



ANNUAL REPORT 2024

"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, former Consultant Neurosurgeon, Walton Centre for Neurosurgery, United Kingdom

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FOREWORD SABRINA DONZELLI

IMPROVING SPINE CARE THROUGH DATA AND COLLABORATION: A VISION FOR THE FUTURE

Dear EUROSPINE colleagues and members,

It is a great pleasure to present the 2024 Spine Tango Annual Report. This year has seen significant progress in our global efforts to strengthen spine care through quality assurance, innovation, and collaboration.

Spine Tango continues to serve as a reliable, internationally recognised registry. In 2024, we introduced several enhancements, including a new dashboard to facilitate data reporting, additional ePROM languages (Czech and Portuguese) and a QR code feature to facilitate patient-friendly data collection.

We also introduced a linked data export format, which simplifies analysis by combining all patient- and clinician-reported forms into one structure. We also revised the surgery form to reflect current classification trends and released a short version to ease the clinical workload.

A major milestone was the implementation of a policy for anonymised data access, allowing academic institutions to use pooled data for research purposes. This has already led to new studies and publications.

We also launched the Spine Atlas Initiative, with the first data call on degenerative lumbar spondylolisthesis attracting over 150 hospitals in 50 countries. Further data calls will follow in 2025, enabling us to expand our global insight.

Spine Tango supports the PREPARE project, helping to develop AI-driven rehabilitation tools based on our data and bringing personalised care one step closer.

Finally, the transition from Task Force to the permanent Spine Tango Committee within EUROSPINE will ensure long-term strategic development. We are delighted to welcome new members from Ireland and the Czech Republic who will help to guide the next chapter.

Thank you for your continued support. Together, we are building a stronger, data-driven future for spine care.

Warm regards,

Sabrina Donzelli, Spine Tango Committee Chair



A GLOBAL COMMITMENT TO DATA-DRIVEN EXCELLENCE

Welcome to this year's Spine Tango Annual Report - a reflection of our continued commitment to advancing spine health through quality assurance, data and innovation. As an internationally recognised registry, Spine Tango acts as a common language for quality assurance in spine care, providing performance benchmarks and a growing, reliable evidence base for treatment worldwide.

Driving progress in spine health through data and collaboration Spine Tango is built on a mission to support healthcare professionals worldwide - surgeons and non-surgeons alike - in creating a consistent and transparent framework for evaluating spine treatments. Our focus is on standardise data collection and evaluation to promote informed treatment decision-making and outcomes improvements across the spine care community.

OUR VISION: IMPROVED OUTCOMES, ENHANCED PATIENT SAFETY

At the heart of Spine Tango is a vision to empower surgeons, hospitals, professional societies and implant manufacturers to continuously monitor and improve clinical outcomes and patient safety. By providing multilingual tools and fostering collaboration with implant manufacturers, we're helping to raise standards, drive innovation and deliver better care around the world.

As you explore this report, you'll discover collaborative achievements and insights. Spine Tango data empowers individuals, institutions and national societies to improve outcomes and prioritise patient safety.

Thank you for being part of this ongoing journey towards excellence in spine health.



SPINE TANGO 2024: PROGRESS AND INNOVATION UPDATE

Over the year 2024, Spine Tango has made significant progress in enhancing functionalities, expanding accessibility, and improving data analysis capabilities. These developments reflect our continued commitment to providing an efficient, user-friendly and impactful registry for all participants. Each of these enhancements supports our mission to provide high-quality data tools that advance research, improve patient outcomes, and empower clinicians worldwide. In 2024, Spine Tango further developed its electronic patient-reported outcome measures (ePROM) functionality. In response to growing demand for multilingual support, Czech and Portuguese language versions of ePROM were added, making the registry more accessible to a wider international community. A notable innovation was the introduction of a QR code feature, giving patients additional flexibility to access ePROMs directly on their own devices, such as tablets, rather than relying on email or SMS links. This addition supports a more streamlined and patient-friendly data collection process. In addition, the ePROM status overview has been enhanced with new action buttons, allowing users to more easily track questionnaire completion and manage patient-reported outcomes in real time.

ONLINE AD-HOC STATISTICS IMPLEMENTED

One of the most anticipated advancements in 2024 was the integration of Power BI into the Spine Tango platform. This powerful technology allows for data reports directly within the system. With new tools to generate and export aggregated results, comparisons, tables and visuals, users now benefit from a more dynamic and flexible approach to working with registry data. These capabilities have greatly streamlined the research and reporting process, making Spine Tango an even more valuable tool for data-driven decision making in spine care.

NEW LINKED DATA EXPORT FORMAT

A major milestone in 2024 was the introduction of a new data export format. This enhancement links all available patient- and clinician-reported forms for a single patient into one comprehensive data line. By consolidating these forms into a single structure, data analysis has become easier and more efficient for both researchers and clinicians. The new format reduces complexity, supports large-scale data analysis and paves the way for more integrated research efforts.

REVISION OF SURGERY FORM DATA STRUCTURE

Throughout 2024, Spine Tango has also been working on a comprehensive revision of the data structure of the surgery form. While the previous version of the surgery form had been in use since 2017, a further development became necessary to align with modern classification trends and streamline data collection. The main goal of this update was to simplify data entry, while still capturing the most essential and clinically relevant information. Drawing on the experience of the Swiss National Implant Registry, a short version of the surgery form was also developed and released. This short form reduces the data entry burden by up to 25%, helping clinical teams to focus on quality care while ensuring that the registry remains a rich source of information. The revised data structure was officially implemented in January 2025.

SPINE TANGO 2024: PROGRESS AND INNOVATION UPDATE

ACCESS TO ANONYMISED DATA FOR RESEARCH

Recognising the immense value of the international dataset collected in Spine Tango, a new policy was fully implemented in 2024 to allow academic institutions that are not participating in the registry to access anonymised pooled data for research purposes. This policy aims to foster collaboration and expand the scientific use of registry data. The terms and conditions for external data use, carefully developed by the Spine Tango Committee, are now publicly available on the Spine Tango website. This initiative has already contributed to several research projects and publications, further strengthening Spine Tango's role in advancing spine care and supporting epidemiological studies on a global scale.

A MORE STREAMLINED EXPERIENCE

With significant improvements to data entry, reporting and analysis throughout the year, the Spine Tango Registry now offers an even more streamlined and valuable experience for its users. These developments mark an important step forward in making the registry not only a leading tool for clinical documentation and quality assurance, but also a cornerstone for research and innovation in spine care.

With these achievements and advancements, participating hospitals and EUROSPINE continues to drive innovation, advance research and improve patient outcomes in spine care. We celebrate these achievements and express our gratitude for the commitment of our esteemed hospitals and partners.

WHAT IS THE SPINE ATLAS INITIATIVE?

Spine Atlas Initiative: A New Global Vision for Spine Care. The Spine Atlas Initiative was launched in 2024 as a pioneering global effort to map spine pathologies, treatment variations and outcomes. Leveraging data from Spine Tango and international registries, this initiative provides unprecedented insight into real-world spine care.

The Spine Atlas Initiative is a collaborative effort to collect and analyse anonymised clinical data to:

- Identify global trends in spine surgery and non-surgical treatments
- Visualise practice variation
- Compare patient populations and approaches across countries

FIRST DATA CALL: A STRONG START

The initial focus is on degenerative lumbar spondylolisthesis (LDS). Data collection began in February 2025 and has already seen enthusiastic participation - over 150 hospitals in 50 countries and multiple spine registries have expressed their interest in combining data, making this initiative a truly global effort.

NEXT DATA CALL: AUTUMN 2025

Coming this autumn: the next data call. More pathologies. Broader participation. We're expanding the reach - and you're invited to be part of this global initiative.

WHY IT MATTERS

With spinal disorders on the rise around the world, understanding how care varies between countries is more important than ever. The Spine Atlas Initiative will shape future research, improve clinical practice and improve patient outcomes on a global scale.

JOIN THE INITIATIVE

Be part of this pioneering effort in spine care. Contribute your data. Share your expertise. And gain access to global benchmarking, research collaboration and international visibility.



EU HORIZON PROGRAMME PROJECT

An outstanding achievement is becoming part of a four-year large European consortium project from the EU's HORIZON programme. This project with the title Personalised Rehabilitation via Novel AI Patient Stratification Strategies (PREPARE) aims to use artificial intelligence methods to analyse Spine Tango and other medical data to develop prediction of patient outcomes and advance rehabilitation in spine care and beyond. This multi-stakeholder, interdisciplinary initiative is at the forefront of transforming rehabilitation care for chronic non-communicable diseases. Christian Herrmann has joined our team as a Senior Data Analyst and is co-leading this project from the EUROSPINE part.

EUROSPINE'S INTEGRAL ROLE

EUROSPINE plays a central role in the PREPARE consortium, bringing decades of expertise in spinal disorders. Our main contribution is the Spine Tango Registry - a comprehensive repository of anonymised medical data that is crucial for research within the spine community.

This rich dataset is essential for the development and refinement of the PREPARE models. The ultimate goal of the PREPARE project is to develop new tools that can be offered to treating physicians. The tools based on the comprehensive data from Spine Tango, will assist in communicating and navigating treatment options, managing patient expectations, and supporting shared decision making for optimal treatment outcomes in spine care.

Additionally, we are:

- Contributing to the conceptualisation, health data integration technology and computational models.
- Defining requirements, validating tools, and designing the overall architecture.
- Conducting smaller studies to explore the usability, compliance, and effectiveness of these tools.

CELEBRATING THE FIRST MILESTONE

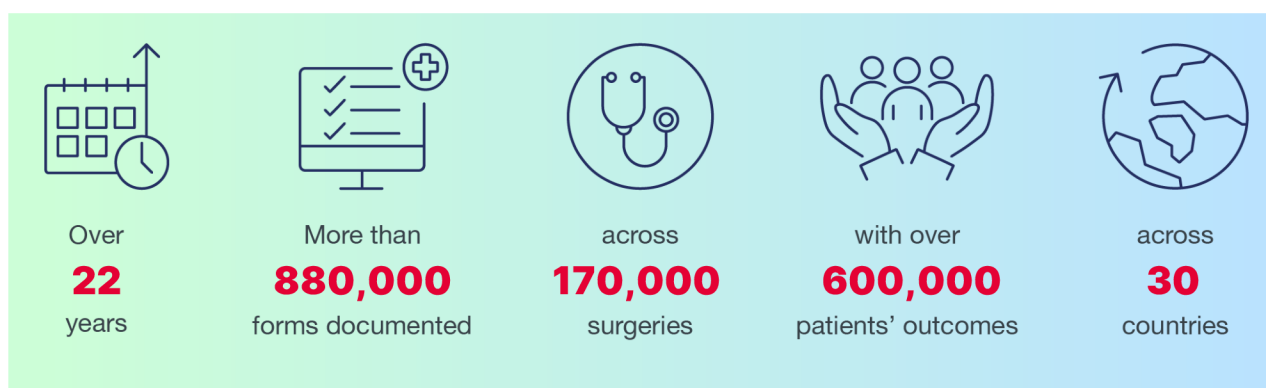
The project celebrated a successful first year milestone in Thessaloniki, Greece in June. The meeting highlighted the timely completion of all planned deliverables and set the stage for the next phases of the project. The consortium reviewed past activities, discussed new findings, and identified action points for the future.



INTERNATIONAL SPINE REGISTRIES (ISR) WORKING GROUP

This working group consisting of representatives of different spine registries has been working in 2024 on three policy papers dedicated to harmonisation of spine registries. The three selected topics were 1) common core data structure, 2) common PROM, and 3) common approach for implant registration. All three policy were elaborated, and they will be published in the coming year.

FACTS & FIGURES



SPINE TANGO COMMITTEE ESTABLISHED

A key milestone in 2024 was the formal transition of the Spine Tango Task Force into a permanent standing committee within EUROSPINE. This development is a crucial step in strengthening the governance of the Registry, ensuring long-term strategic oversight and alignment with the mission of EUROSPINE. The move also reflects the growing importance of Spine Tango as a tool for quality assurance and research in spine care.

In line with its expanding international reach, the Committee has welcomed new representatives from Ireland Stacey Darwish and Lukáš Čapek from Czech Republic - bringing fresh regional perspectives and expertise to help shape the future of the Registry.

Looking Ahead: Goals for 2025

We look forward to a new exciting year of the registry during which we will aim to launch the first version of the registry app, further expand the number of registry participants and international collaborations, carry out a number of research studies, support the upcoming Spine Atlas data call 2026, further develop the implant and hospital reports as well as to introduce the surgeon report.

USE OF ANONYMISED POOLED DATA BY NON-PARTICIPANTS FOR STATISTICAL AND RESEARCH PURPOSES

Over the past year, Spine Tango has compiled a unique rich international dataset. In 2023, the Spine Tango Task Force approved the use of this anonymised, pooled data for statistical and research purposes by individuals or groups for academic purposes, including those who have never contributed data to the registry.

To support this initiative, the Task Force has established specific terms and conditions governing data access and use. These guidelines are now available on the Spine Tango website.

This new data-use opportunity is designed to support the spine community in conducting meaningful research and advancing spine care globally. The programme has now launched, and we are welcoming applications from qualified researchers and institutions interested in accessing the data.



SELECTED STATISTICS

WORLD MAP

The Spine Tango registry and the majority of participating hospitals are based in Europe. Hospitals from many other countries are or have previously been participating in the registry, as illustrated in the following three maps. This international distribution demonstrates the interest for a common language in the registration of spinal treatments and their outcomes, which in turn will help to further develop spinal care as well as harmonise and improve it.

All following maps are based on registry data collected up to 31 December 2024.

