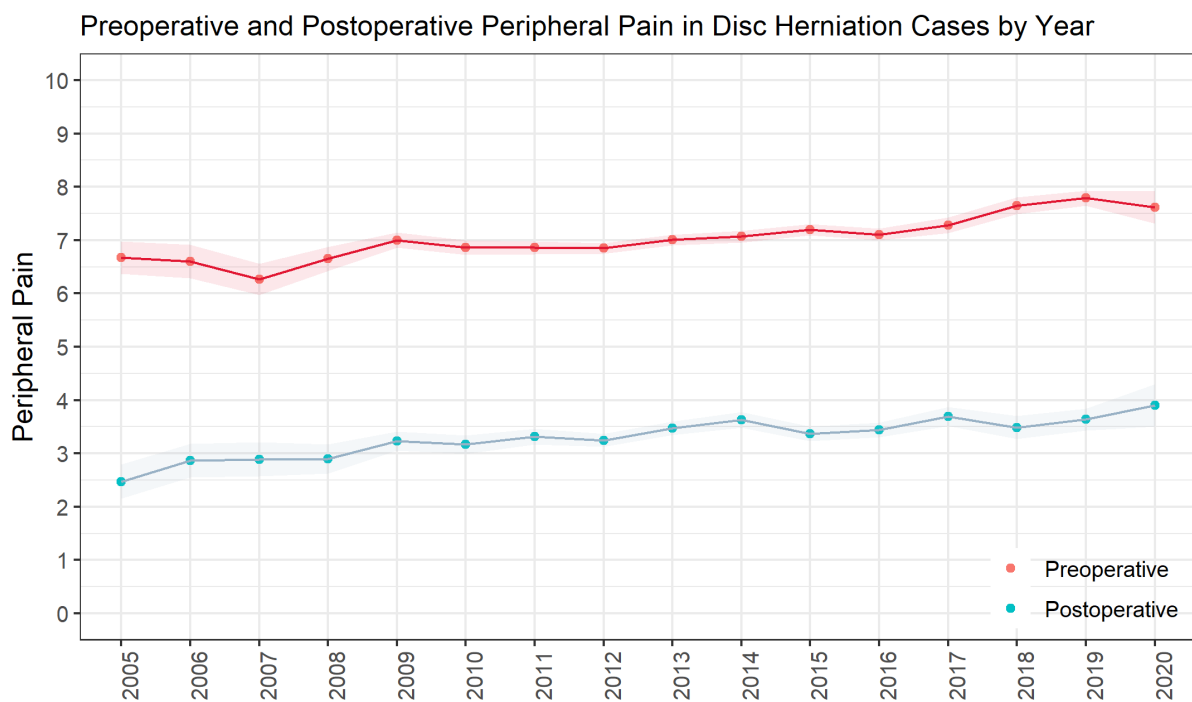


Figure 19. Preoperative peripheral pain in disc herniation cases by year

Over this time period the preoperative pain remained very stable at 8 points, while the postoperative COMI score has steadily increased from 3.5-4 points to 5 points. The increasing postoperative COMI score reflects a higher level of postoperative disability, which is a not favourable finding.

