

Presentation at CFA congress of positive results obtained for SpineGuard's new ultrasound technology

- Feasibility of entry point and trajectory determination in vertebral drilling
- Ideal complement of DSG real-time X Ray-free guidance technology
- Collaboration with the LIB and ISIR labs of Sorbonne University
- Reference congress in the field of ultrasounds

PARIS, BOULDER (Colorado), April 29, 2025 - 6:00 pm CEST - SpineGuard (FR0011464452 - ALSGD), an innovative company that deploys its DSG® (Dynamic Surgical Guidance) sensing technology to secure and streamline the placement of bone implants, today announces that a team of researchers presented on the podium, a new scientific paper at the French Acoustic Congress (CFA) on April 28th in Paris (France), reporting on the progress with a new ultrasound robot-assisted technology allowing the determination of the entry point and pedicle trajectory from the bony surface of the spine.

Stéphane Bette, Co-Founder and Deputy CEO of SpineGuard, said: *"The acceptance of this paper in a reference congress is the first validation by the scientific community of the pertinence and feasibility of a new original ultrasound technology, patented by SpineGuard and perfectly complementing our DSG technology. It allows to determine without using X-Rays, the entry point and the drilling direction from the posterior surface of the bone, before the DSG sensor drill bit penetrates bone to perform a drilling secured by the automatic breach detection previously validated by published papers. In this study, we used robotic assistance, but the technology could also be applied to hand-held instruments. These outcomes demonstrate once more the richness of the collaboration with Sorbonne University, this time under the dual supervision of the Laboratory for Biomedical Imaging (LIB) and of ISIR (Institute of Intelligent Systems and Robotics) and involving surgeons as well as SpineGuard's engineers."*

Quentin Grimal, Professor at Sorbonne University, member of LIB (CNRS 7371 - INSERM 1146) and co-author of the study, added: *"The results presented during this conference demonstrate that it is possible to identify thanks to the ultrasounds, in realistic models of human vertebra, the optimal angle for a secured pedicle drilling. The innovation resides in the design of a dedicated ultrasound transducer, associated to an original signal treatment method. The technique was developed and validated using computer simulations followed by physical experiments in vertebral models of increasing complexity. We were able to observe that, despite the significant attenuation of ultrasounds in bone, the echoes originated within the pedicle are exploitable and allow for the identification of a trajectory that preserves the integrity of the pedicle. These outcomes suggest that the combination of the transducer with a robotic arm could in the future provide surgeons with a real-time indication to guide the drilling in a safer and more accurate manner."*

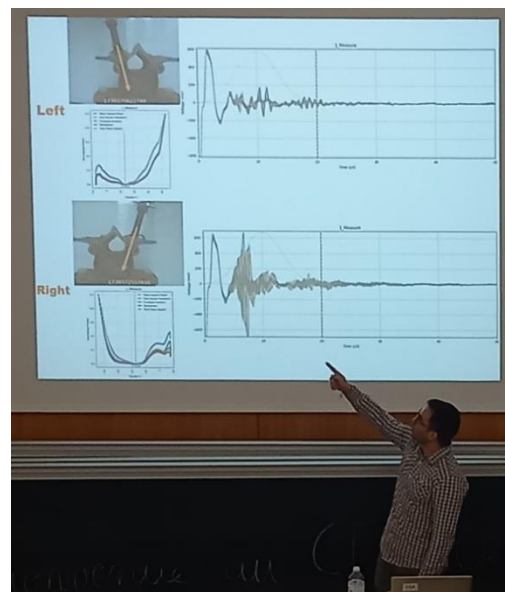
Brahim Tamadazte, Research Director at CNRS, member of the ISIR and manager of the RPI-Bio team (Sorbonne Université, CNRS UMR 7222, Inserm U1150), co-author of the study, concluded: *"This new collaboration between ISIR, LIB and SpineGuard has once more allowed for major advances in the robotic-assisted surgical gesture of pedicle screw insertion for scoliosis treatment, combining precision and safety. This study focuses on the optimization of the insertion trajectory of pedicle screws by the integration of a new ultrasound technology. It consists in scanning the surface of the pedicle with a specifically designed transducer mounted on a robotic arm. Advanced techniques in ultrasound signal treatment and robotic control were implemented to identify the optimal entry point and the adequate drilling trajectory. These results complement previous work on imminent bone breach detection algorithms based on DSG signal, produced by recent collaborations between Sorbonne University and SpineGuard. The combination of DSG and ultrasound technology without a doubt represent an ideal solution for surgeons in pedicle screw*

insertion without the necessity for preop ionizing imaging nor navigation systems that can be complex and may lack accuracy.”

As a reminder, DSG is based on the local measurement of electrical conductivity of tissues in real time without X-ray imaging, with a sensor located at the tip of the drilling instrument. Its efficacy was proven by more than 100,000 surgeries across the globe and 34 scientific publications. SpineGuard has entered in 2017 a collaboration with the ISIR (Institute of Intelligent Systems and Robotics) lab of Sorbonne University, CNRS and INSERM, for the application of DSG to surgical robots and the enhancement of their safety, accuracy, and autonomy.

The new presented ultrasound technology, property of SpineGuard, consists in identifying an entry point and a trajectory from the surface of the bone thanks to a specific transducer and signal treatment. This determination is performed by the detection of a minimum reflected energy, within a well picked time window, of a focalized unidirectional ultrasonic wave. This minimum corresponds to a deep travel in bone, revealing a correct trajectory, as opposed to an incorrect trajectory that would generate a more powerful and quicker echo.

The CFA (French Acoustic Congress) is the congress of the French Acoustic Society (SFA). In 2025, it is held in Paris from April 27-30th. The SFA is a non-profit organization created in 1948 that regroups acousticians, practitioners and scholars. Its purpose is to facilitate technical and scientific information sharing between the various actors of the acoustic field, as well as connections between research labs and industry. As such, it actively takes part in national and international (particularly European) scientific and technical activities in the various fields of acoustics. It is the founding member of the European Acoustic Association (EAA). It counts nearly 1,000 members for whom it facilitates exchanges, survey, access and organization of national and international conferences.



Presentation at the CFA by Jorge Andrés Pérez Velásquez, PhD Research Engineer of SpineGuard

About SpineGuard®

Founded in 2009 in France and the USA by Pierre Jérôme and Stéphane Bette, SpineGuard is an innovative company deploying its proprietary radiation-free real time sensing technology DSG® (Dynamic Surgical Guidance) to secure and streamline the placement of implants in the skeleton. SpineGuard designs, develops and markets medical devices embedding its technology. Over 100,000 surgical procedures have been secured worldwide thanks to DSG® and 34 studies published in peer-reviewed scientific journals have demonstrated the multiple benefits DSG® offers to patients, surgeons, surgical staff and hospitals. Building on these strong fundamentals and several strategic partnerships, SpineGuard is expanding the scope of its DSG® technology to the treatment of scoliosis via anterior approach, sacroiliac joint fusion, dental implantology and innovations such as the « smart » pedicle screw and power drill or surgical robotics. DSG® was co-invented by Maurice Bourlion, Ph.D., Ciaran Bolger, M.D., Ph.D., and Alain Vanquaethem, Biomedical Engineer. SpineGuard has engaged in multiple ESG initiatives. For further information, visit www.spineguard.com

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