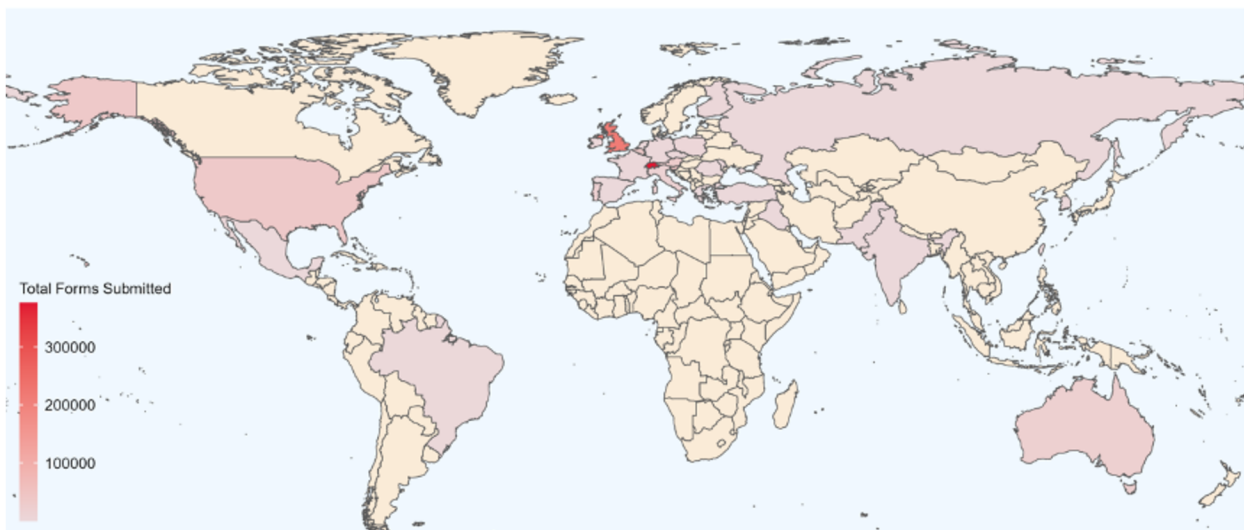


Figure 1. Global overview of origin of participants in the registry and submitted forms by country

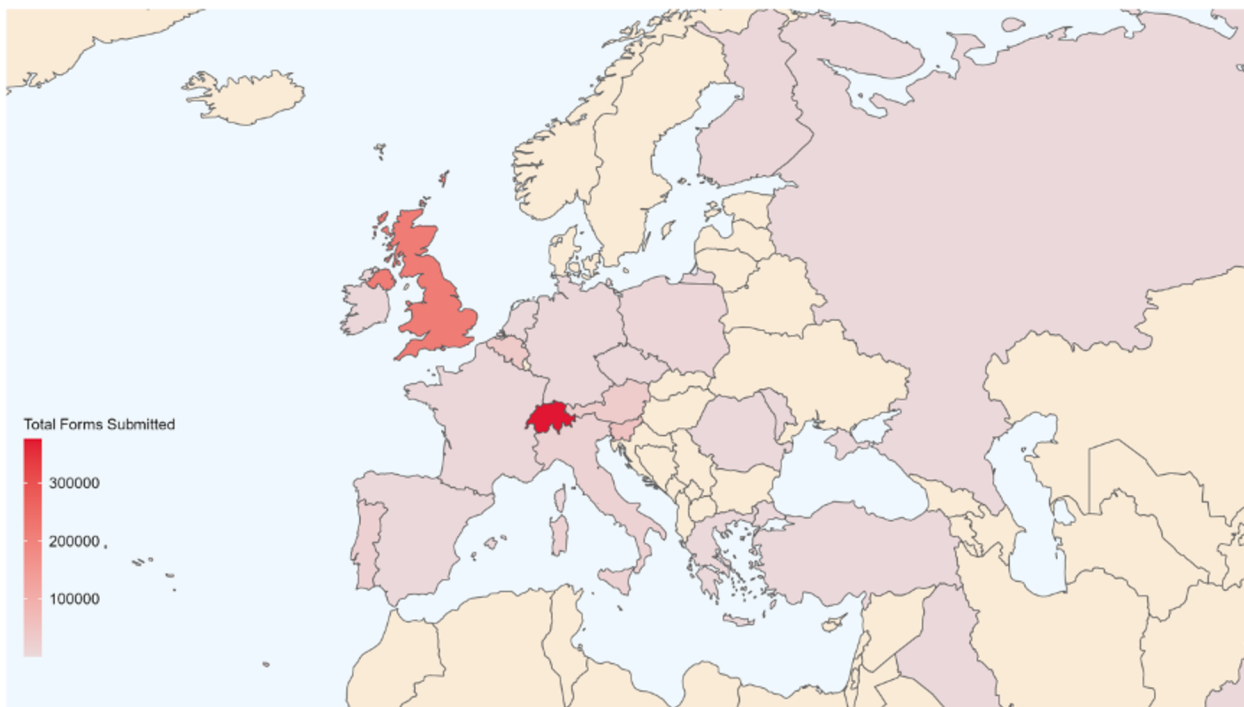


Figure 2. Overview of submitted forms of the participants by country in Europe

OVERALL DATA GROWTH BY FORM TYPE

The number of documented forms in the registry increases each year. After a significant drop in 2021, the number of documented forms in 2022 has picked up again. The drop in 2021 was probably related to the COVID 19 pandemic.