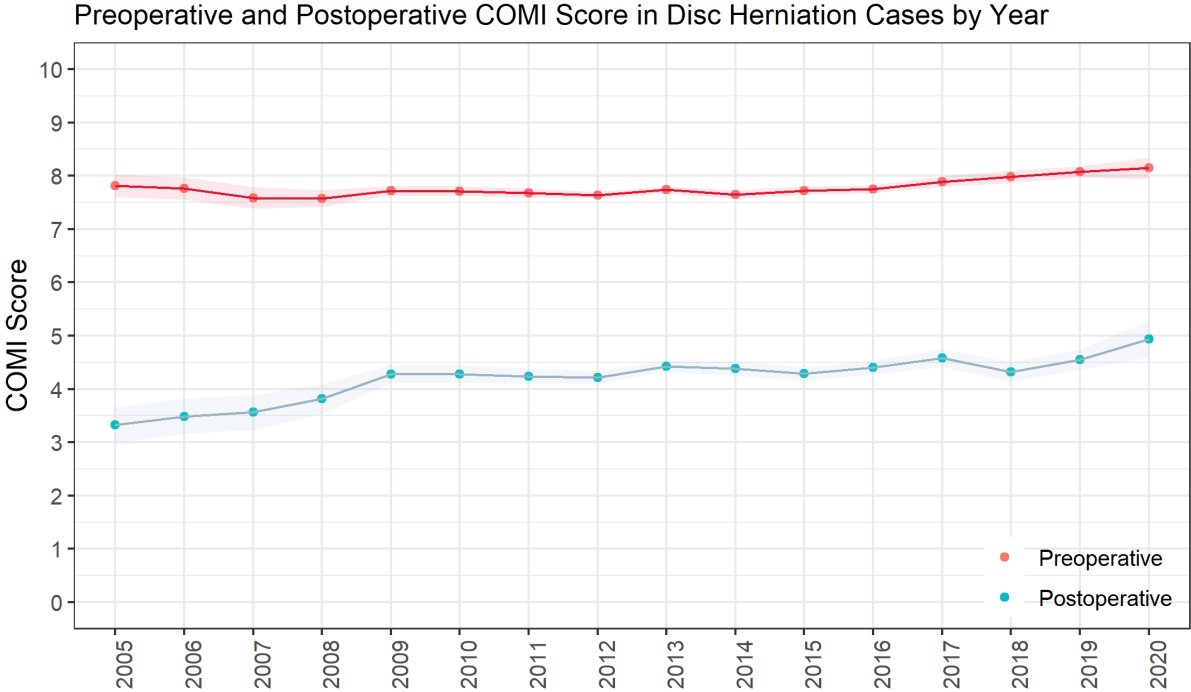


Figure 20. Preoperative and postoperative COMI score in disc herniation cases by year

Spinal stenosis

49.4% of all surgeries documented in Spine Tango (N= 66,427) were related to the treatment of spinal stenosis. The following Table 4 describes characteristics of this patient population.

Patient characteristics

Characteristic	Subgroup	Percent
Age	< 40	4.7%
	40-50	10.5%
	50-60	19.6%
	60-80	55.0%
	> 80	10.2%
Gender	Male	49.4%
	Female	50.6%
Smoker	No	49.2%
	Yes	11.5%
	Unknown	39.3%
BMI	< 20	3.0%
	20-25	22.2%
	26-30	34.1%
	31-35	17.9%
	> 35	7.0%
	Unknown	15.8%
Number of Segments Affected	1	47.8%
	2	35.2%
	3	11.6%
	> 3	5.5%
Number of Previous Surgeries (any level)	0	75.0%
	1	17.6%
	> 1	7.4%

Table 4. Patient characteristics spinal stenosis

Surgical measures

The following Figure 21 demonstrates proportions of key surgical measures over a time period of 16 years between 2005 and 2020. The distribution of individual surgical measures changed over this time period. The proportion of decompression alone has grown from approx. 40% initially to over 70% of all surgeries in the last years. The proportion of instrumented fusion has steadily decreased from approx. 55% in 2005 to approx. 20-25% in the last three years. The proportion of motion preserving stabilisation has remained mostly stable in around 5% of surgeries, but decreased in the last four years.

