

# WFNS SPINE COMMITTEE

"Equal Spine Care for All"

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## EDITORIAL

## VISUALIZATION SYSTEM IN SPINE SURGERY

## ARTIFICIAL INTELLIGENCE IN SPINAL SURGERY

## INTERVIEW OF SPINE COMMITTEE MEMBERS

## COURSES AND WEBINAR

## UPCOMING CONGRESS AND COURSE

## UPCOMING RECOMMENDATIONS

## EDITORIAL

Francesco Costa and Nikolay Peev



Dear All,

The 2023 actually is running full of activities. The Planetary COVID-19 emergency is officially ended. Our life and work are back to normality, atleast in appearance. But we can just back page and forgot these year? Obviously not. From the past we need to build our present and future, making treasure form our experience. We learned a new way to remain in contact, discovering the powerful of the online education, e-learning as well as events like webinars. Today they represent one of the most common ways of connecting people and sharing knowledge.

"What benefits do webinars offer you? I have address this question during the COVID-19 emergency (*Costa F, Servadei F. Webinar During COVID-19 Pandemic: Necessity or Uncontrolled Phenomena? World Neurosurg. 2021 Oct;154:186. doi: 10.1016/j.wneu.2021.07.087. PMID: 34583482; PMCID: PMC8529613*) when the numbers of online events were uncontrolled. Actually the numbers of events is progressively decreased, mainly due to the return of the standard educational program and consequently reduction of available time. However, this question remain of actuality and now is time to understand how to integrate these instruments in a prolific way in the post-pandemic era. Probably the scientific society must integrate this tool not as an independent alternative but as an integrated opportunity to our educational portfolio.

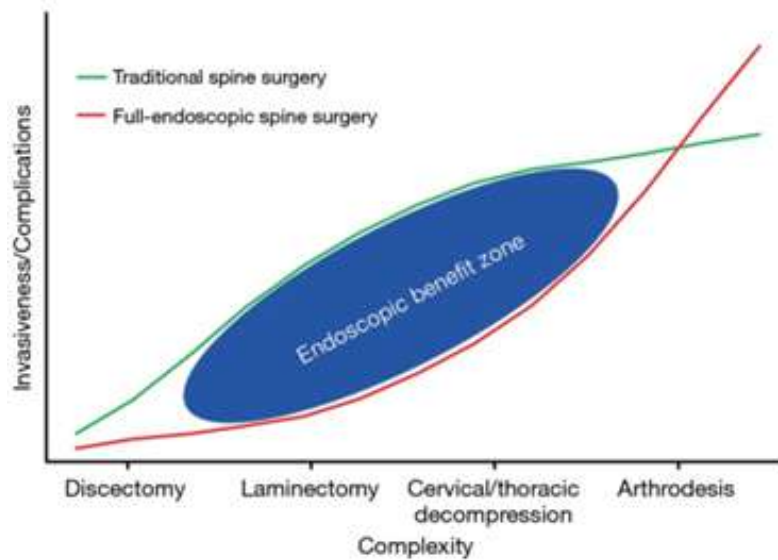
A clear example is represented by the transformative **WFNS Spine Committee Basic Course held in Santa Cruz de La Sierra (Bolivia)**, as pre-meeting course of the International Conference on Recent Advances in Neurotraumatology (ICRAN) 2003, where a combination of online, pre-recorded and in person lectures were performed.



## VISUALIZATION SYSTEM IN SPINE SURGERY

Francesco Costa (Italy)

A proper visualization and illumination of the operative field are the two vital cornerstones upon which neurosurgery has evolved over time. Moreover in a era where minimally invasive surgery is advocated the visualization tools have a key role for the success of surgery. Before the advent of the surgical microscope, surgeons had been using various magnifying systems mounted on spectacles or headbands. But is the introduction of operative microscopes (OMs) represent the first real revolution, especially in neurosurgery, as a result of the implementation of lighting and magnification of the surgical field and of the capability to dissect the microneurovascular structures. Surgical microscopes have gone through a long evolution and development, granting even better resolution and solution. However, nearby the microscope, in the last years new others visualization tools where introduce in surgery. In particular, speaking of our field of interest, the spine surgery, from 1980' endoscope procedure starts, gaining progressive popularity particularly in Europe and Asia, and actually endoscopic procedures provides equivalent outcomes to microsurgical or tubular techniques with shorter hospital stay and less collateral tissue injury and less systemic stress for the patient. Rather than being touted as a panacea for all spinal pathology, full-endoscopic spine surgery offers distinct advantages which vary based on the overall health status of the patient and the technical complexity of the planned procedure.