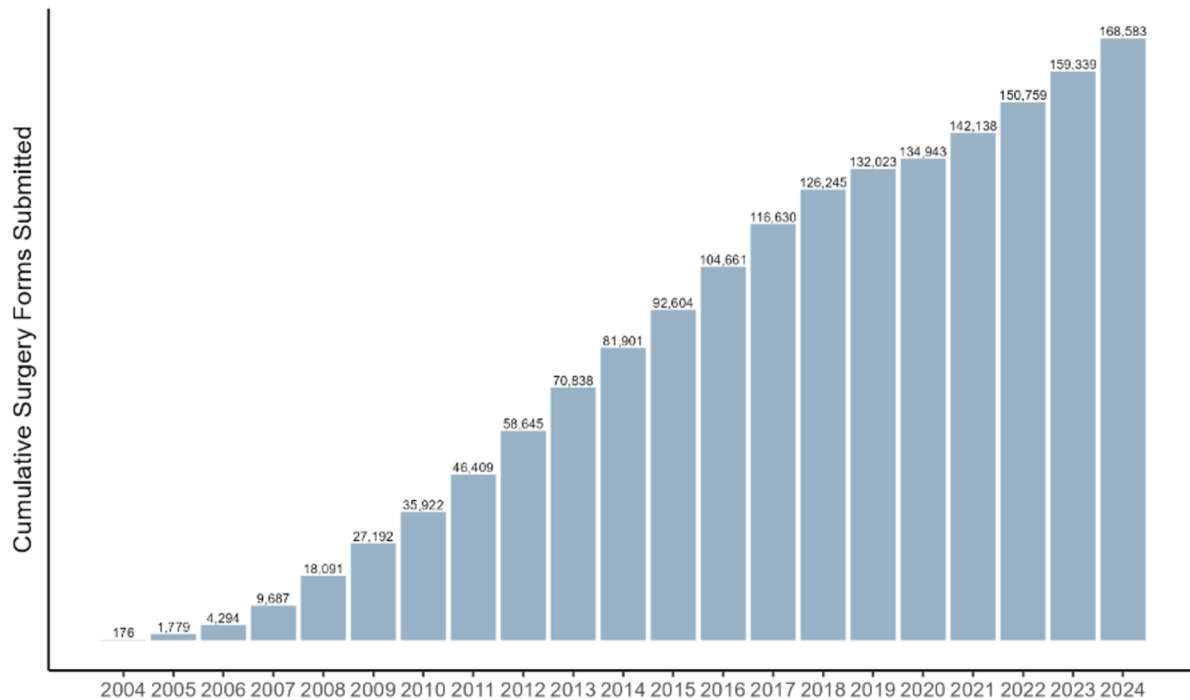


Figure 3. Cumulative Surgery forms

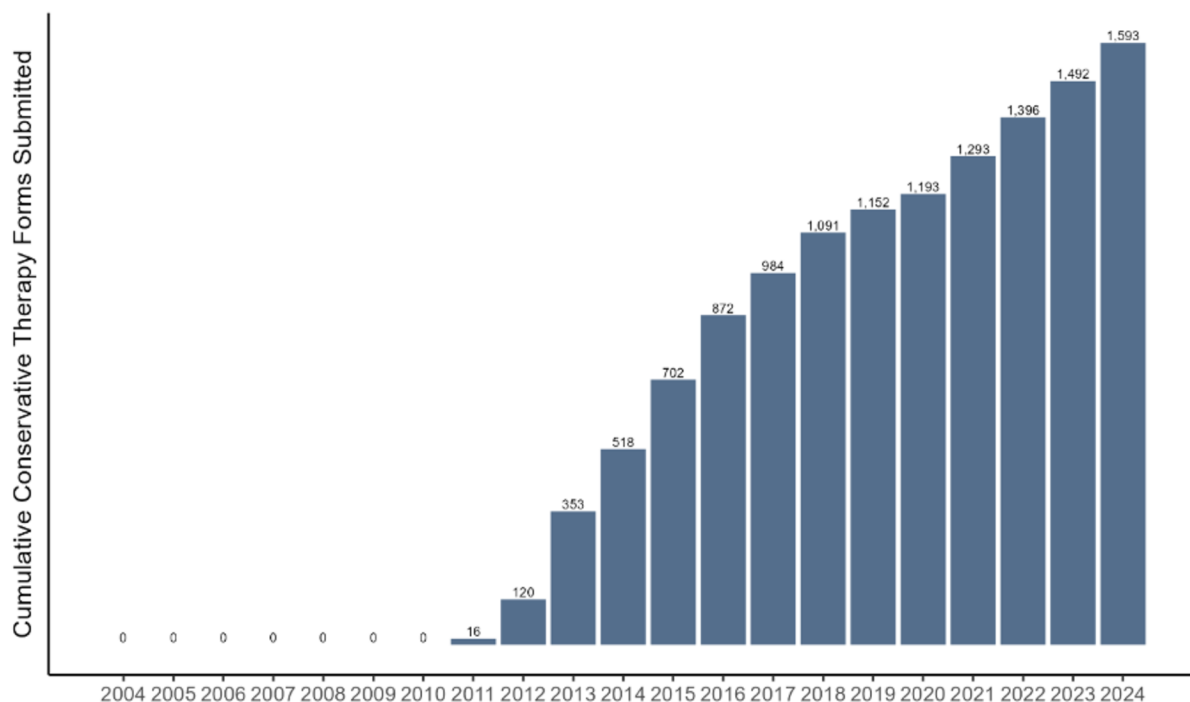


Figure 4. Cumulative Conservative treatment forms

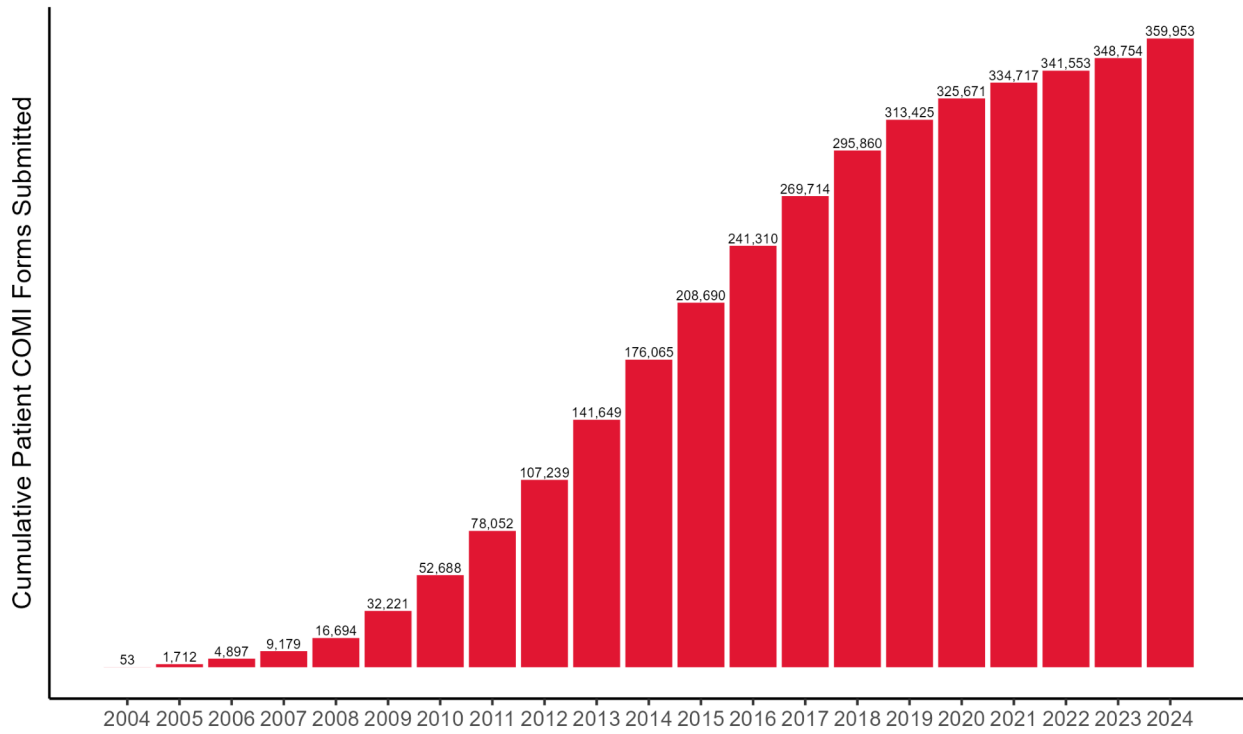


Figure 6. Cumulative Patient COMI form submitted

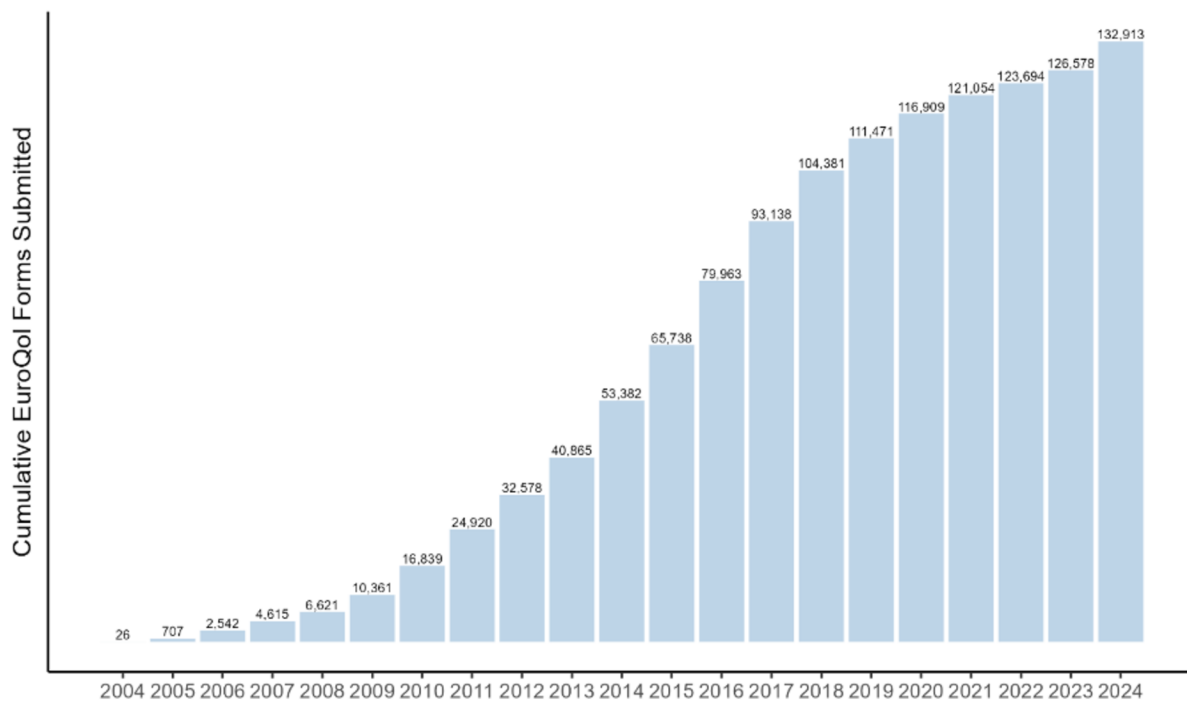


Figure 7. Cumulative EuroQol forms

PATIENT CHARACTERISTICS

The figures presented in the following tables are based on 168.583 surgeries documented up to 31 December 2024.

Table 1. Patient characteristics overview (unknown data is not included in the calculation of the other proportions)

Surgical Forms (N= 168.583)

Characteristic	Subgroup	Precent	Count
Age	< 40	14.3%	24.078
	40-50	15.9%	26.757
	50-60	20.1%	33.799
	60-80	41.6%	70.113
	> 80	8.2%	13.836
Gender	Male	47.8%	80.506
	Female	52.2%	88.069
	Other	0.0%	6
	Unknown	0.0%	2
Smoker (N = 118.403)	No	77.6%	60.229
	Yes	22.5%	17.508
	Unknown	(34.4%)	40.666
BMI (110.249)	< 20	5.3%	5.822
	20-25	34.4%	37.879
	26-30	36.5%	40.269
	31-35	15.9%	17.561
	> 35	7.9%	8.718
	Unknown	(34.6%)	58'334
Number of segments affected	1	36.3%	61.045
	2-3	29.4%	49.417
	>= 4	34.4%	57.854
	Unknown	(0.2%)	267
Number of previous surgeries	0	69.3%	114.899
	1	19.8%	32.873
	>1	10.8%	17.928
	Unknown	(1.7%)	2.883

MAIN PATHOLOGIES

The most frequent pathology seen in the registry is degenerative disease with around three quarters of the surgeries, followed by repeat surgery with 6% and other less frequent pathologies.

Table 2. Main pathologies tabular overview

Pathology	Percent	Count
Degenerative disease	75.7%	127.539
Repeat surgery	6.0%	10.078
Fracture / trauma	3.7%	6.294
Pathological fracture	3.7%	6.161
Spondylolisthesis (non-degenerative)	3.1%	5.304
Tumour	2.3%	3.810
Non-degenerative deformity	2.2%	3.683
Failed surgery	1.2%	2.060
Other	1.1%	1.818
Infection	0.9%	1'590
Inflammation	0.1%	246

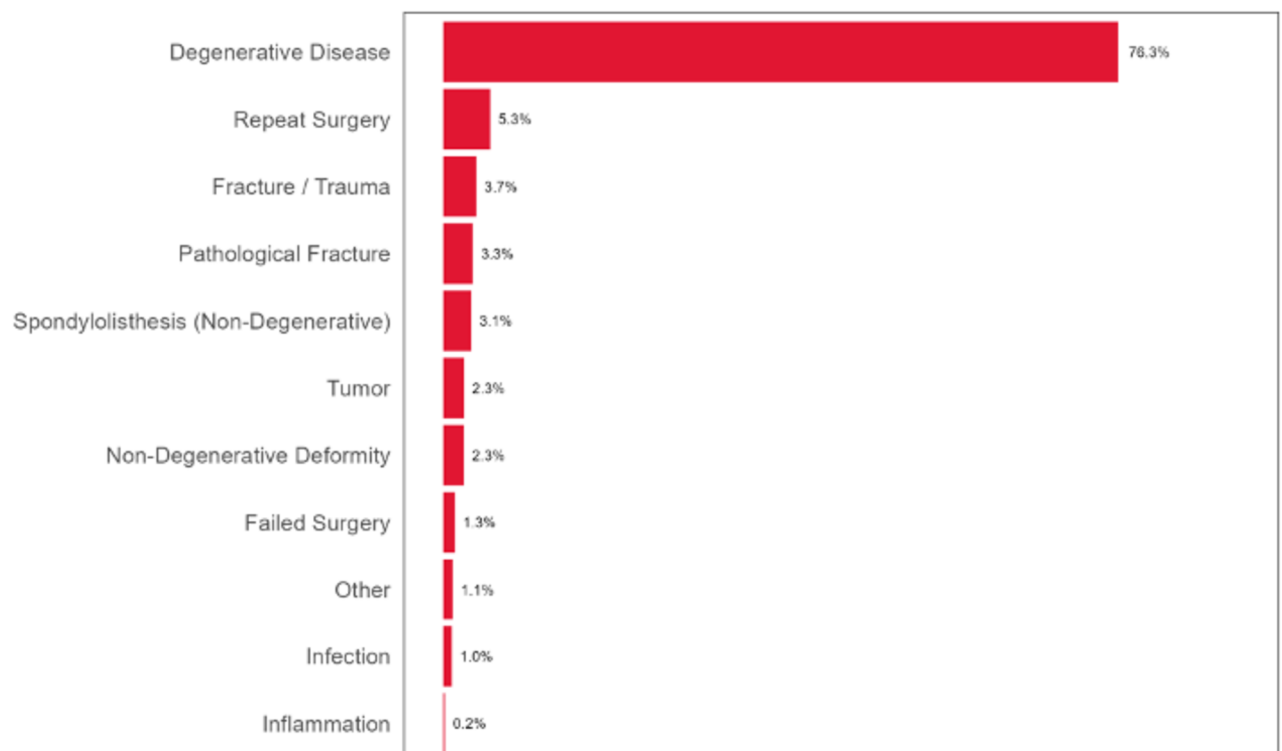


Figure 8. Main pathologies bar chart overview

Regarding the levels of intervention, most of the cervical surgeries take place at C5 (11.7%), followed by C6 (9.3%). Thoracic levels are rather rare with Th12 as the most frequent thoracic level at 4.4%. The three most treated lumbar levels are L4 (53.7%) followed by L5 (41.9%) and L3 (24.7%).

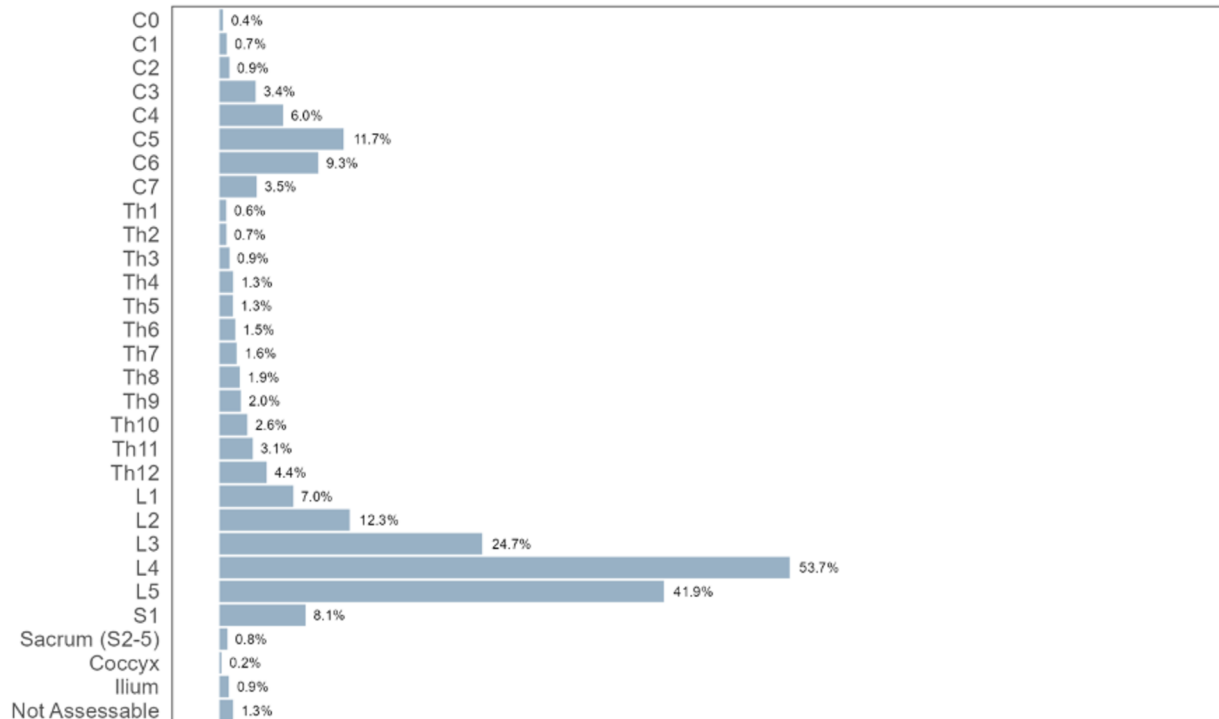


Figure 9. Levels of intervention



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

35.8% of all documented surgeries in Spine Tango (N=60.282) were related to the treatment of disc herniation. The following Table 3 describes characteristics of this patient population.

Patient characteristics

Table 3. Patient characteristics disc herniation (unknown data is not included in the calculation of the other proportions)

Surgical forms (N = 60.282)

Characteristic	Subgroup	Precent	Count
Age	< 40	22.3%	13.444
	40-50	25.5%	15.390
	50-60	22.9%	13'794
	60-80	26.2%	15.816
	> 80	3.1%	1.838
Gender	Male	52.3%	31.539
	Female	47.7%	28.741
	Other	0.0%	2
Smoker	No	73.4%	18.436
	Yes	26.6%	6.688
	Unknown	(39.8%)	16.634
BMI	< 20	4.4%	1.656
	20-25	33.5%	12.761
	26-30	38.0%	14'360
	31-35	16.0%	6.016
	> 35	8.0%	3.072
	Unknown	(37.2%)	22.417
Number of segments affected	1	46.5%	28.024
	2-3	23.5%	14.184
	>= 4	30.0%	18.068
	Unknown	(0.0%)	6
Number of previous surgeries	0	77.5%	46.714
	1	16.4%	9.911
	> 1	6.0%	3.620
	Unknown	(0.1%)	37

Surgical measures

The following Figure 10 demonstrates proportions of key surgical measures over a time period of 20 years between 2005 and 2024. 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 decade. A visible decrease of decompression only in the last 4 years is primarily due to the data from the mandatory Swiss Implant Registry SIRIS that started in 2021 and that is focusing in the first line on the implant-related surgery.

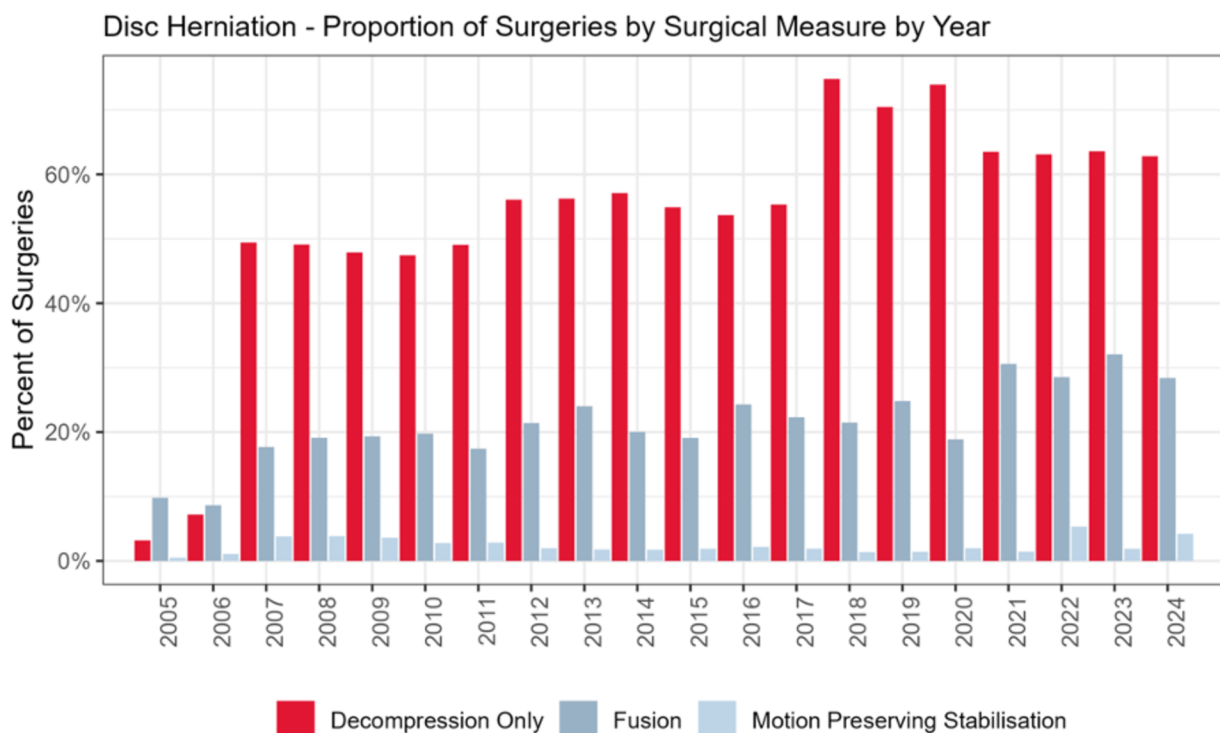


Figure 10. Proportion of surgeries by surgical measure by year

Complications

General complications were rather rare with the leading complication of kidney / urinary system in 0.24% of the surgeries (Figure 11).