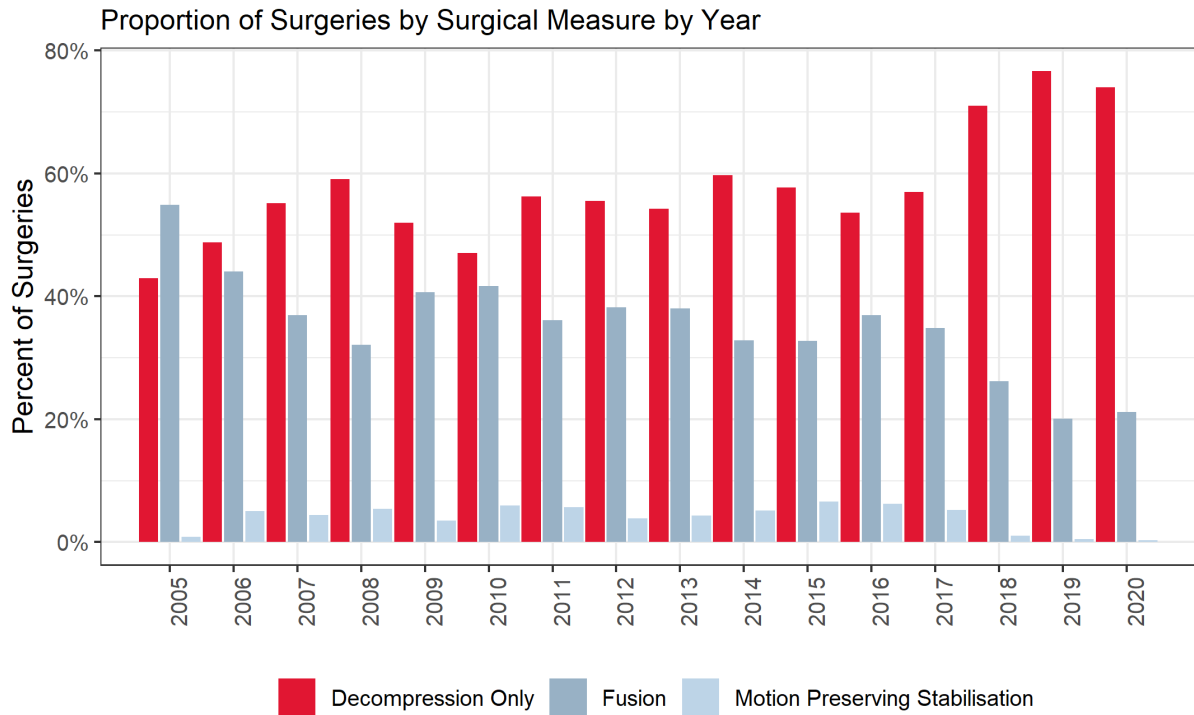


Figure 21. Proportion of surgeries by surgical measures by year

Complications

General complications were rather rare with the leading complication of kidney and urinary tract in 0.63% of the surgeries (Figure 22).

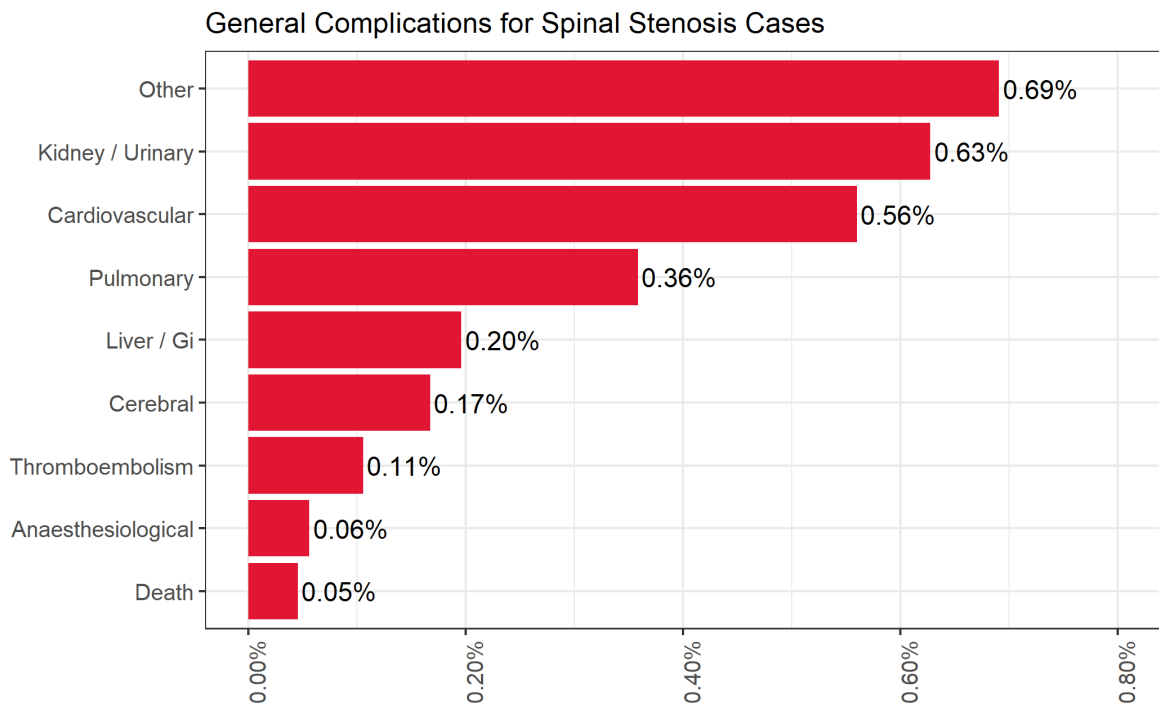


Figure 22. General complications for spinal stenosis cases

Surgical complications were more frequent with dural lesions documented in 5.28% of the surgeries (Figure 23). The next most frequent complications were neurological with motor dysfunction, epidural hematoma, sensory dysfunction and radiculopathy in 0.65%, 0.59%, 0.44% and 0.42%, respectively.