*The surgical invasiveness and complexity index is a qualitative graphical representation which plots the perceived complexity and invasiveness of spine surgical procedures which can be accomplished via open, minimally-invasive tubular or endoscopic methods. The endoscopic benefit zone is depicted by the blue ellipse and represents the theorized advantage endoscopic techniques have for different surgical procedures based on comparative surgical risk profiles from current published data. The advantage of endoscopic techniques is more pronounced for moderate to higher complexity procedures such as decompression for lumbar spinal stenosis and cervical/thoracic decompression.*

If the microscope technology can be considered in the “plateau of productivity” (which represents the final stage of the technology life-cycle, whereby the true advantages and limitations of a technology are accepted) the full-endoscopic spine surgery probably is currently in the “slope of enlightenment” phase which represents a period in which the specific value of innovation is better understood (Hasan S, Härtl R, Hofstetter CP. *The benefit zone of full-endoscopic spine surgery. J Spine Surg. 2019 Jun;5(Suppl 1):S41-S56. doi: 10.21037/jss.2019.04.19.*). Between these two visualization tool more recently the exoscopes where introduced to the neurosurgeons’ armamentarium, acting as a bridge between operating microscopes and endoscopes.



However, this technology is still not so widespread in daily routine, as this technology may be considered in the early “hype” period (when newer technologies often are unable to meet overinflated expectations and are perceived to not provide improvement over the current standard). A special issue of World Neurosurgery (Guest Editor: Prof Francesco Costa, Dr. Francesco Restelli) entitled “Exoscope-assisted spine surgery: from basics to complex pathologies” will present an up-to-date review on exoscopic use in spine surgery, presenting theoretical and practical tips and tricks.

## Artificial Intelligence and Spine Surgery

*Nikolay Peev (UK)*

**Artificial intelligence (AI)** is revolutionizing various sectors of healthcare, and one area that stands to benefit significantly is spinal surgery. With the integration of AI technologies, doctors and patients can experience improved surgical outcomes, enhanced decision-making capabilities, and increased safety measures. One way in which AI is being used in spinal surgery is through the analysis of medical images. Radiological images such as CT scans and MRIs can be analyzed using AI algorithms. AI-powered tools can precisely measure spinal parameters, assess spinal alignment, and simulate the effects of surgical interventions. Surgeons can utilize this information to create patient-specific surgical plans, leading to improved surgical accuracy and reduced surgical time. During surgery the AI can guide the surgeon's movements and provide real-time feedback. For example, a surgical robot equipped with AI can help the surgeon make precise incisions and ensure that the surgical instruments are placed in the correct location. This can help reduce the risk of complications and improve patient outcomes.

**Augmented reality (AR) and virtual reality (VR)** technologies offer unique opportunities in spinal surgery. By overlaying computer-generated images onto the surgeon's field of view, AR systems can provide real-time guidance, highlighting anatomical structures, critical landmarks, and areas of interest. Another way in which AI is being used in spinal surgery is through predictive modeling. By analyzing large sets of patient data, AI algorithms can help identify patterns and predict which patients are most likely to have complications after surgery. This information can be used to adjust surgical plans and improve outcomes. AI algorithms can identify patterns and trends in the postoperative recovery process, enabling early intervention when necessary. This proactive approach reduces the risk of complications. While AI presents numerous benefits for spinal surgery, there are also concerns that need to be addressed. It is crucial to carefully consider these concerns to ensure the responsible and ethical use of AI technologies.



**AI algorithms** are trained on historical data, which may contain inherent biases. If not properly addressed, these biases can lead to disparities in patient care and treatment outcomes. It is crucial to ensure that AI models are trained on diverse and representative datasets, and that the algorithms are continuously monitored and audited for fairness and accuracy. As AI algorithms become more complex, it can be challenging to understand the decision-making process and interpret the results. Surgeons and healthcare professionals should have a clear understanding of how AI systems arrive at their recommendations. Transparent algorithms and explainable AI techniques can help provide insights into the reasoning behind AI-generated recommendations, ensuring accountability and enabling surgeons to make informed decisions. AI should be seen as a tool to assist surgeons, rather than a replacement for human expertise. It is essential to maintain the appropriate balance between human judgment and AI-generated insights. Surgeons should have the final decision-making authority and should be aware of the limitations and potential biases of AI systems. Collaborative approaches that involve surgeons and AI working together can lead to the best outcomes for patients.