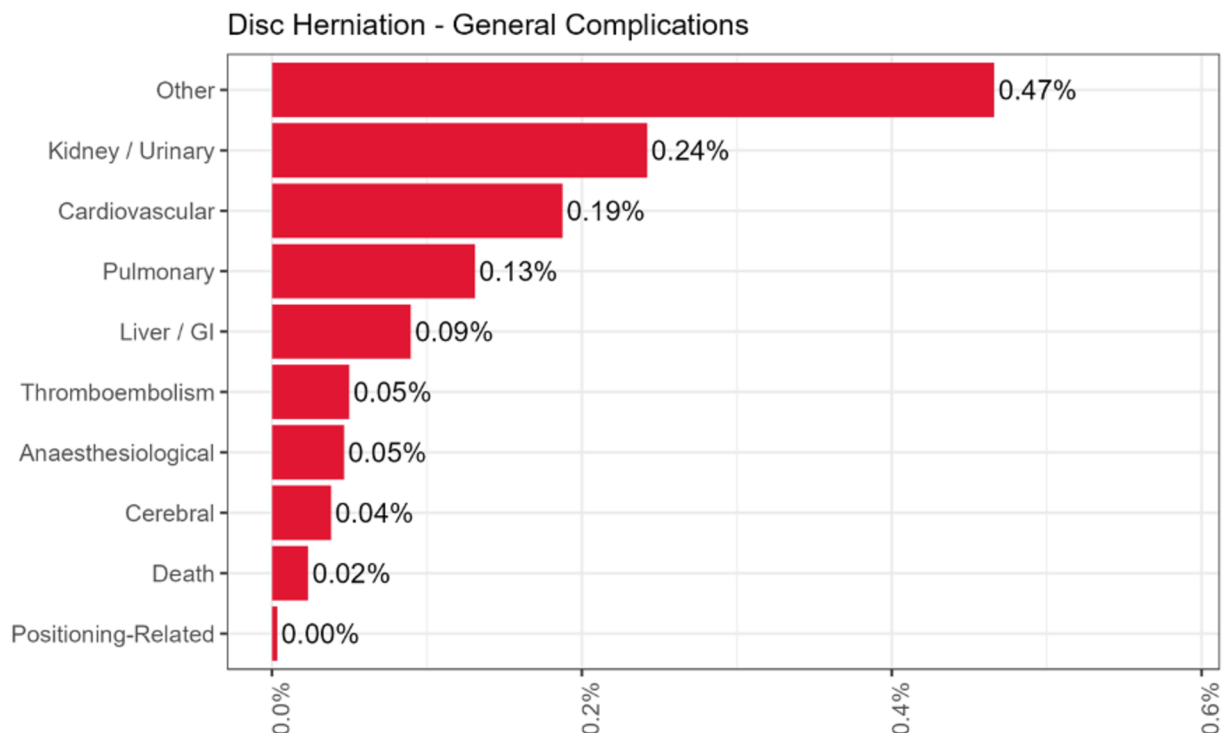


Figure 11. General complications for herniated disc cases

Surgical complications were more frequent with dural lesions documented in 2.95% of the surgeries (Figure 12). The next most frequent complications were neurological with motor dysfunction, radiculopathy and sensory dysfunction in 0.38%, 0.34% and 0.31%, respectively.

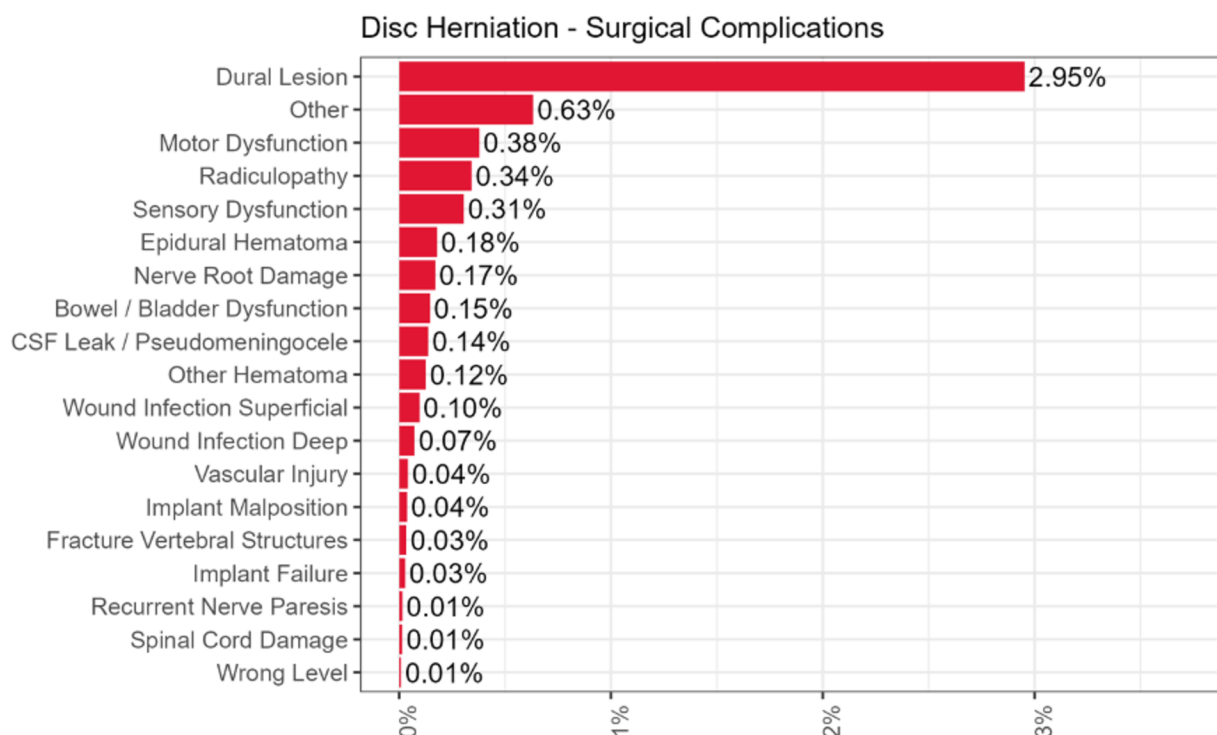


Figure 12. Surgical complications for herniated disc cases

Outcomes - COMI

In one fourth of all patients with disc herniation a baseline COMI form and a 3-month postoperative or a later COMI form were documented. This rate varies considerably between hospitals, depending on whether they systematically collect COMI or not. The following figure 13 to figure 15 demonstrates the average preoperative and postoperative axial and peripheral pain levels as well as COMI score with 95% confidence intervals over the last 20 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 period the preoperative axial pain has steadily increased from about 5 points to 6 points, while the postoperative axial pain has slightly increased from 3 to 3.5 points. This finding of increasing preoperative axial pain points to a stable but still improving treatment indication. This is 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. However, the average improvement increased from 2 to 2.5 points, which is a positive development.

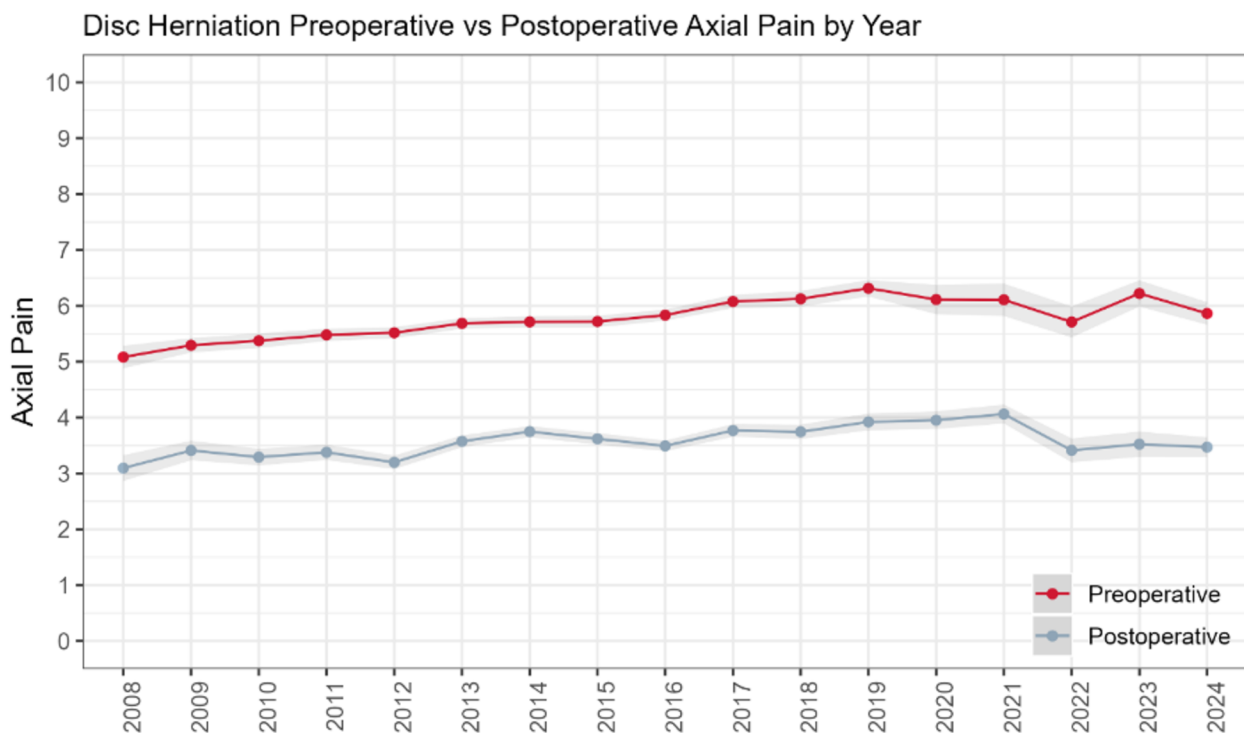


Figure 13. Preoperative and postoperative axial pain in disc herniation cases by year

Over this time period the preoperative peripheral pain stayed around 7 points, while the postoperative peripheral pain also stayed more or less stable around 3.5 points.

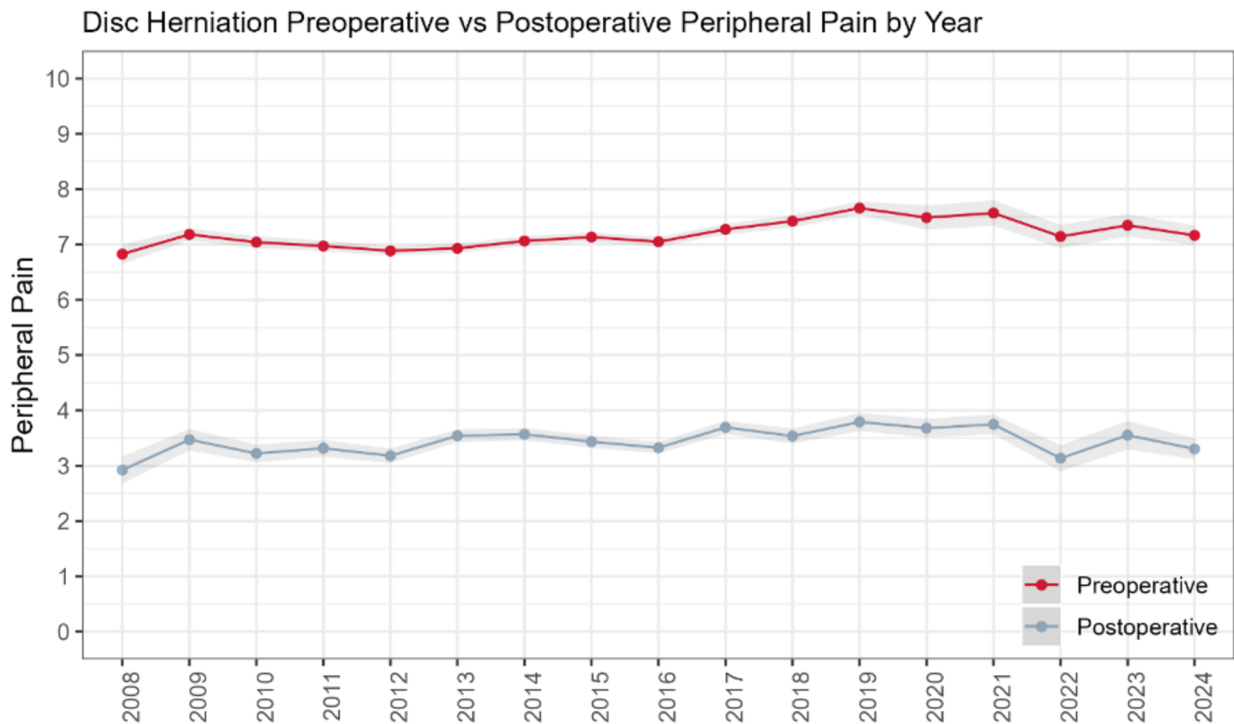


Figure 14. Preoperative and postoperative peripheral pain in disc herniation cases by year

Over this time period the COMI score preoperative and postoperative remained also stable around 7 and 4.5 points, respectively. No relevant trend both for preoperative and postoperative scores were observed over the whole time period.

