

# An Operative Case Study using the enSpire™ Surgical Discectomy System

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**Background:** The enSpire™ Surgical Discectomy System (Spine View, Inc., Fremont, CA) utilizes a novel new technology platform designed to facilitate a more complete discectomy including decortication, accelerating tissue removal in open and MIS discectomies in lumbar interbody fusion procedures. The device utilizes an expandable wire with integrated cutter to selectively side-cut nucleus and endplate cartilage and an impeller mechanism to extract tissue out of the disc space into an external tissue collection chamber (Figure 1). The system has both a straight-tip device for PLIF, Lateral, and TLIF (ipsilateral), and curved-tip device to remove disc material from the hard to reach contralateral side of the disc space in TLIF's (Figure 2 & 3). The device is disposable with no tethering or console.

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## Objective:

A simple case study is presented to depict the enSpire system advantages over traditional disc removal and endplate preparation using only manual instruments. Reported on are three distinct parameters: discectomy time, instrument passes, and volume of graft material used within the interbody space.

## Methods:

A minimum of fifty (50) levels were previously treated with the enSpire system on a consecutive series of TLIF procedures before studying the three parameters in a fifty-two year old male undergoing a two level L4-S1 TLIF and decompression. The patient had failed conservative management treatments and elected to undergo operative treatment after all risks and benefits were discussed.

The L4-5 disc level was treated with the enSpire system (and is representative of a typical TLIF level). Preoperative disc height was approximately 7 mm (75% as compared to the adjacent L3-4 level), was desiccated on MRI, and had a positive discogram with concordant pain and a fissured annular tear. A standard open technique was used with removal of the left L4-5 facet complex and a standard 7mm wide annular window.

Discectomy time was tracked from initial annulotomy completion to graft sizing. In addition, the total number of instrument passes was recorded, including the initial use of a 7mm disc shaver and 2mm pituitary rongeur for the creation of a void within the disc space for the use of the enSpire system, per the company's technique manual. Total fusion graft volume placed in the interbody space was also recorded. A bone mill was used for preparation of the local autogeneous bone, which was augmented with a bone void filler. A 9mm(H) x 7mm(W) x 24mm(L) solid PEEK spacer was sized as correct for the disc space. Note that the enSpire device was not used on L5-S1 as the disc space was collapsed.

## Results:

Total elapsed discectomy time from annulotomy completion to initial graft trailing was five (5) minutes. The actual active use time of the enSpire device was timed to be sixty (60) seconds for the straight device and forty-eight (48) seconds for the curved device.

A total of eight (8) total instrument passes were required after the completion of annulotomy and before graft. This included three (3) total passes with the enSpire devices (1 straight, 1 curved, and 1 final straight),

and five (5) total passes with manual instruments (1 - disc shaver at start, 2 - pituitary at start, and 2 - rasp at end, one for each endplate to confirm enSpire endplate preparation).

Approximately 8.2cc's of graft material was used, comprised of 5cc's of morselized local bone graft and 3.2 cc's of an inductive bone void filler. As a solid interbody spacer was used, all of this graft was placed anterior, lateral and posterior in the disc space and none was place inside the spacer itself.

**Discussion:**

As indicated, the enSpire device had been utilized in over fifty levels and this observational case was typical of the OR team's previous experience in terms of discectomy time, instrument passes and graft volume. The typical total discectomy time is 4-6 minutes and typical passes is 6-15, with over half of this time and passes for the manual instruments, which are still part of my discectomy routine. The reported total volume of graft material of 8cc's is also typical for both local bone graft and graft extender.

Compared to past discectomies using only manual instruments for my TLIF's, the time savings and number of instrument passes have become significantly reduced. In addition, although the amount of graft extender remains about the same, the local bone graft is likely the biggest difference.

Of particular note is the volume of interbody graft around the interbody spacer. This is perhaps the most important parameter studied, as the graft volume is a predictor of the amount of disc material removed, and therefore how much actual surface area is available for bone fusion from endplate to endplate. Additional studies are warranted to compare discectomy and decortications using manual instruments to the enSpire System in a consecutive series of patients at multiple sites. In addition, a long term follow-up study utilizing CT scans for assessment of fusion would be useful to further validate the use of the enSpire System in lumbar interbody fusion cases.

**Acknowledgment:**

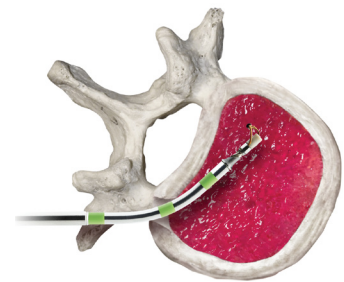
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**Figure 1.** enSpire device tip with integrated cutter and impeller



**Figure 2.** Straight and Curved enSpire devices



**Figure 3.** Curved enSpire device