The **integration of AI** in spinal surgery raises questions about liability and accountability. Clear guidelines and regulations need to be established to address legal and ethical issues, such as who is responsible in case of adverse events or errors caused by AI systems. Additionally, the regulatory framework should ensure that AI technologies in spinal surgery undergo rigorous testing, validation, and continuous monitoring to ensure safety and efficacy.

By addressing these **ethical considerations** and implementing appropriate safeguards, AI technologies can be harnessed responsibly in spinal surgery, promoting patient well-being, improving surgical outcomes, and advancing the field of healthcare. It is important for healthcare providers, policymakers, and researchers to collaborate in establishing ethical guidelines and frameworks that promote the responsible use of AI in spinal surgery.

The field of artificial intelligence in spinal surgery is expected to continuously evolve in the next years, and several milestones are anticipated in the near future. While it is challenging to predict precise developments, some potential milestones include:

1. **Enhanced Surgical Planning and Personalization:** AI algorithms will become more sophisticated in analyzing patient data, including medical records, imaging scans, genetic information, and patient-reported outcomes. This will enable surgeons to develop highly personalized treatment plans.
2. **Advanced Surgical Navigation and Robotics:** The integration of AI with surgical navigation systems and robotics will lead to further advancements in precision and safety.
3. **Real-time Predictive Analysis:** AI will play a significant role in predicting intraoperative and postoperative complications in real-time by analyzing patient's vital signs, sensor data, and surgical parameters.
4. **Augmented Reality and Virtual Reality Advancements:** Augmented reality (AR) and virtual reality (VR) technologies will continue to advance, providing surgeons with immersive and interactive experiences in the operating room.
5. **Integration of AI with Electronic Health Records (EHR) and Clinical Decision Support Systems:** AI will be seamlessly integrated with electronic health records and clinical decision support systems. This integration will enable AI algorithms to analyze comprehensive patient data, provide real-time recommendations to healthcare providers, and assist in clinical decision-making.
6. **Continued Research and Development:** The field of AI in spinal surgery will witness ongoing research and development efforts. Academic institutions, medical device companies, and technology firms will collaborate to refine existing AI algorithms, develop new models, and conduct large-scale clinical studies.

It is important to emphasize however, that the potential milestones mentioned above are speculative and represent potential directions for AI in spinal surgery. The actual timeline and achievements will depend on technological advancements, regulatory considerations, and collaborative efforts across the medical and AI communities.

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# INTERVIEW OF THE SPINE COMMITTEE MEMBER

by Christoph Sippl



*Prof. Joachim Oertel*  
*Germany*

**Q. Kindly Introduce yourself and tell us why did you choose neurosurgery as a profession?**

My name is Dr. Oertel. I'm a Professor of neurosurgery at the Saarland University in Germany. And it's a pleasure to give you my thoughts about neurosurgery and neurosurgical development in the future.

Neurosurgery, actually, it was by accident. I thought I would become a general surgeon and then I got in contact with the neurosurgery and I think it's the most sophisticated surgical discipline. So we have very delicate procedures dealing with vessels on an almost molecular level. And then we also have big spine procedures where we do basically make a new spine. So I think neurosurgery is by far the most interesting surgical discipline.

**Q. Tell us something about some of your mentors during residency and your training in neurosurgery and spine surgery?**

I had the pleasure to work with a lot of a different, very well-known and experienced neurosurgeons. So I started my neurosurgical practice with Prof. Sami in Hanover, and I really learned a lot about his thoughts and his ideas. And he really coined me to some degree to do a particular skull-based surgery. Then I had the opportunity to work with Prof. Gab, and he basically was my boss for... Well, he still is my boss to some degree. He really made a lot of effort to make me a good neurosurgeon. Not always very pleasant, but well, with at least some force and some effect. And he taught me a lot about indication, surgical techniques, the idea how to avoid complications and particularly endoscopic procedures. And then later, when I became the Vice Chairman of the Department in Mainz, I had the pleasure to meet Pernetski for his last months and learned his ideas about minimally invasive techniques.