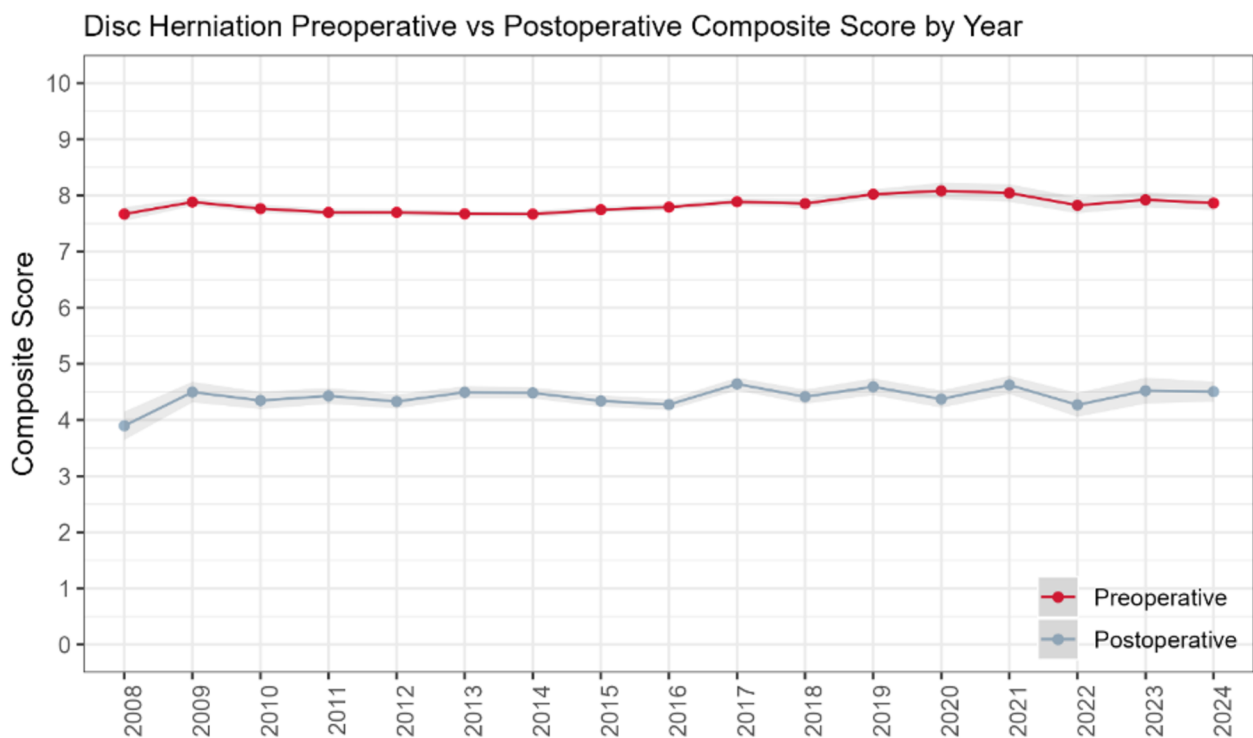


Figure 15. Preoperative and postoperative COMI score in disc herniation cases by year

SPINAL STENOSIS

43.9% of all surgeries documented in Spine Tango (N=73.983) were related to the treatment of spinal stenosis. The following Table 4 describes characteristics of this patient population.

Table 4. Patient characteristics spinal stenosis (unknown data is not included in the calculation of the other proportions)

Surgical Forms (N=73.983)

Characteristic	Subgroup	Percent	Count
Age	< 40	4.3%	3.204
	40-50	10.0%	7.401
	50-60	19.3%	14.290
	60-80	55.7%	41.192
	> 80	10.7%	7.896
Gender	Male	49.4%	36.578
	Female	50.6%	37.404
	Other	0.0%	1
Smoker	No	80.8%	29.370
	Yes	19.2%	6.963
	Unknown	(35.8%)	20.245
BMI	< 20	3.6%	1.389
	20-25	28.5%	11.181
	26-30	39.8%	15.567
	31-35	19.3%	7.575
	> 35	8.8%	3.460
	Unknown	(47.1%)	39.172
Number of Segments Affected	1	33.1%	24.485
	2-3	34.6%	25.595
	>= 4	32.3%	23.894
	Unknown	(0.0%)	9
Number of Previous Surgeries	0	74.6%	55.162
	1	17.8%	13.174
	> 1	7.56%	5.590
	Unknown	(0.1%)	57

Surgical measures

The following Figure 16 demonstrates proportions of key surgical measures over a time period of 20 years between 2005 and 2024. The distribution of individual surgical measures changed over this period substantially in the year 2021, which is primarily caused by the substantial proportion of fusions that were registered in the mandatory Swiss Implant Registry SIRIS that started in 2021 and that are part of the international pooled data.

If excluding the last four years, the proportion of decompression alone was increasing and the proportion of fusions decreasing over time.

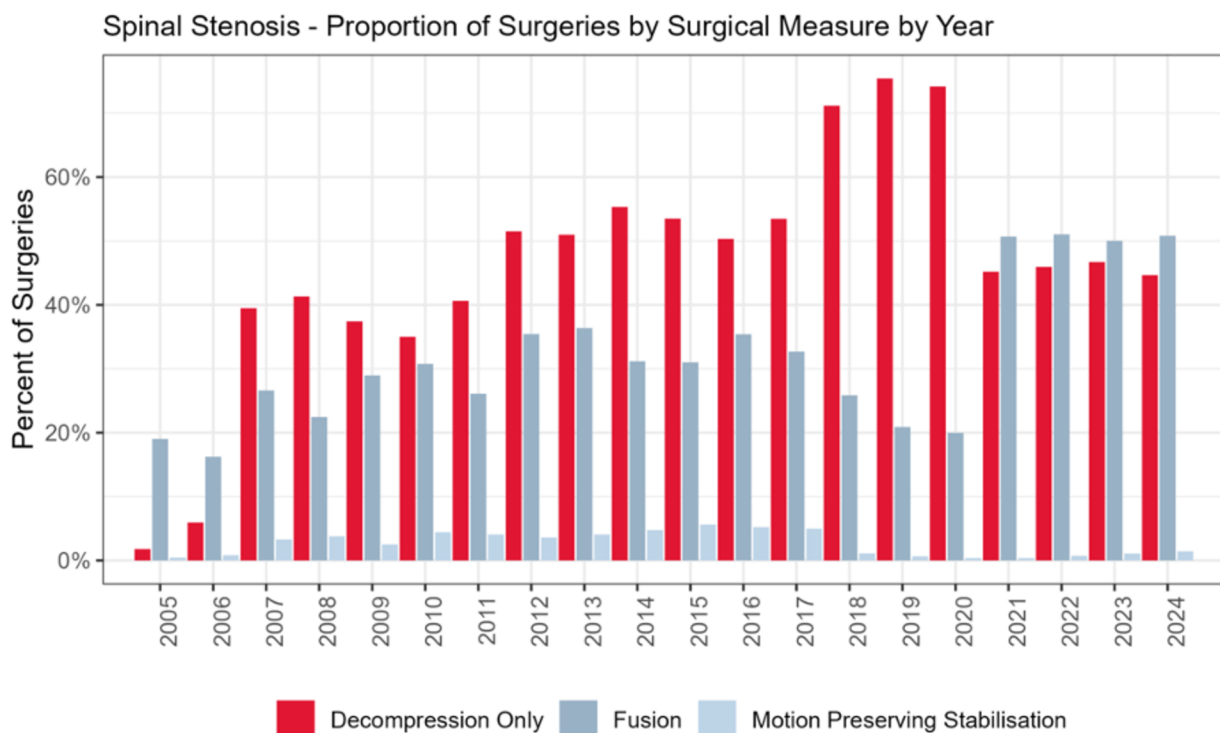


Figure 16. Proportion of surgeries by surgical measures by year

"Our registry is committed to shaping a future of better patient outcomes by ensuring that all participants and stakeholders benefit from valuable data. Spine Tango serves as a unifying platform for the global spine care community, establishing a common language and data structure through its international multilingual registry. "

Sabrina Donzelli, Chair Spine Tango Committee

Complications

General complications were rather rare with the leading complication of kidney and urinary tract in 0.55% of the surgeries (Figure 17).

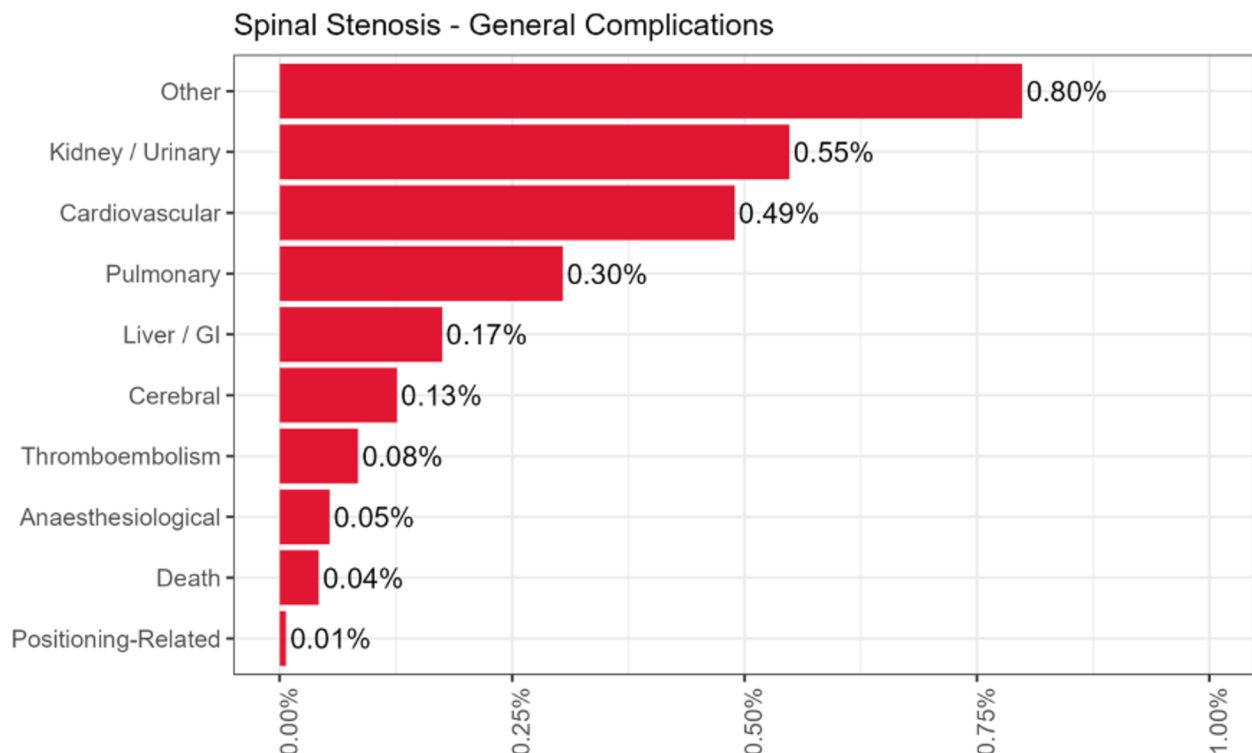


Figure 17. General complications for spinal stenosis cases

Surgical complications were more frequent with dural lesions documented in 4.52% of the surgeries (Figure 18). The next most frequent complications were neurological with motor dysfunction, epidural hematoma, sensory dysfunction and radiculopathy in 0.53%, 0.47%, 0.37% and 0.37%, respectively.

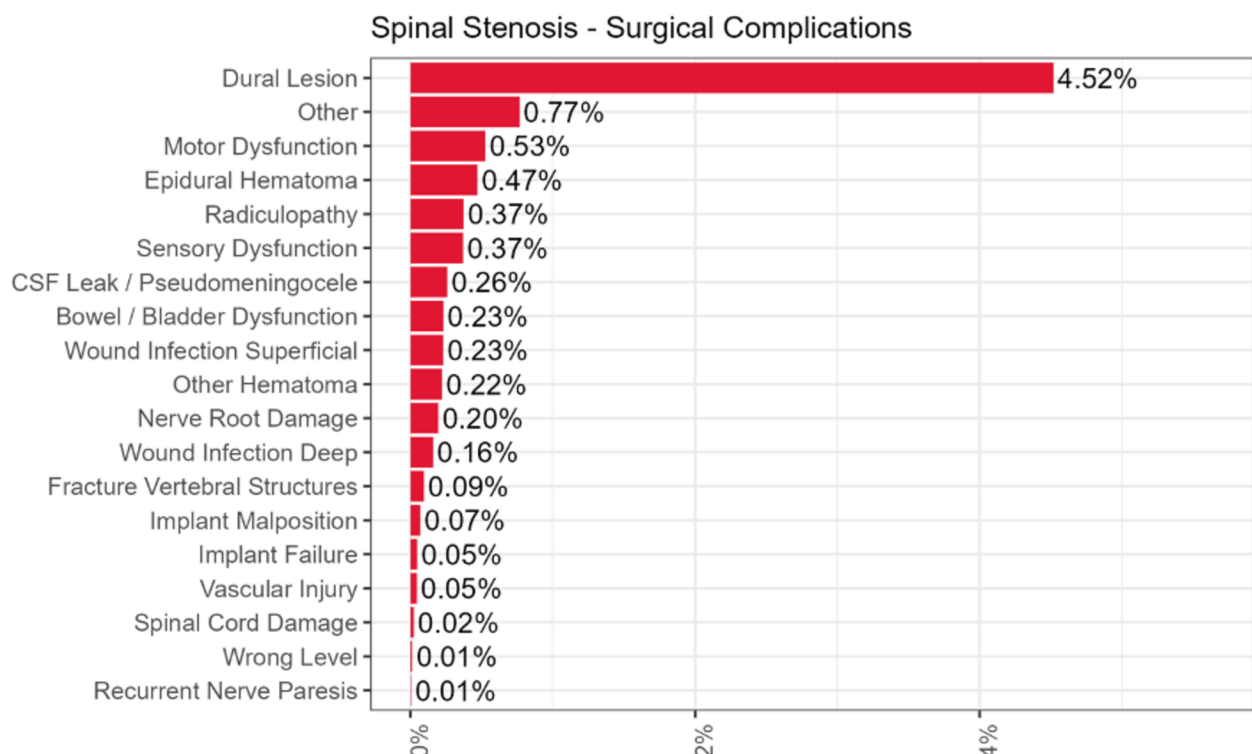


Figure 18. Surgical complications for spinal stenosis cases

Outcomes - COMI

In almost every third patient, a baseline COMI form and a 3-month postoperative or a later COMI form were documented. This rate varies considerably between hospitals, depending on whether they systematically collect COMI or not. The following figure 19 to figure 21 demonstrates the average preoperative and postoperative axial and peripheral pain levels as well as COMI score with 95% confidence intervals over the last 20 years. The curves were not adjusted by patient characteristics, surgical measures and follow-up intervals, which are assumed to be relatively stable. The figures have a descriptive character only and a conclusive interpretation requires more granular investigations.