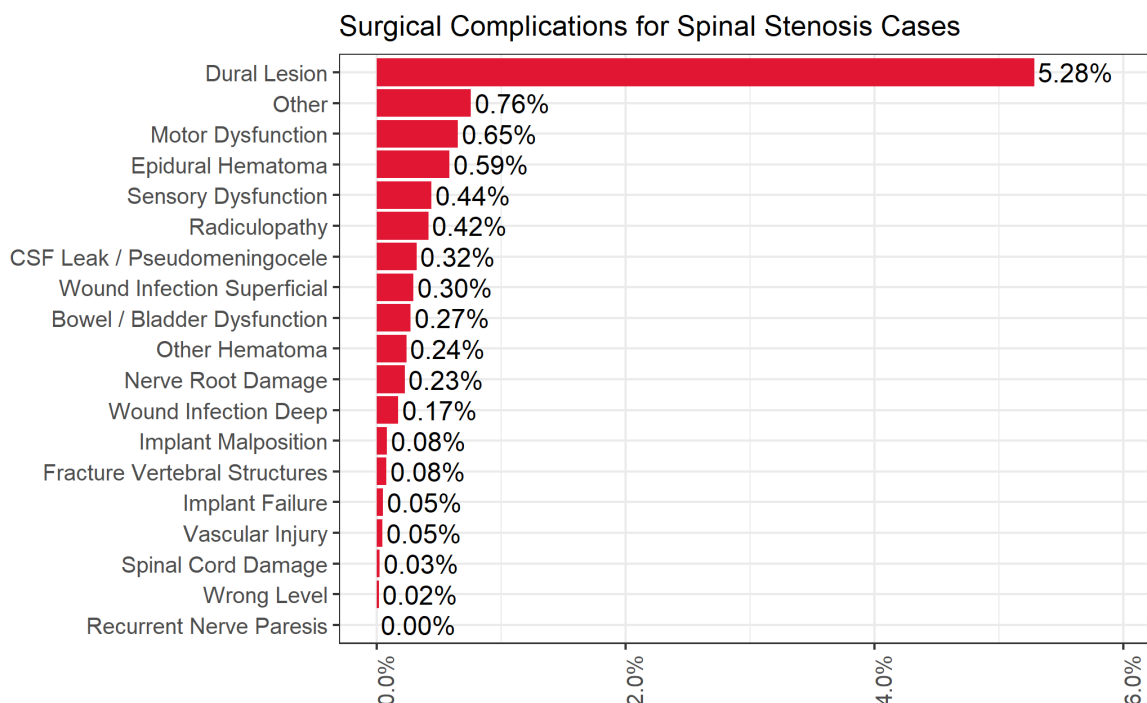


Figure 23. Surgical complications for spinal stenosis cases

Outcomes - COMI

In 42.8% of all patients, a baseline COMI form and a 3-month postoperative or later COMI form were documented. The following Figure 24 to Figure 26 demonstrates the average preoperative and postoperative axial and peripheral pain levels as well as COMI score with 95% confidence intervals over the last 16 years. The curves were not adjusted by patient characteristics, surgical measures and follow-up intervals, which are assumed to be relatively stable. Nevertheless, the figures have a descriptive character only and a conclusive interpretation requires more granular investigations.

Over this time period the preoperative axial pain has steadily increased from about 5.5 points to slightly more than 6 points, while the postoperative axial pain has slightly fluctuated around 4 points mark. This finding of increasing preoperative axial pain points to a stable but marginally improving treatment indication. The stable postoperative axial pain is rather a neutral finding pointing out that changes in the treatment strategy did not result in worsening or improving postoperative axial pain.