**Q. What do you think about training residents in endoscopic procedures during their residency, or do you think they should be reserved for a special fellowship?**

I think now we are one step further than 10, 20 years ago. when the endoscopic procedures were to some degree experimental. We had a high complications. Success rate was not very obvious, but now we have some distinct endoscopic procedures we really need to teach the residents. For example, ETV in obstructive hydrocephalus, endoscopic application in the endonasal skull base approaches and endoscopic spine procedures. Atleast the residents need the experience to be familiar with the technique. Maybe they don't have to do 100 cases during residency. They should be able to identify strengths and disadvantages of the different techniques.

**Q. If there is a new applicant for a residency, what would you recommend to him for training in neurosurgery and spine surgery?**

In my experience, it's important to learn the anatomy. The next step is to be familiar with the procedures. And when you have done this or like I mean, today we do all about YouTube.

It's not about books, but you have to know the anatomy, and then the procedure and the third step is to see the procedure and to assist in these procedures. And not only one time, maybe three, four, or five times. When you have done all this, then the next step is to do it yourself. When you have done quite a number, then you can start to teach one. Today, we have the problem that frequently residents think that they start with a procedure on their own responsibility without really knowing the procedure, and the anatomy, knowing the risks and advantages and disadvantages of the individual technique. This is mandatory because later on you're alone. It's always only you. There is nobody you can call.

**Q. If a residents comes to you and has questions regarding research on a spine topic, such as stem cell research in wet lab techniques. What would you recommend for him?**

That's a difficult question because it depends a lot on the environment, on the academic environment, in the individual setting. In my opinion, I think that the most important part is research that you can translate to the clinical application. So it should not be too far away from the clinical application. So basically you develop new techniques, you develop new systems. This is a good thing. This is an important thing. You develop new applications, do new drugs like stem cell graphs.

If you really think that this is an indication which can be translated to the clinical application very soon. If it's not very soon, it's rather basic research, I think it's not helpful to become a good neuro or spine surgeon to do too much basic research. This is sometimes different in different settings. There are also settings where you do a lot of basic research, and then you have basically two different careers. It depends on your own interests, but to become a good surgeon, if this is the final goal of your interest, then I think it should be rather closer to clinical application.

**Q. What do you think about our WFNS Spine Committee guidelines and do you think they are helpful in general? And should there be some uniformity throughout the world regarding such guidelines? What do you think about that?**

To make a consensus statement for the WFNS is a challenging task. Why is that a challenging task? Because in the WFNS, the society represents all societies of the World. That means those who have no X-ray and microscope should also be included, and those who have all the sophisticated one million microscopes, exoscopes, and navigation in the OR at hand. I think it's a very challenging task to make a recommendation where you really include everybody throughout the World. It's very good because then we really clean out what is rubbish and what is really evidence based. I think it's important to get an idea of what is common sense. For the application itself in the individual setting, it can help you, but it will not actually be the guideline you have to adhere very tightly in your individual setting.

**Q. What do you think about the progress in general, the spine committee is doing during the last few years?**

*The Spine Committee*, has always been a very active committee. And when you look back for the last three, four, five years, there are so many meetings, so many educational activities, and so many consensus statements out there now. I think it's, at least from my perspective, one of the most active committees in the WFNS.

**Q. Is there any question I missed?**

I think the first statement is *neurosurgery is the most interesting discipline*. Secondly, *if you want to do neurosurgery, you should try to incorporate research with clinical application*.



# WFNS-SC Course in Kinshasa (DRC)

## June 23-24, 2023

**Aderehime Haidara (Ivory Coast)**



One of the primary objectives of the education program of the World Federation's Spine Committee (2021-2023) is to conduct training courses on spine surgery in Low- and Middle-Income (LMI) countries. As part of this initiative, several courses have been organized in different locations and time frames. The courses were held in Bingerville, Cote d'Ivoire, in June 2022, Nairobi, Kenya, in November 2022, Lomé, Togo, in February 2023, and most recently in Kinshasa in June 2023. The course in Kinshasa was associated with the CAANS Youth Forum (Young African Neurosurgeons) and for the first time, brought together participants from all regions of North, West, Central, East, and South Africa. The course was attended by at least 135 resident and new graduate neurosurgeons from 35 African countries. The program included a two-day course that featured hands-on techniques and saw bone sessions with the aim to provide training and enhance the skills of young neurosurgeons in spine surgery. 5 Spine committee members, Salman Sharif, Mirza Pojskic, Aderehime Haidara, Corinna Zygourakis and Sandeep Vaishya participated in this Kinshasa event. Whole meeting was arranged by Jeff Ntalaja. The president of the Congo and the Secretary and the Minister of health were the chief guest.