Over this period the preoperative axial pain slightly increased from 5.5 to 6 points, while in the same time the postoperative axial pain has also slightly increased from 3.5 to 4 points. Thus, for spinal stenosis the levels of preoperative and postoperative axial pain were relatively stable with an indication of slight improvement in treatment indication.

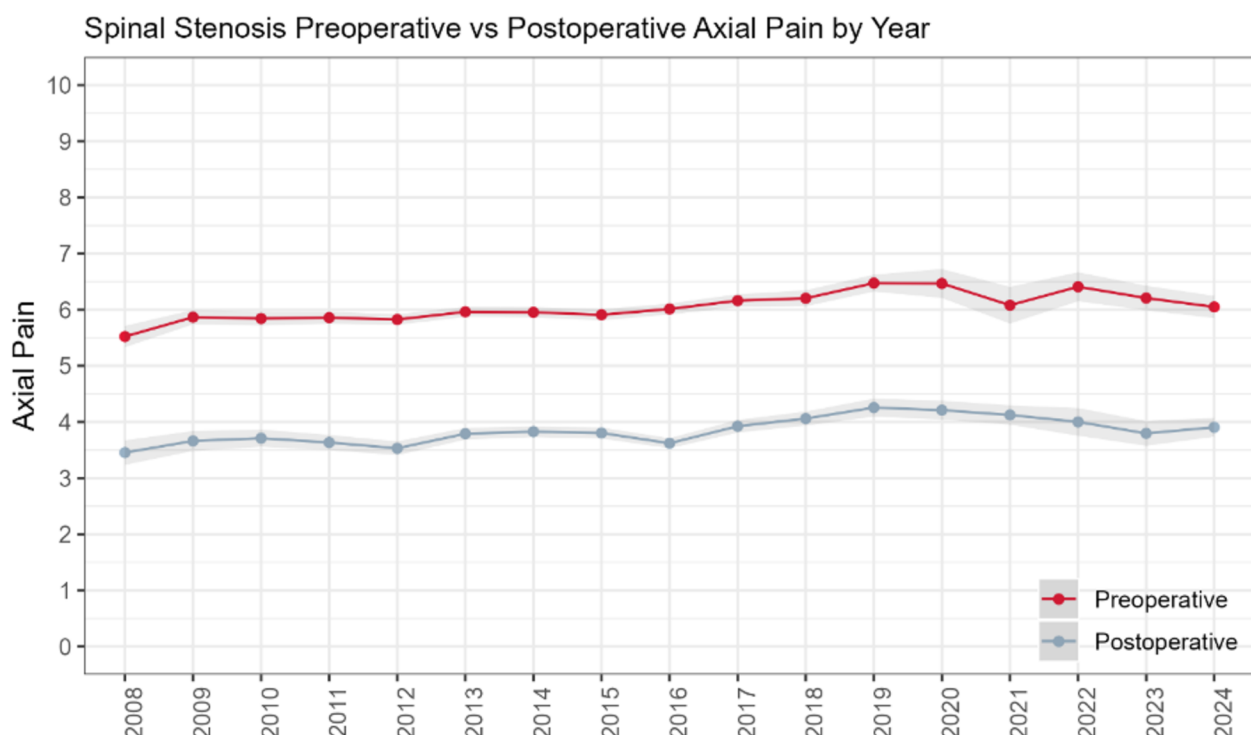


Figure 19. Preoperative and postoperative axial pain in spinal stenosis cases by year

Over this time period the preoperative peripheral pain remains stable between 6.5 and 7 points with one exception in 2019, when it was slightly higher than 7 points. The postoperative peripheral pain remains stable too, mostly between 3.5 and 4.0 points.

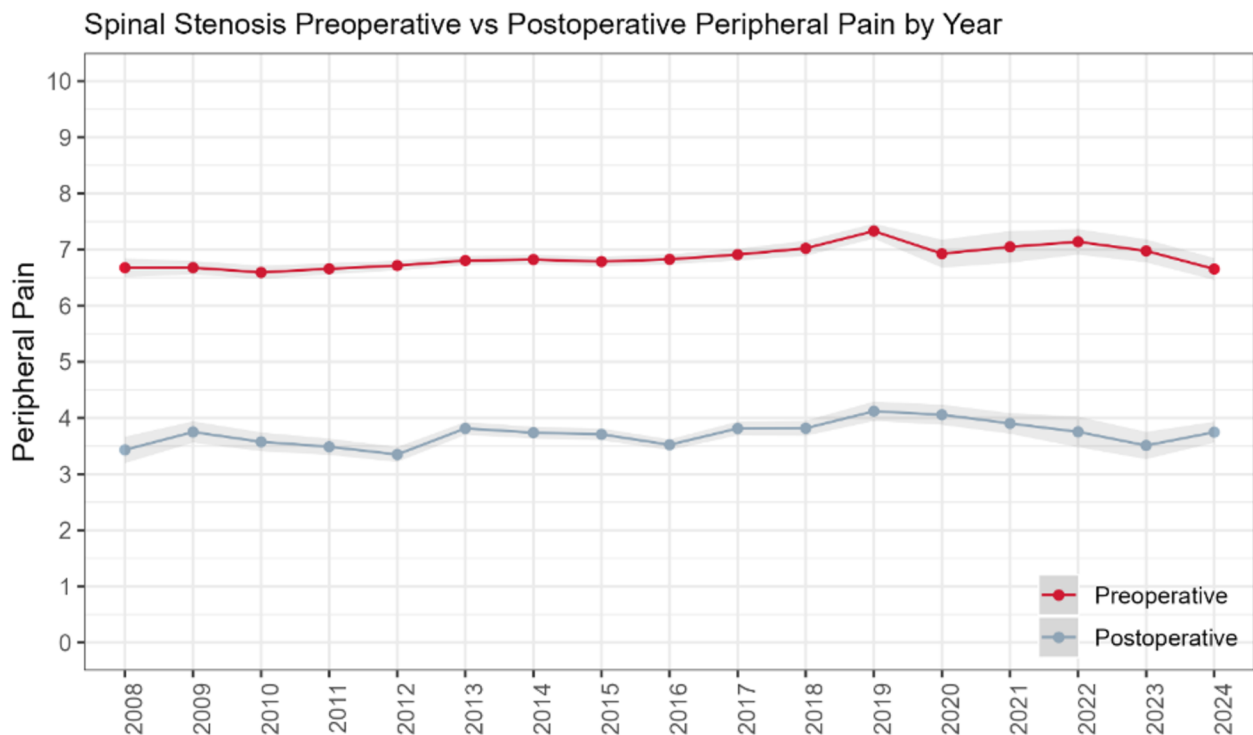


Figure 20. Preoperative and postoperative peripheral pain in spinal stenosis cases by year

Over this period the preoperative and postoperative COMI scores remained very stable around 7.5 and 4.5-5.0 points, respectively.

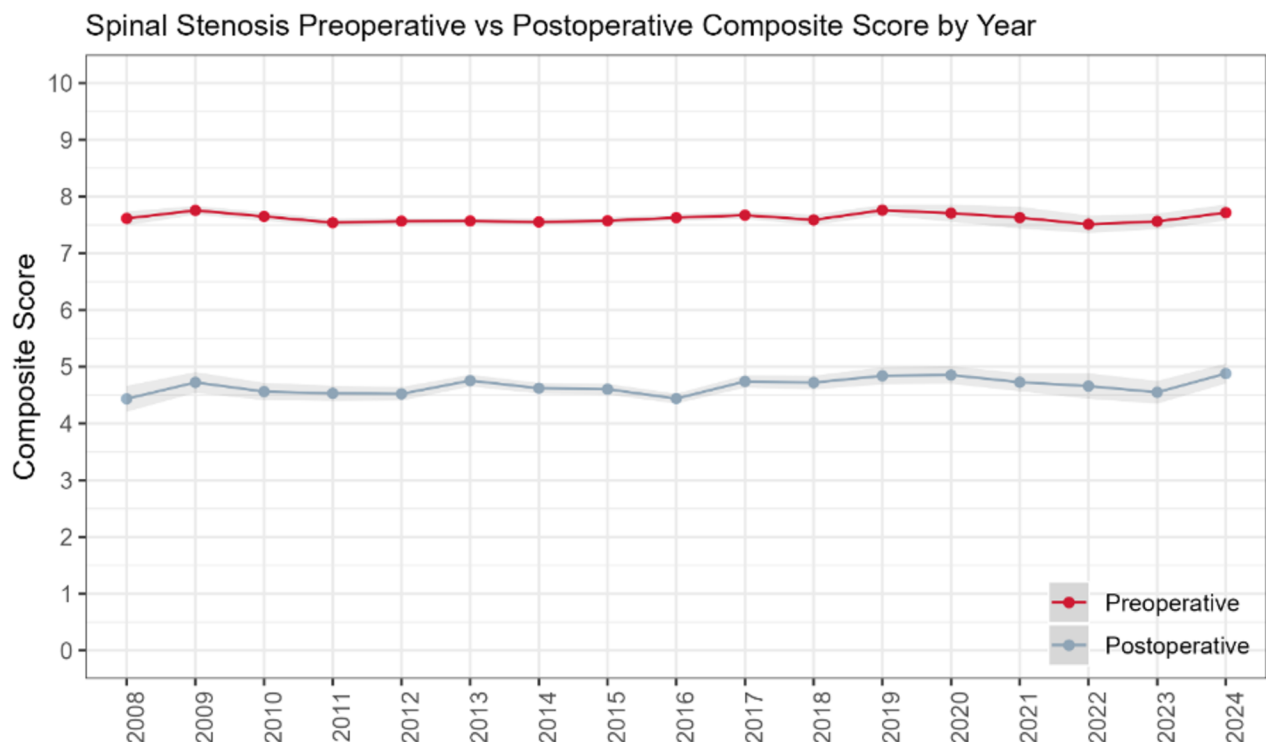


Figure 21. Preoperative and postoperative COMI score in spinal stenosis cases by year

SELECTED RESULTS: CUMULATIVE REVISIONS RATES

The Kaplan-Meier (KM) curves for cumulative revisions rates have been calculated and stratified by selected characteristics. The analysis was performed based on the complete registry population of 168,583 surgeries.

The following figures 21 and 25 demonstrates cumulative revisions rates by age groups and smoking status of the patients.

Looking at the KM curves of age groups at 2 years postoperative, patients older than 70 years of age appears to have the highest cumulative revision rates, while the least rate is seen in patients younger than 50 years of age.