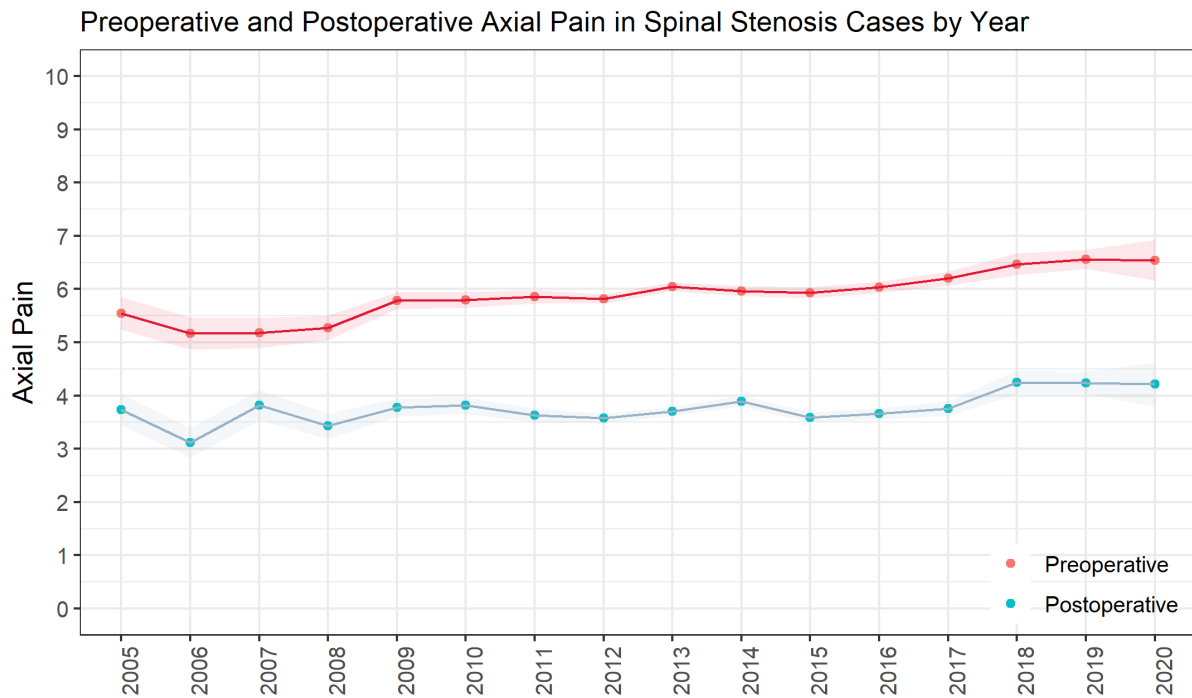


Figure 24. Preoperative and postoperative axial pain in spinal stenosis cases by year

Over this time period the preoperative peripheral pain has steadily increased from about 6.5 points to 7 points, while the postoperative peripheral pain has steadily increased from 3.5 to 4.2 points. The increase of preoperative peripheral pain level of the years is slightly higher than that of the postoperative pain level, which points to a slightly higher pain reduction achieved in the last years.