There are discernible infrastructural disparities between Northern Africa and South Africa when compared to other sub-Saharan African countries. Sub-Saharan African countries face significant challenges in the field of neurosurgery, including limited infrastructure, equipment and access to specialized neurosurgical services for the population. Consequently, there is currently a growing exchange between different regions of Africa, which offers unique opportunities for collaboration and learning across various neurosurgical disciplines, particularly in the realm of spine surgery. The objective is to bridge this gap and contribute to the long-term advancement of spine surgical practice in the region by training African neurosurgeons, establishing specialized centers, and advocating for improved resources and infrastructure.

To address the issue of limited access to surgical instruments and implants required for spinal surgery, partnerships can be developed with countries like China, Pakistan, and India, which are known for providing good quality and affordable equipment. The evolution of human resources in neurosurgery in Africa has shown promising growth, with the number of neurosurgeons increasing from 182 in 1982 to 1160 in 2023, particularly in sub-Saharan Africa. This upward trend offers better prospects for the field. The introduction of innovative techniques in spinal surgery, such as minimally invasive surgery, spinal deformity surgery, and endoscopic spinal surgery, in some African reference centers is a testimony to the progress being made.

#### **Cote D Ivore 23-26th June 22**



#### **Nairobi, Kenya - November 2022**



#### **Lomo, Togo 8-9th February 2023**



#### **Kinshasa 23 – 25th June 2023**



Partnerships with government and running these events with the local infrastructure and involving whole of the continent will enhance the training in Africa and improve the standard dramatically.



# Webinars

## WFNS HOW I DO IT

### Improving Fusion in Spine with Clinical Cases

5th March 2023

[https://www.youtube.com/watch?v=f\\_hENeaWu0](https://www.youtube.com/watch?v=f_hENeaWu0)



## WFNS HOW I DO IT

### Webinar on Cervical Disease

28th May 2023

<https://www.youtube.com/watch?v=m5o9JE7eAYQ>



Prof. Sharif, Prof. Gushcha, Prof. Chen, Dr. Guan, Dr. Duan during the webinar

## WFNS HOW I DO IT

### Endoscopic Lumbar Spine Surgery

2nd April 2023

[https://www.youtube.com/watch?v=-J1MH\\_bk2yU](https://www.youtube.com/watch?v=-J1MH_bk2yU)



## WFNS HOW I DO IT

### Difficulties and Problems Spine Surgery in Africa

22nd July 2023

<https://www.youtube.com/watch?v=nB0EF0tru6o>



Prof. Haidara, Prof. Sharif, Prof. Peev, Prof. Hartl, Prof. Najia, Prof. Qureshi, Prof. Shabani, Prof. Feiggen, during the Webinar



# Upcoming Congress and Courses

Below we present the next scheduled events:

- 12th Homburg Neuroendoscopy week - 3-9th September (Germany)
- Tarija Meeting - 10 - 12th October
- Istanbul Spine Masters - 19 - 22nd October (Istanbul)
- Senegal Meeting - 26 - 28th October
- 18th World Congress of Neurosurgery - 6-11th December (South Africa)

## Upcoming Recommendations of Spine Committee

Dear Reader,

The following recommendations (and correlate papers) will be published in 2023 by the Spine Committee:

- Back Pain
- Lumbar Dis Herniation
- Cranio-Vertebral Junction Pathologies
- Spine Tumor

**We would like to remind you that all of the papers of previous Recommendations are open access. The specific recommendations of the spine committee can be found on the website of WFNS:**

**<http://wfns-spine.org/recommendations>**



# WFNS SPINE COMMITTEE

## 2021-2023

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Salman Sharif (Pakistan)

### VICE-CHAIRMAN



Francesco Costa (Italy)

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(Russia)



Aderehime Haidara  
(Ivory Coast)



Corinna Zygourakis  
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