**Subject:** Moving from art to science brings new possibilities to spine surgery
**Date:** Tuesday, July 31, 2018 at 8:18:54 AM Mountain Daylight Time
**From:** Kleck, Christopher
**To:** Kleck, Christopher

# Moving from art to science brings new possibilities to spine surgery

Surgeons are accustomed, in various degrees, to identifying a plan of action for their surgeries. However, there has never been a way to physically manifest the preoperative planning in the operating room, until now.

***This content is sponsored by [Medicrea](Medicrea).***

*Becker's Spine Review* spoke with Christopher Kleck, MD, an orthopedic spine surgeon and co-director of the spine fellowship program at the University of Colorado Hospital in Aurora to discuss this new link between preoperative planning and intraoperative confirmation. Dr. Kleck went on to describe his experience using Medicrea's patient-specific implant technologies.

Medicrea's Adaptive Spine Intelligence (UNiD ASI) introduces a complete personalized implant and data service to spine surgeons that is continually learning and building upon itself through integrated predictive analytics.

**Question: How did you originally perceive the usefulness of preoperative planning in your practice?**

**Dr. Christopher Kleck:** I have always been a big believer in preoperative planning and systematically used it in my practice, though still aware of its shortcomings, in particular the inability to directly implement the plan in surgery. This is how spine surgery uniquely became known as an art. I took pride in my ability as an artist, to select and manipulate implants and change my strategy on-the-fly, as many surgeons do. Although being medically-trained, surgeons are also very scientific in their methodologies. I knew there was room to bridge this planning gap and improve my practice.

**Q: What was your reaction to introducing patient-specific implants, like Medicrea's UNiD Rod, to spine surgery?**

**CK:** For this type of technology to be effective in spine surgery, it needs to be holistic. Offering a patient-specific implant even with a surgical planning component is not sufficient. To be truly powerful, there needs to be a scientific methodology driving the entire process.

For instance, a manufacturer could produce a custom rod, but it may not be the optimal rod for the patient or surgical strategy. Further, designing a rod or other patient-specific implant preoperatively does not necessarily provide insight into the efficacy of that implant postoperatively versus a standard one.

**Q: What was the tipping point when you began to believe in preoperative planning, predictive modeling and "trusting" the patient-specific rods?**

**CK:** We had an early case example where we planned a fairly large thoracic spine correction in a young patient. An initial comparison between the 3-D-printed model of the patient's spine up against the patient-specific rods had us questioning whether we could achieve the correction originally planned. We kept the rods on hand as we began moving through the case. At the end, we positioned the rods against the patient's spine and were surprised to learn how close we were to achieving our original plan. After a few adjustments to the patient, we were able to implant the patient-specific rod.

**Q: Do you think there is a benefit in applying preoperative planning and predictive analytics to degenerative cases as well as complex spine?**

**CK:** After experiencing great success in my complex cases, I started implementing Medicrea's UNiD technology into my degenerative cases, including minimally invasive applications. When we think of deformity, it is all about achieving the optimal alignment. It turns out the same is true of degenerative surgery. We know adjacent level disease is significantly increased when certain alignment parameters are not met even in short-construct cases. So as spinal surgeons, we are either dealing directly with deformity or we are at risk of creating it if we choose to ignore it.

The UNiD Rods I am implanting today in my degenerative cases have a significantly higher lordosis than I was previously applying with traditional rods. Beyond my experience, the ultimate goal for the industry would be to end revision surgery.

**Q: I understand the predictive analytics component includes data from pre and postoperative analysis. Have you found these procedural analyses to be directly helpful and how?**

**CK:** Prior to our first 50 or 60 cases, we really were not looking closely enough at a patient's thoracic kyphosis when we were doing the planning. However, by going over the thorough postoperative analysis provided by Medicrea, we saw some junctional failures in our cases that we thought were probably due to the patient being hypokyphotic in the thoracic spine. This prompted us to make an immediate strategic change in forming our next preoperative surgical plans for patients, whom we began to see were really hypokyphotic, based on the preoperative analytics at our fingertips. The analytical services are key elements in helping us to perfect our planning strategy.