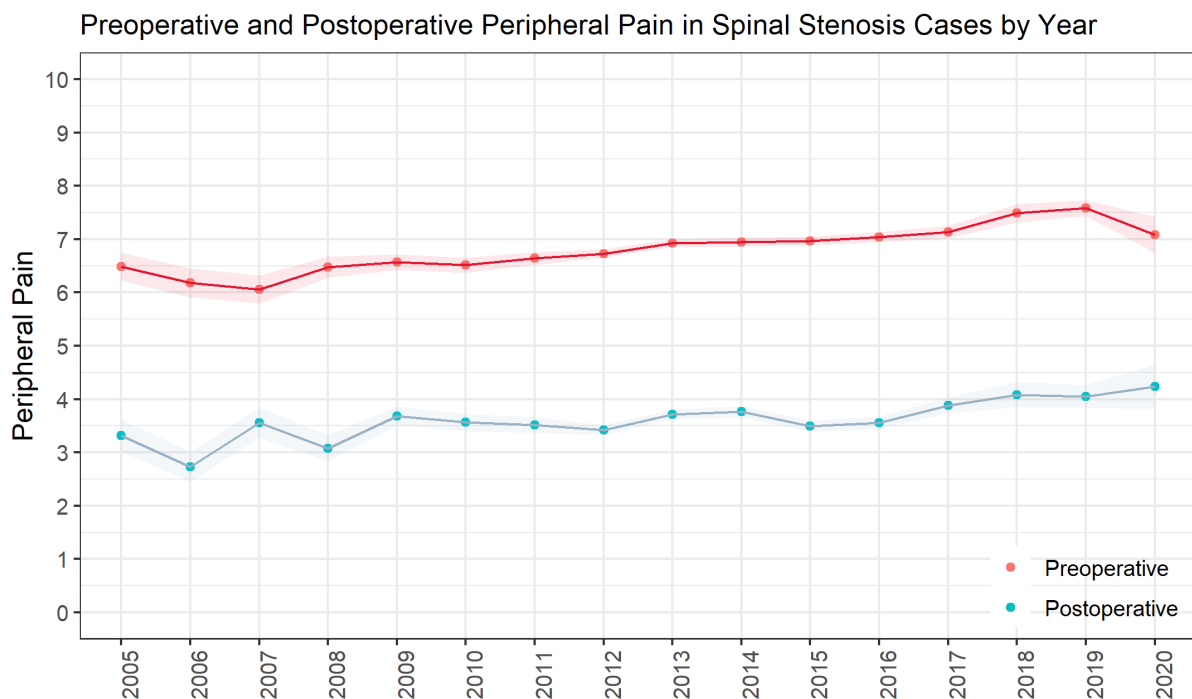


Figure 25. Preoperative and postoperative peripheral pain in spinal stenosis cases by year

Over this time period the preoperative remained very stable at 7.5 - 8 points and the postoperative COMI score remained rather stable between 4.5 and 5 points.

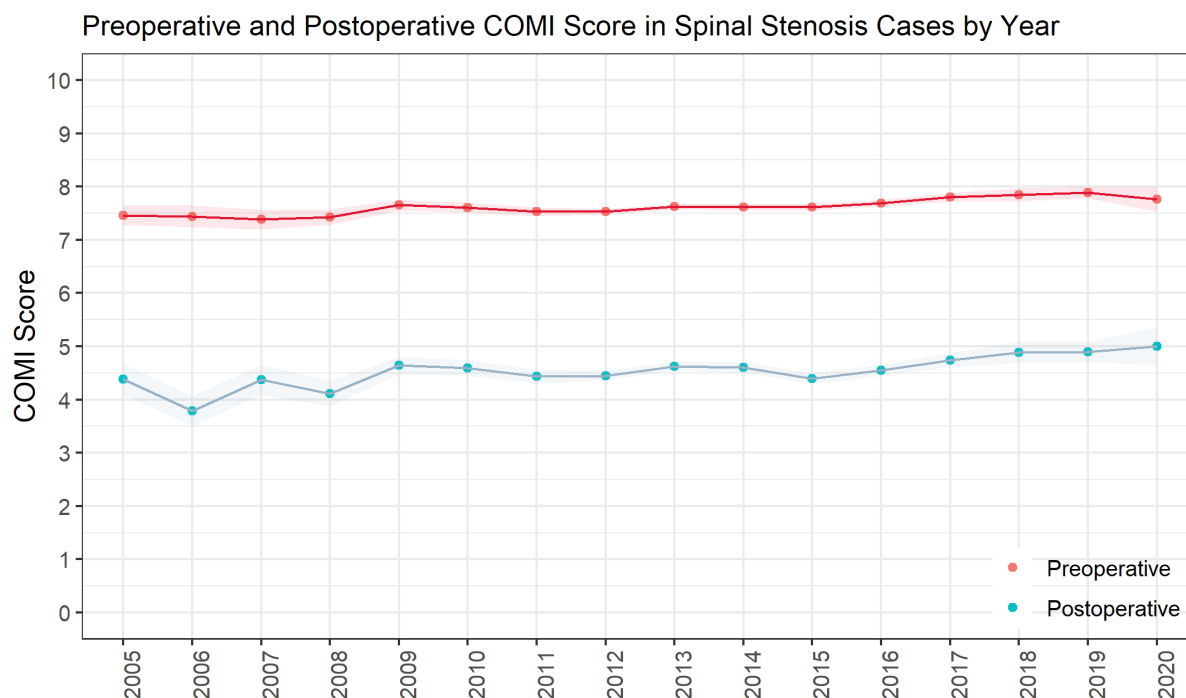


Figure 26. Preoperative and postoperative COMI score in spinal stenosis cases by year

Research

How to publish with Spine Tango data

As a participant of the Spine Tango registry, you have access to Spine Tango data for research purposes. The access to data is bound to specific studies and is granted following approval of the study protocol. A template for the study protocol can be found [here](#). The protocols should be sent to spinetango@eurospine.org.