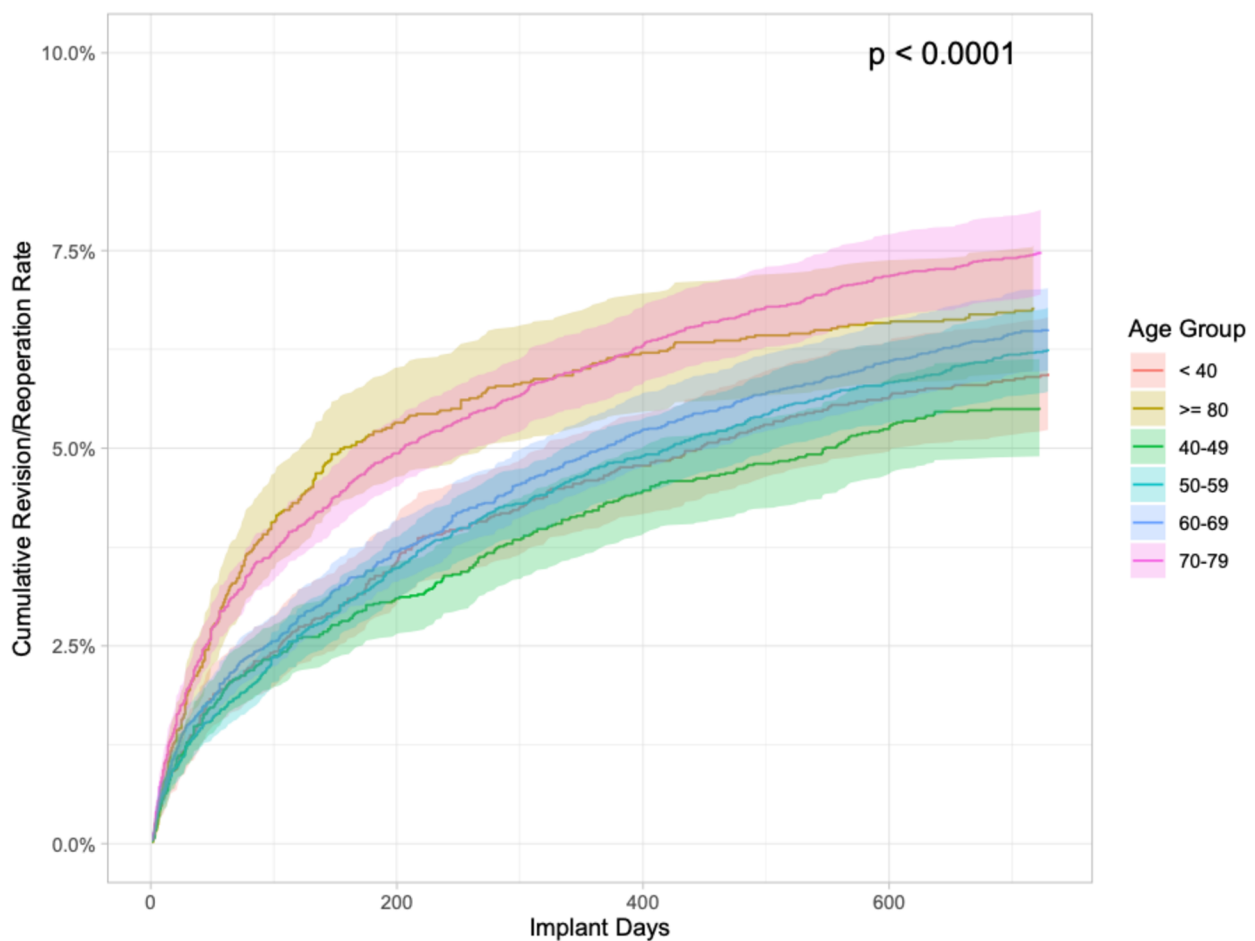


Figure 22. Cumulative revision rate by age group.

While the curves for the smoking status “no” and “unknown” are distinct from each other, they both have significantly lower cumulative revision rates at 2 years than the smokers.

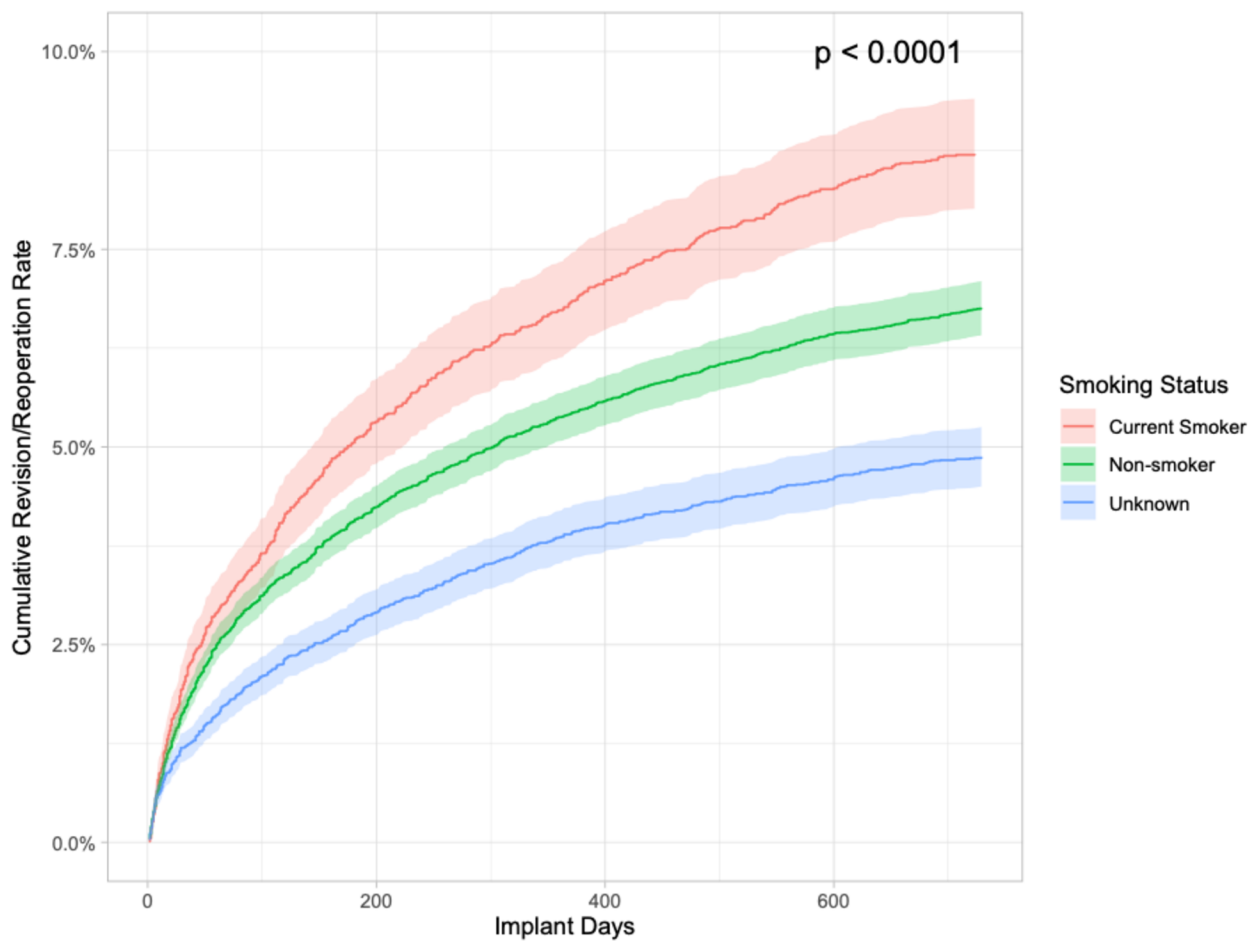


Figure 23. Cumulative revision rate by smoker status.

The next figure 24 demonstrates similar cumulative revisions rates for male and female patients. While the curves are parallel in principle, as slight deviation is seen toward the end of the 2nd postoperative year with female patients having a slightly higher rate.

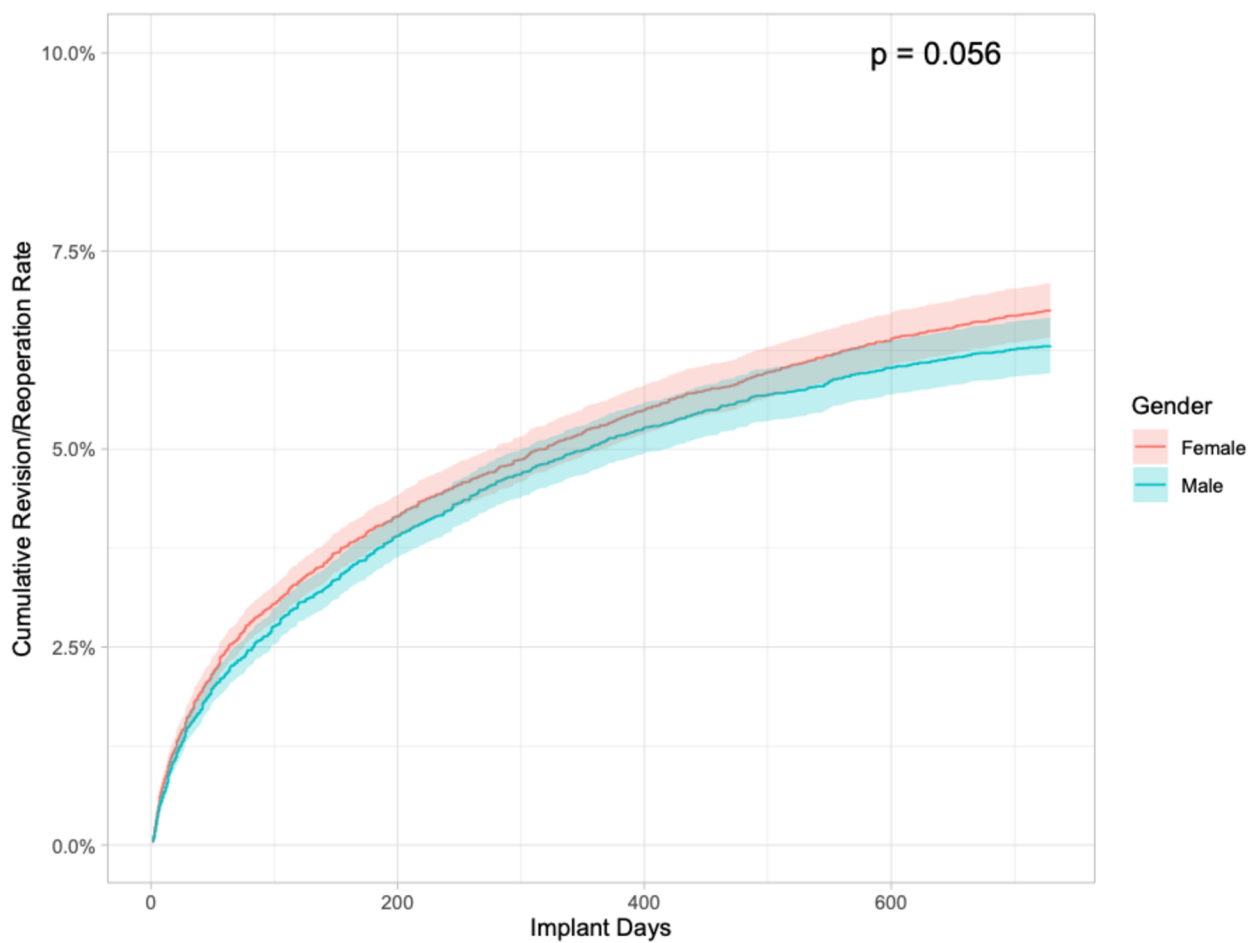


Figure 24. Cumulative revision rate by gender.

The following stratification of cumulative revision rates by ASA in the figure 25 shows a rather expected image with the highest cumulated revision rates for higher ASA. The ASA 5 category is excluded from the analysis due to low numbers.

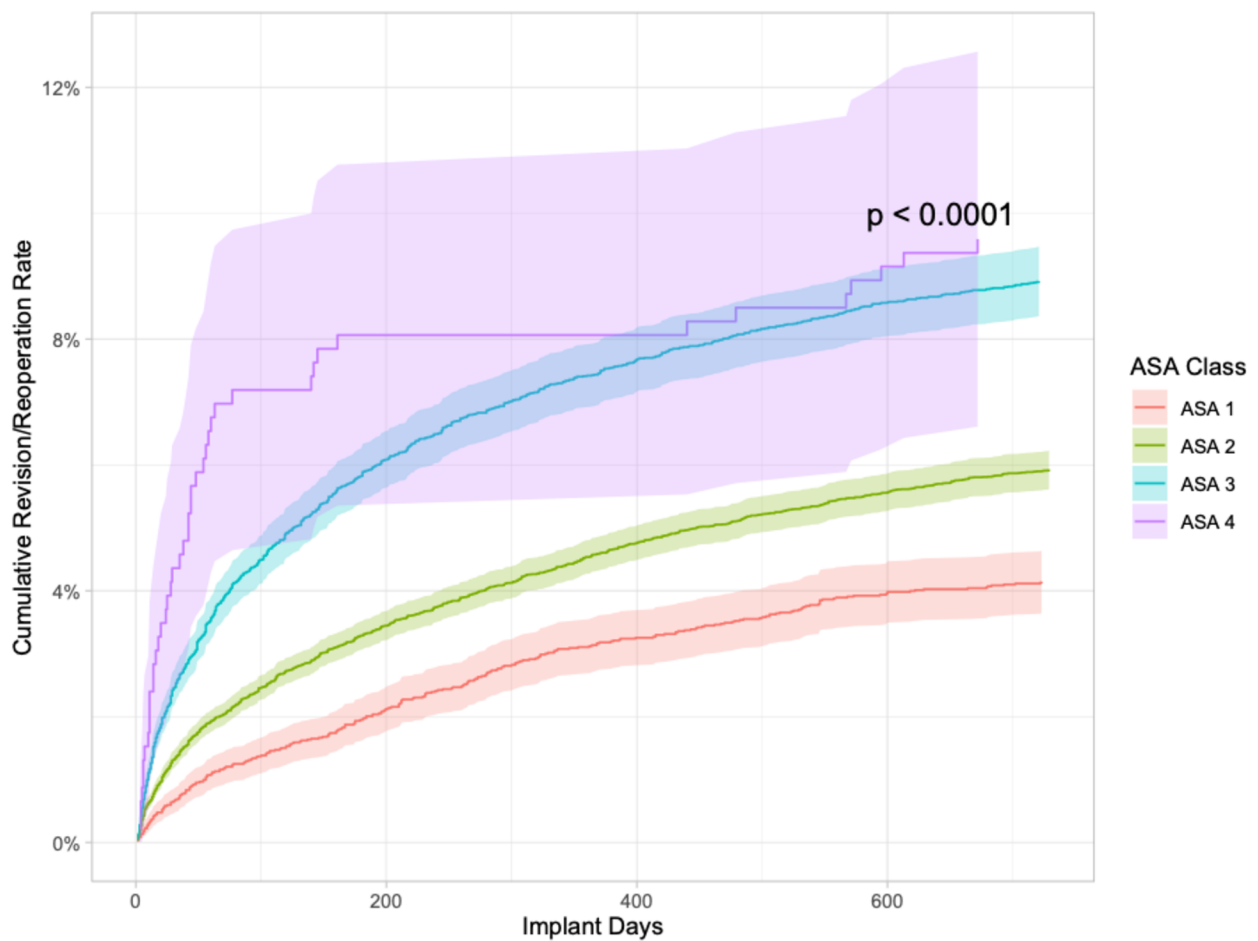


Figure 25. Cumulative revision rate by ASA category.

