The next evolution for minimally invasive spine: OLIF in the ASC

The oblique lateral interbody fusion is among the most innovative spine surgery approaches. It allows surgeons to achieve the same outcomes as open procedures with less tissue disruption and an accelerated patient recovery time. *Becker's* was able to sit down with four leading spine surgeons to learn more about how they incorporated OLIF into their practice and where they see the procedure heading in the future.

The surgeons participating in the roundtable include:

- **John Williams, MD,** of SpineONE in Fort Wayne, Indiana
- **Luis Duarte, MD,** of Shannon Clinic in San Angelo, Texas
- **John Peloza, MD,** of Center for Spine Care in Dallas, Texas
- **Kornelis Poelstra, MD,** of OrthoNorCal in Los Gatos, California

Dr. Williams began the discussion by outlining the benefits of OLIF compared to other fusion techniques.

"When you approach the anterior spine obliquely, you're no longer retracting the lumbar plexus in the way that we do when we do transpsoas surgery," said Dr. Williams. "You essentially eliminate plexus injury, limb numbness, quadriceps weakness and other issues we have with transpsoas surgery."

Patients are placed in the lateral decubitus position to allow gravity to drain away the peritoneal contents; surgeons don't have to retract them. OLIF is associated with fewer instances of postoperative complications including ureteral injuries, retrograde ejaculation and peritoneal injuries.

"The genius of this procedure is that it's really a modified ALIF that's done through the lateral approach, and in which gravity does a lot of the retraction for you," said Dr. Duarte. "It's extremely valuable because you can do it right side up or left side up, whatever your most comfortable level is, and it eliminates a lot of issues with the lateral procedures or ALIF just because the tissue retraction is almost absent."

Camber Spine's SPIRA®-O, which has an arch design for the oblique position, multiplies arches throughout the internal architecture so there are multiple points of contact with the endplate. The stress is distributed evenly across the implant and the implant's material nano-signals to the cells to make bone.

"The key is to make sure you know where the orientation of the implant's position is so you don't put it into the canal or into the foramen," said Dr. Peloza. "There's all these different stops and visual ways to do that with the Camber instrumentation."

"Do you use one incision or multiple incisions for multiple levels?"

Surgeons can either perform an OLIF procedure with a single, larger incision or two smaller incisions. Dr. Peloza uses the single incision approach, making a 2.5 to 3 centimeter incision in the skin for a more tubular retraction; new retractors require a bit larger incision, but he found it has little neural tissue manipulation and remains cosmetically attractive for the patient.

Dr. Poelstra, also typically performs the procedure with one incision to relieve compression. "With this approach, it's almost like we have the illusion that we're going through posteriorly," he said. "Initially when people started to do interbody surgery they get clips and then somebody realized that if we go a bit more lateral and we start doing TLIFs we have a beautiful window and there is no requirement for nerve retraction to get into the interbody space in the back. It's an evolution now that we're doing it in the front."

On the other hand, Dr. Williams makes two smaller incisions for the procedure, especially when he first teaches the technique to other surgeons. Dr. Duarte typically uses one incision for procedures at L1 to L5 and then two incisions for L4-5 and L5-S1. "The reason for that is the angle at L5-S1 in some patients is very pointed toward the floor and L4-L5 is more horizontal," he said. "It's very hard to do that through a single incision."

"Can you decompress the spinal canal from the OLIF approach like an ACDF?"

Dr. Poelstra performed around a thousand direct lateral spine surgeries to correct deformities before he discovered the OLIF procedure and realized the direct lateral approach disrupted patients more than was necessary. Surgeons can decompress the spinal canal with OLIF, which is similar to anterior cervical decompression.

"I believed before that anterior column reconstruction and posterior tension band recreation was the way to go. But the problem was always that you could not get enough of an opening of the interior column from the direct lateral approach," Dr. Poelstra said. "The OLIF allows you to carefully come around, open up the front, restore that sagittal balance where the patient needs to go and through that soft tissue plane that we take, we hurt the patient so much less than we used to."

Dr. Williams said standing anterior to the patient and performing a complete discectomy is his most successful approach. He is able to set his retractor and light source to look into the back of the disc space and then use fluoroscopy guidance to remove the disc space with an angled curette. As the surgeon moves up towards the diaphragm, it becomes more difficult to see back into the spinal canal, but at L5-S1 the procedure is identical to the ACDF; it's close to identical at L4-5 as well.

"As my practice has evolved and changed through the years, I really loved the direct lateral transpsoas surgery," Dr. Williams

said. "I still do, but I believe when using the instruments that Camber has provided me over the last couple of years, I can look to the back of the interbody space and with fluoroscopy make sure that I'm safe in reaching back and taking down the posterior annulus and posterior longitudinal ligament at L4-5 and L5-S1, and really do an outstanding decompression. I'm able to reach into the spinal canal and pull out recurrent disc herniation that I could never do with the XLIF-type procedure. My inclination is that the OLIF approach is not only safe, but it's the next step in really doing a good anterior decompression."

The new retractor system from Camber Spine allows great visualization, said Dr. Peloza, so surgeons can see into the disc space as if they were doing an ACDF and then release the spine in the back with a technique similar to an artificial disc replacement. Dr. Peloza performs a fair amount of deformity and spondylolisthesis procedures and often opens up the spine when reducing the deformity in the coronal and sagittal planes to see the canal at all levels, but particularly at L4-5 and L5-S1.