Once we have received the completed study protocol, the following steps will be required to access the requested data:

1. The STTF will review the protocol in terms of scientific accuracy, good clinical and epidemiological practice, methods, and appropriateness of the analysis based on the Spine Tango data.
2. You will receive feedback from the STTF either approving your protocol, advising that you make some adjustments to the study, or requesting clarification on some points.
3. Once the protocol has been approved by the STTF, an analysis will be conducted by EUROSPINE or you will be provided with data, depending on the study protocol and some other factors.

Publications (2020)

The following list includes publications released between 1 January 2020 and 31 December 2020.

1. Risk Factors for Negative Global Treatment Outcomes in Lumbar Spinal Stenosis Surgery: A Mixed Effects Model Analysis of Data from an International Spine Registry. Aghayev E, Mannion AF, Fekete TF, Janssen S, Goodwin K, Zwahlen M, Berlemann U, Lorenz T; Spine Tango Registry Group. *World Neurosurg.* 2020 Apr;136:e270-e283. doi: 10.1016/j.wneu.2019.12.147. PMID: 31899404.

Conclusions: LSS surgery fails to help at least 1 in 10 patients. High baseline back pain is the most important factor associated with a negative treatment outcome. Department-level and potentially country-level factors of unknown origin explained a nonnegligible variation in the treatment results.

2. Non-medical factors significantly influence the length of hospital stay after surgery for degenerative spine disorders. Mai D, Brand C, Haschtmann D, Pirvu T, Fekete TF, Mannion AF. *Eur Spine J.* 2020 Feb;29(2):203-212. doi: 10.1007/s00586-019-06209-5. PMID: 31734806.

Conclusions: Patients of advanced age and female gender are at increased risk of longer hospital stay after surgery for degenerative spinal disorders. Further studies should seek to understand the reasoning behind the gender disparity, in order to minimise potentially unnecessary costs of prolonged LOS. Targeted preoperative discharge planning may improve the utilisation of hospital resources.

3. Primary lumbar decompression using ultrasonic bone curette compared to conventional technique. Moon RDC, Srikandarajah N, Clark S, Wilby MJ, Pigott TD. *Br J Neurosurg.* 2020 Sep 15:1-5. doi: 10.1080/02688697.2020.1817321. PMID: 32930607.

Conclusions: the use of ultrasonic bone curette for primary lumbar decompression is associated with reduced intra-operative blood loss compared to conventional techniques, alongside a comparable safety profile and equivalent patient reported outcomes.

4. Does neck pain as chief complaint influence the outcome of cervical total disc replacement? Finkenstaedt S, Mannion AF, Fekete TF, Haschtmann D, Kleinstueck FS, Mutter U, Becker HJ, Bellut D, Porchet F. *Eur Spine J.* 2020 Nov;29(11):2675-2682. doi: 10.1007/s00586-019-06052-8. Epub 2019 Jul 8. PMID: 31286245.

Conclusions: Having neck pain as opposed to arm pain or neurological deficits as preoperative chief complaint had no significant impact on clinical outcome after cTDR.

Participants

The following is a list of hospital departments that submitted forms to the Spine Tango registry based on surgeries dated between 1 January 2020 and 31 December 2020.

