Reline

From Nuvasive

https://www.nuvasive.com/surgical-solutions/complex/

Reline Cervical

The Reline Cervical system is designed to achieve your posterior cervical fixation (PCF) surgical goals through thoughtful implant design, improved operative efficiency, expansive and versatile junctional offering, and instrument balance elegance and capability.

Thoughtfully designed with the patented Helical Flange® set screw technology allowing for our smallest run-on rod in a dual-rod system

Expansive junctional solutions, designed with safety and versatility in mind, resulting in various implants for surgeon intraoperative selection

From degenerative to complex deformity applications, the Reline system can help you address even the most difficult pathologies. Reline was built to evolve with advances in enabling technology from complex open deformity to minimally-invasive surgery and everything in between

The easy to use Reline system enables an efficient workflow for operative time savings

Comprehensive rod reduction offering to deliver powerful reduction to support multi-rod and revision constructs

Reline MAS

Minimally-invasive fixation system for reliable implant performance, optimum procedural versatility and simplified surgical workflow.

Multiple screw options to support degenerative to complex pathologies

Universal low-profile tulip design supports multiple rod dimensions

Rigid connection between maximum access surgery (MAS) guide and implants providing optimum feedback and surgical control

Robust instrumentation suite designed to accommodate corrective maneuvers and restore sagittal alignment

Reline Open

Designed to offer the unimpeded access and maximized visibility of an open approach with our versatile implant and instrumentation solutions.

Offers both modular and pre-assembled screw options to accommodate multiple workflows and surgical techniques

Low-profile tulip design minimizes screw prominence

Intentionally designed engagement features that sit high on the tulip allow for simplified instrument attachment by minimizing interference with bony anatomy

Helical flange* locking technology simplifies thread alignment, provides tactile feedback and mitigates the risk of crossing threading

Reline 3D

Reline 3D is a posterior fixation system that unifies traditional deformity techniques into one efficient and holistic procedure. For complex pathologies, Reline 3D is designed to provide simultaneous and powerful 3D correction through optimized load sharing across segments

Addresses common surgical challenges including lateral rod capture, unwanted tower disengagement and rod flattening

Simple and efficient design to decrease time spent in the OR with a system that integrates surgical steps and instruments

Reline Small Stature

Reline Small Stature is the first pediatric deformity fixation solution that combines rod strength with low-profile implants for a small, yet mighty, patient population. The system features instrumentation designed to help surgeons gain heightened anatomical awareness to optimize implant placement

Multiple rod options in one low-profile tulip create improved construct strength with 5 mm CoCr and Ti rod options for optimal deformity correction

Differentiated alternative thoracic fixation implants, coupled with the continued addition of next generation devices, are designed to enable surgeons to achieve optimal correction during the initial surgery

Reline Trauma

Reline Trauma is the first system designed to allow surgeons the ability to customize their approach intraoperatively, choosing from traditional open approaches to more modern hybrid/MAS approaches, depending on pathology and patient needs.

The system is further integrated with the NVM5 platform, which combines intraoperative neuromonitoring and computer-assisted technologies, including Bendini

NVM5 intraoperative neuromonitoring (EMG, MEP, and SSEP) to help avoid further postoperative deficits and maximize correction.

Knowledge of the manufacturer of the previously implanted pedicle screw systems prior to revision spinal surgery may facilitate faster and safer surgery. Often, this information is unavailable because patients are referred by other centers or because of missing information in the patients' records. Recently, machine learning and computer vision have gained wider use in clinical applications. The authors propose a computer vision approach to classify posterior thoracolumbar instrumentation systems.

Lateral and anteroposterior (AP) radiographs obtained in patients undergoing posterior thoracolumbar pedicle screw implantation for any indication at the authors' institution (2015-2021) were obtained. DICOM images were cropped to include both the pedicle screws and rods. Images were labeled with the manufacturer according to the operative record. Multiple feature detection methods were tested (SURF, MESR, and Minimum Eigenvalues); however, the bag-of-visual-words technique with KAZE feature detection was ultimately used to construct a computer vision support vector machine (SVM) classifier for lateral, AP, and fused lateral and AP images. Accuracy was tested using an 80%/20% training/testing pseudorandom split over 100 iterations. Using a reader study, the authors compared the model performance with the current practice of surgeons and manufacturer representatives identifying spinal hardware by visual inspection.

Among the three image types, 355 lateral, 379 AP, and 338 fused radiographs were obtained. The five pedicle screw implants included in this study were the Globus Medical Creo, Medtronic Solera, NuVasive Reline, Stryker Xia, and DePuy Expedium. When the two most common manufacturers used at the authors' institution were binarily classified (Globus Medical and Medtronic), the accuracy rates for lateral, AP, and fused images were 93.15% ± 4.06%, 88.98% ± 4.08%, and 91.08% ± 5.30%, respectively. Classification accuracy decreased by approximately 10% with each additional manufacturer added. The multilevel five-way classification accuracy rates for lateral, AP, and fused images were 64.27% ± 5.13%, 60.95% ± 5.52%, and 65.90% ± 5.14%, respectively. In the reader study, the model performed five-way classification on 100 test images with 79% accuracy in 14 seconds, compared with an average of 44% accuracy in 20 minutes for two surgeons and three manufacturer representatives.

Anand et al. developed a KAZE feature detector with an SVM classifier that successfully identified posterior thoracolumbar hardware at five-level classification. The model performed more accurately and efficiently than the method currently used in clinical practice. The relative computational simplicity of this model, from input to output, may facilitate future prospective studies in the clinical setting [1)]

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Anand A, Flores AR, McDonald MF, Gadot R, Xu DS, Ropper AE. A computer vision approach to identifying the manufacturer of posterior thoracolumbar instrumentation systems. J Neurosurg Spine. 2022 Dec 27;38(4):417-424. doi: 10.3171/2022.11.SPINE221009. PMID: 36681945.