SELECTED RESULTS: PATIENT SATISFACTION BY COUNTRY AND SURGERY TYPE

The next analysis included all patients with lumbar spinal stenosis who were ≥ 18 years of age and had a preoperative and postoperative COMI form. The analysis assessed level of patient satisfaction (COMI item "Over the course of treatment for your back problem, how satisfied were you with your overall medical care in our hospital?") with decompression alone and fusion surgeries, while adjusting for the case mix (age, gender, smoker status, ASA, and number of previous surgeries).

The following figure 26 demonstrates a very similar level of patient satisfaction around 87.5% after decompression alone as well as after fusion in the analysed countries.

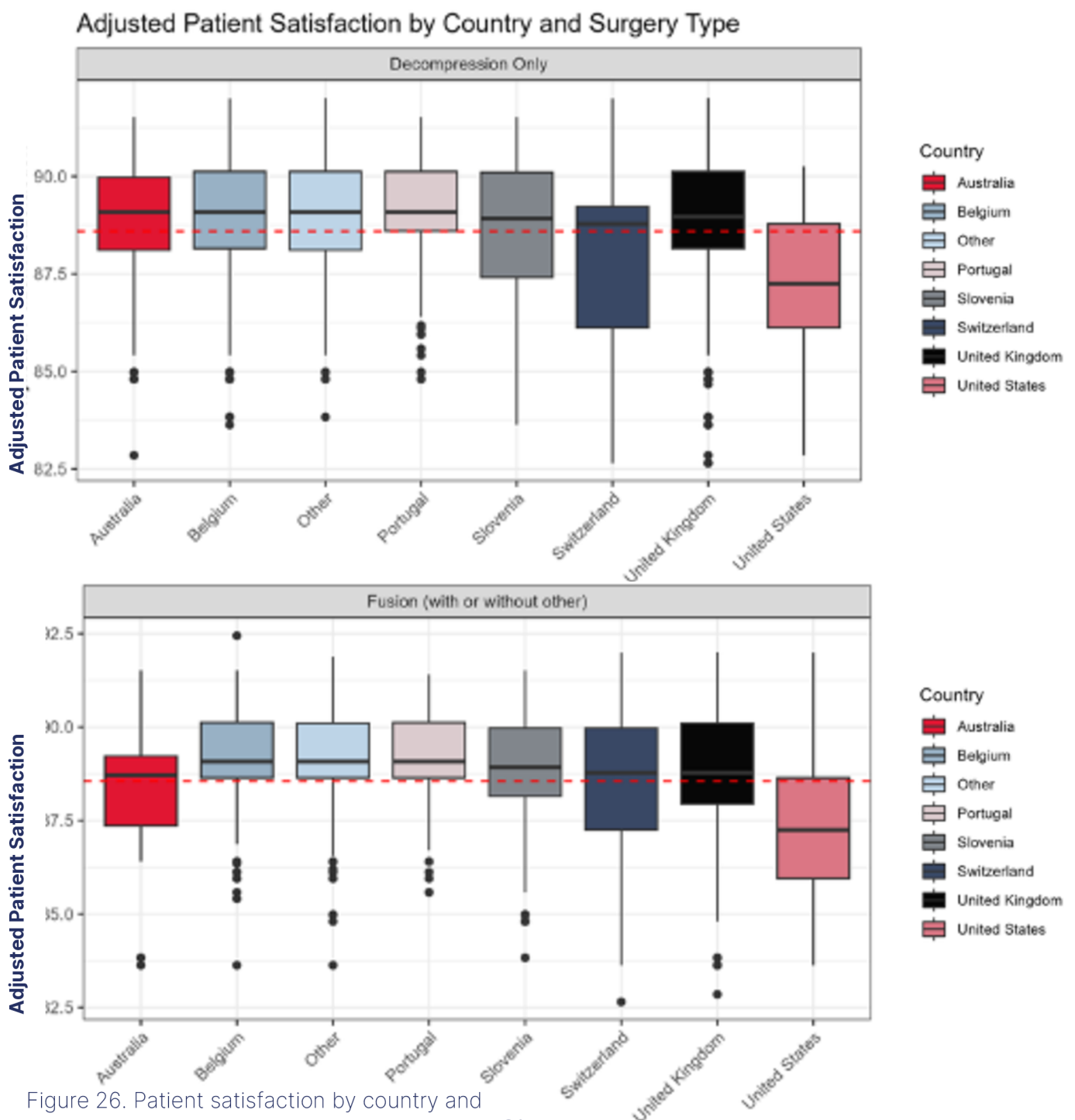


Figure 26. Patient satisfaction by country and surgery type for spinal stenosis.

SELECTED RESULTS FROM IMPLANT DATA ANALYSES

The following analysis demonstrates the revision rates by anonymised implant manufacturer, implant category and implant brand. The left figure includes all revisions, while the right figure only includes revisions with an implant-related cause (like implant failure or loosening, hardware removal and similar).

The x-axis (horizontal) shows the number of expected revisions. This number of expected revisions is calculated for each implant manufacturer, category or brand, taking into account the total volume of operations, the age of the patients, their gender, smoking status, BMI, ASA category and the number of previous operations. This approach allows a fair comparison despite differences in patient populations. The y-axis (vertical) shows the rate of actual revisions observed in relation to the expected revisions. The axis represents the rate of deviation between the observed and expected revisions. If the number of revisions observed is the same as expected, the implant manufacturer, category or brand has a standardised rate of 1. However, if twice as many revisions are observed as would have been expected in the patient population, the implant manufacturer, category or brand has a standardised rate of 2. The funnel-shaped control limits 95.0% (orange and light blue) and 99.8% (red and dark blue) of the overall average show the respective confidence interval. The determined number of revisions may fluctuate randomly within this range. The red dots above the control limits indicates an outlier with a significantly higher number of revisions than expected and requires a closer look. The dark blue dot below the control limits is a downward outlier with a significantly lower number of revisions than expected, which may indicate under-reporting or a better performance. The points in yellow and light blue between the 95.0% and 99.8% control limits indicate the implant manufacturer, category or brand that are in the borderline range for an outlier.

"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, former Consultant Neurosurgeon, Walton Centre for Neurosurgery, United Kingdom

ALL REOPERATIONS (LEFT) AND IMPLANT-ASSOCIATED REOPERATIONS, BY MANUFACTURER

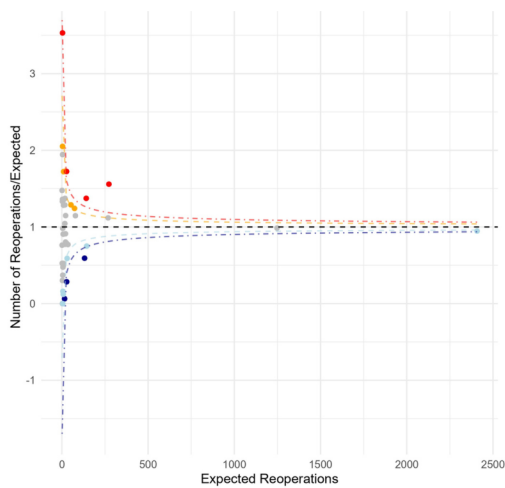


Figure 27. The overall revision/reoperation rates by implant manufacturer

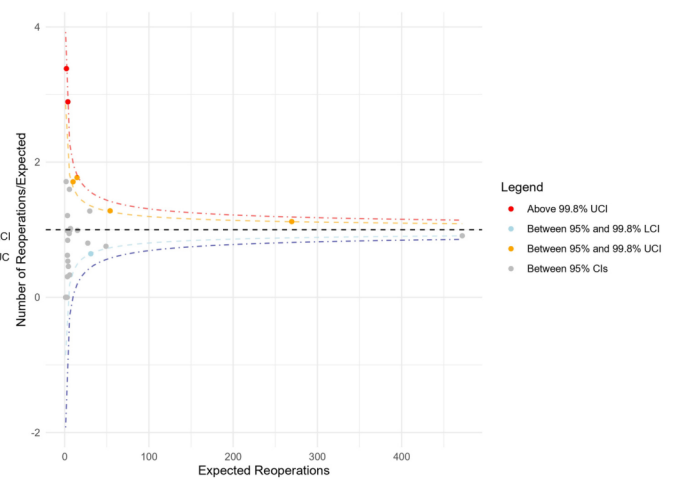


Figure 28. The rates of implant-associated revisions/operations by implant manufacturer

ALL REOPERATIONS (LEFT) AND IMPLANT-ASSOCIATED REOPERATIONS, BY IMPLANT TYPE

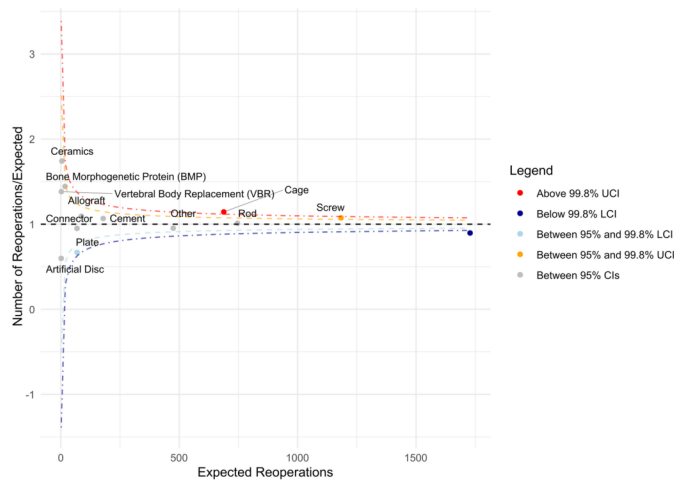


Figure 29. The overall revision/reoperation rates by implant type

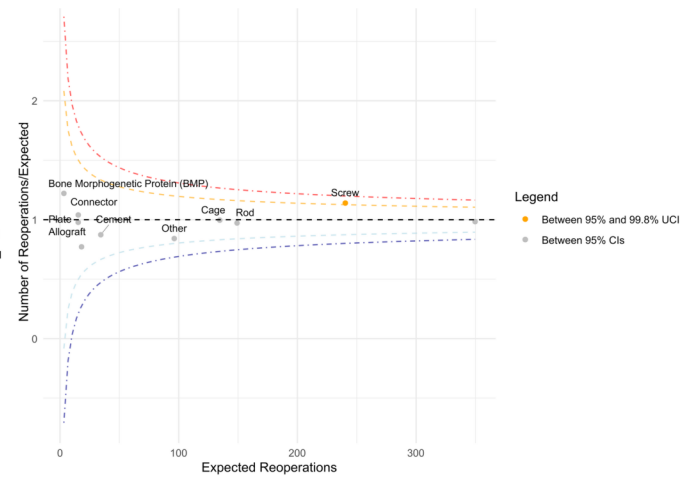


Figure 30. The rates of implant-associated revisions/operations by implant type

ALL REOPERATIONS (LEFT) AND IMPLANT-ASSOCIATED REOPERATIONS, BY IMPLANT BRAND

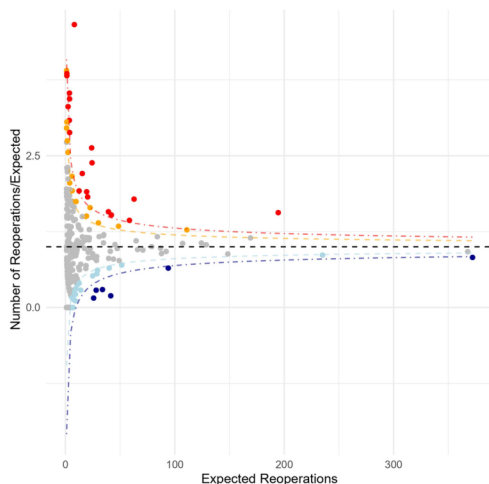


Figure 31. The overall revision/reoperation rates by implant brand

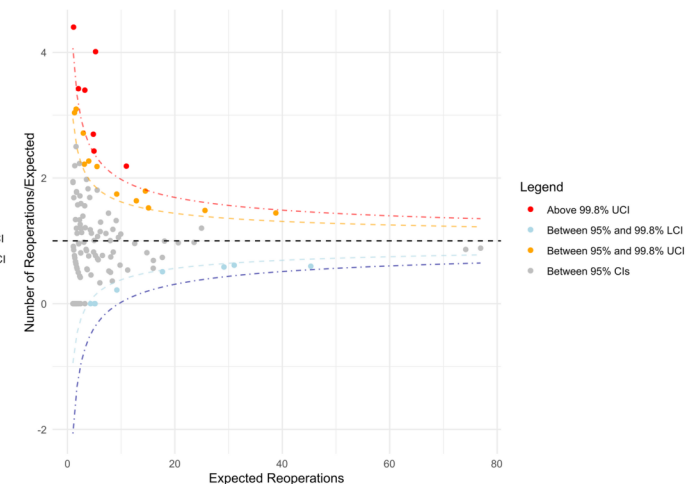


Figure 32. The rates of implant-associated revisions/operations by implant brand

Figure 27-32

The rates of overall and implant-associated revisions by anonymised implant manufacturer, implant category and implant brand.

If taking into account all causes for revision (left images), there is a number of implant brands and a few manufactures as well as one implant type (cage) which are statistically more frequently revised with a revision. However, if considering the implant-associated causes for a revision only (right images), then this number of significant outliers get reduced to a couple of manufacturers and seven brands. At the moment we do not further interpret these figures, as a closer look is required and a concept for the identification of outliers is yet under development.



CONTACT

Office Team

Emin Aghayev, Senior Advisor Spine Tango and Project manager SIRIS Spine

Christian Herrmann, Senior project manager and data analyst Spine Tango

Sandy Sutter, Quality Assurance Manager

Sylvia Hartog, Marketing Manager

Spine Tango Committee

Chair

Sabrina Donzelli, Italy

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Bart Depreitere, Belgium

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“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, Past President EUROSPINE, Ingolstadt, Germany

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