Austria

- Universitätsklinik für Orthopädie und Unfallchirurgie in Vienna

Belgium

- Department of Orthopaedic Surgery in Clinique Edith Cavell in Bruxelles
- Department of Neurosurgery in AZ Rivierenland campus in Bornem
- Department of Orthopaedic Surgery in Clinique Saint-Pierre in Ottignies
- Department of Neurosurgery in Clinique Saint-Pierre in Ottignies
- Department of Neurosurgery, Physical medicine and Rehabilitation, and Algology in Heilig Hart Ziekenhuis in Lier
- Department of Neurosurgery in ZNA Middelheim in Antwerp

Greece

- Orthopaedic Department in General Hospital of Argolida in Argos

Ireland

- Department of Neurosurgery in Beaumont Hospital in Dublin
- Department of Orthopaedic Surgery in National Spinal Cord Injuries Unit at Mater Misericordiae University Hospital in Dublin

India

- Department of Orthopaedic Surgery in Stavva Spine Hospital and Research Institute
- Department of Physiotherapy in Stavva Spine Hospital and Research Institute

Italy

- Spine Deformity Unit in Istituto Ortopedico Rizzoli in Bologna

Pakistan

- Department of Orthopedics in Hayatabad Medical Complex in Peshawar
- Department of Orthopaedics in PolyClinic Hospital and Allied Hospitals in Islamabad
- Department of Spine Surgery in Combined Military Hospital in Rawalpindi
- Spine Unit in Ghurki Trust Teaching Hospital in Lahore
- Spine Unit in Khyber Teaching Hospital in Peshawar

Portugal

- Orthopaedic department in Centro Hospitalar Universitário de São João in Porto
- Department of Neurosurgery in Centro Hospitalar Universitário de São João in Porto

Slovenia

- Department for Spine Surgery and Paediatric Orthopaedics in Orthopaedic Hospital Valdoltra in Ankaran
- Orthopaedic Clinic in University Clinic Orthopedics Ljubljana

Spain

- Unidad Funcional de Columna Vertebral (UFCV) in Hospital del Mar - Parc de Salut Mar in Barcelona

Switzerland

- Department of Rheumatology in Centre Hospitalier Universitaire Vaudois in Lausanne
- Department of Spine Surgery in Centre Hospitalier Universitaire Vaudois in Lausanne
- Spine Unit in Clinica Ars Medica in Gravesano
- Spine Unit in Clinica Ars Medica in Lugano
- Department of Neurosurgery in Clinique Generale de Fribourg
- Department of Neurosurgery in Clinique de Genolier
- Spine Unit in Das Rückenzentrum Thun
- Department of Spine Surgery in Kantonsspital Liestal

- Department of Orthopaedic Surgery and Traumatology in Kantospital St Gallen
- Spine Unit in MediSpine Wirbelsäulenzentrum Biel-Seeland
- Department of Spine Surgery in University Hospital of Bern, Inselspital in Bern

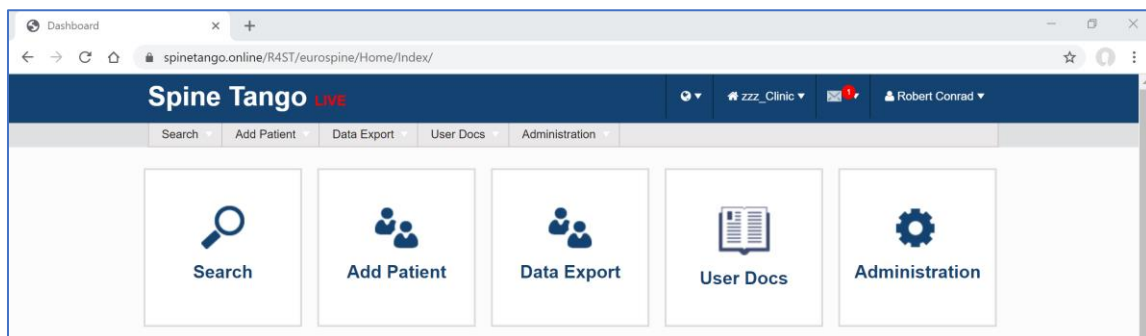
United Kingdom

- Department of Neurosurgery in Salford Royal NHS Foundation Trust
- Department of Spine Surgery in Salford Royal NHS Foundation Trust
- Department of Neurosurgery in the Walton Centre NHS Foundation Trust in Liverpool

Images of the Spine Tango registry

The following screen shots are from the web interface of the ST registry.

User-friendly dashboard:



Powerful search function to find patients, questionnaires and implants:

Guided documentation procedures with indications of missing or inappropriate data:

The surgery and conservative forms, as well as key patient-reported outcome measure forms, can be found [here](#).

Contact



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