"OLIF is so good that you can do a very aggressive anterior release if you have a kyphotic spine and you need to release the anterior and put in a lordotic or hyperlordotic cage so that you can get the kind of correction that you used to have to do a pedicle subtraction osteotomy for," he said. "You're right at the anterior part of the spine with the OLIF, you're in a nice corridor, so you can easily mobilize the vessels and protect them with the retractor system and then release the anterior spine and open it up."

The combination of decompressing the spinal canal from the front and indirect decompression by districting the spine open allows surgeons to increase the amount of time available to perform the decompression. After the anterior work is done, surgeons can use the system to perform a percutaneous approach in the back, which Dr. Peloza says is a huge advantage.

"If you've ever seen an open deformity case, it's like fileting open the spine," he said. "Now it can be done with robotics or navigation in a percutaneous manner because you've done all the hard stuff up front."

When performing OLIF, surgeons can also retract the vessels more inferiorly to see the longitudinal ligament better and then it becomes much easier to release it. "I think the biggest benefit of the procedure as far as deformity is that as a spine surgeon, using the correct lordotic cage from the start, you're not creating a sagittal imbalance, which is what happens with a lot of posterior surgery," said Dr. Duarte. "Even with direct lateral surgery performed on an adult with a calcified ligament, it's hard to get anything more than a 10 or 12 degree lordosis at the disc level. With OLIF, it's very easy to obtain 15 degrees and releasing the ligament is much easier from an OLIF approach than the lateral approach."

Surgeons that perform the anterior longitudinal ligament release form the transpsoas approach are performing the release indirectly without seeing the structures they're releasing. Surgeons have to trust their intuition and retractor placement to ensure they're not injuring the patient. But performing the anterior longitudinal ligament release from the oblique approach allows surgeons to look directly at the anterior longitudinal ligament.

Dr. Poesltra said his OLIF patients typically report the same outcomes at six weeks that patients who undergo direct lateral fusion report at four to six months. "We see the tremendous benefit of this procedure to minimize comorbidities for the patient and speed up their overall recovery," he said. "It's much more than doing a new trick in the operating room; it's truly to the benefit of the patient's recovery and the speed at which they can get themselves back to where they would want to be."

"Do your single level anterior only patients go home the same day? Is single level OLIF appropriate in an ASC setting?"

Prior to the pandemic, spine surgeons were migrating cases to the outpatient setting when possible due to cost and outcome benefits. But the shift away from the inpatient setting during COVID-19 has accelerated the move to ASCs, and surgeons are more eager for the efficiency and cost-effectiveness at specialty centers.

OLIF can be performed in the ASC, and many of the surgeons already using the technique discharge patients home within 23 hours. The minimally invasive procedure is conducive to the outpatient setting with the right pain management regimen in case. Dr. Peloza uses perioperative anti-inflammatory agents to avoid narcotics in postoperative pain management. His team uses IV Tylenol, Decadron, Gabapentin and Celebrex as well as IV infusion of Lidocaine with patients.

"It's an old anesthetic technique, but it's incredibly effective so we don't have to use opiates as much during the case," he said. "Then afterwards, we hardly use any opiates at all and we can send them home on Tramadol and Tylenol, and maybe as a back-up they get Norco, but we don't do that very often."

Patients begin ambulating within hours of surgery with physical and occupational therapists to prepare for returning home. Dr. Peloza's team educates patients about pain management protocols and expectations ahead of time to reassure them they have a low chance of becoming addicted to opioids as a result of the procedure. "We're trying to make an experience out of this for them so that it isn't so scary," he said.

Patients often prefer outpatient surgery and a swifter recovery when possible because they can resume more normal activities with less disruption. The minimally invasive approach in the ASC can help them return to work in weeks instead of months.

"A lot of people in the past were fearful of having spinal reconstruction, especially as the word 'deformity' was used," said Dr. Poelstra. "But the way we do it nowadays, people can go back to their regular activity level quickly. People ubiquitously say 'thank you doctor, I wish I would have done this two or three years ago, but I just had so much fear about the impact of the procedure and of what the outcome was going to be.'"

Dr. Peloza is typically able to perform the procedure in about 30 minutes per level anteriorly and then do any posterior work as necessary. "Doing an OLIF, single or two levels, and putting a plate on the front in the right patient is a wonderful procedure to deliver convenience and safety, in this day and age, of an ASC," he said. "It's a very safe procedure." ■

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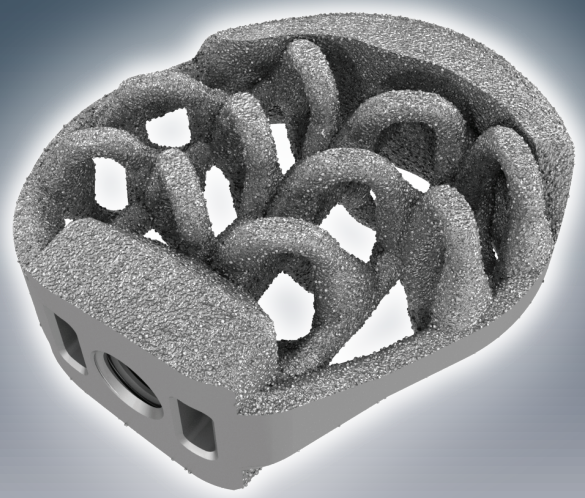

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