CASE REPORT

Rectifying a failed titanium fusion with PEEK-OPTIMA™ HA Enhanced cage and iliac crest autograft

Timothy Bassett, MD (SouthEastern Spine Specialists, Tuscaloosa, AL, USA) has over 23 years of experience in spinal surgery, predominantly in the treatment of adult degenerative lumbar spine. Specialising in addressing failed lumbar fusions, Dr. Bassett has extensive experience in the use of interbody fusion devices with autograft and a variety of bone graft substitutes. In this case, a failed surgery with a titanium implant was rectified using an EVOS HA cage (Cutting Edge Spine, Inc.) comprised of PEEK-Optima™ HA Enhanced (Invibio Biomaterial Solutions), which combines polyetheretherketone (PEEK) with osteoconductive hydroxyapatite (HA).

Case description

A 53-year-old female patient presented with back pain and severe left side and leg pain after two previous minimally invasive unilateral pedicle screw constructs a year apart. The original procedure was performed on the left side at L3-4 MIS, with a titanium implant and a recombinant human bone morphogenetic protein-2 (rhBMP-2) with an added allograft bone void filler, and the second procedure at the same level on the opposite side, also using rhBMP-2 and filler.

The back pain was attributed to non-union but the left-side pain was found by CT scan to be secondary to an overgrowth of bone in the foramen, likely due to the BMP. In fact, I noted more bone growth in the foramen than in the disc space.

Intervention

I treated the patient with a foramenectomy on the symptomatic side to resolve the pain, and—with some difficulty—removed the original implant on that side. However as the patient was not experiencing pain on the right side, the second titanium cage was left in situ at L4-5.

To assist bone healing in the disc, the patient received an EVOS HA cage at L3-4 and bilateral pedicle screw implants at L3-4 and L4-5. Iliac crest-derived autograft was used to enhance fusion in the interbody area, without the use of synthetic biologics like those that had caused the bone overgrowth. Interbody fusion is preferred in order to protect the nerve and ensure a solid fusion.

The device

The EVOS HA cage, made with PEEK-OPTIMA™ HA Enhanced, is a transforaminal lumbar interbody fusion-style curved cage. Its cutting-edge biconvex design, strength and matching modulus can yield a very rapid bone fusion ingrowth. The top and bottom of the device is curved, designed to match the opposing endplates in the disc space.

Typically, we insert the device following clearance of the disc on the symptomatic side. We then turn the cage sideways and place it against the front margin as far forward as possible. This will maximise space available for the bone graft. When using pedicle screws, we triangulate and then compress them to ensure that the graft is under direct compression.

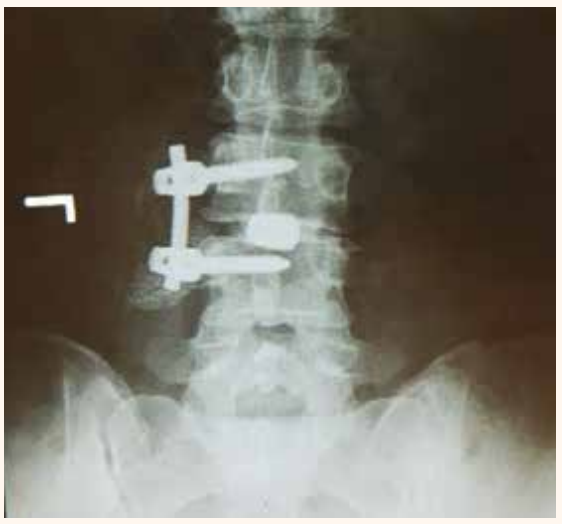
Results

The scans showed good abutment right up to the cage and a bone seam was clearly seen. Six and 12-week radiographic results show evident fusion around the EVOS HA cage at an early stage. At six months, they showed full incorporation in the L3-4 disc space, even across the defect created by the previous implant.

The titanium cage fusion at L4-L5 showed signs of delayed union at six-month follow up. Importantly, the patient's leg pain was resolved and a successful outcome reached.

Timothy Bassett, MD, is an orthopaedic surgeon at SouthEastern Spine Specialists, based in Tuscaloosa, AL, USA.

Preoperative images

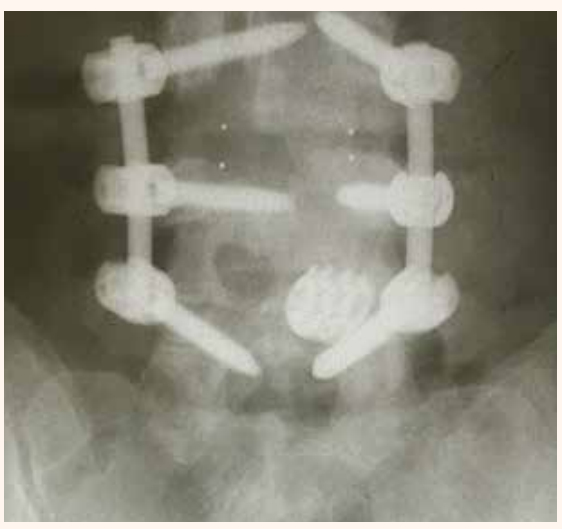


Coronal view showing patient's titanium implant from previous failed procedure

Axial view showing bone overgrowth in the foramen

Early follow-up results

Twelve-week sagittal view showing bone growth



Twelve-week coronal view showing bone growth

Six-month results

Six-month coronal CT scan showing full incorporation in the L3-4 space with delayed union in the L4-5 space with the titanium cage

Six-month axial CT scan showing a bone seam abutting the EVOS HA cage, and dense areas of solid bone growth