PFLUMfusion™

PATENTED SPINE SURGERY™

METHOD DESCRIBED FOR FUSION OF THE LUMBAR SPINE (a)

[Transforaminal Approach with Instrumentation]

The patient is placed on the operating table under anesthesia. Intraoperative imaging is used to insert pedicle screws unilaterally over the segment to be fused and distraction is applied to maximize disc space height.

Imaging intensification is used to identify the plane parallel to the segment to be fused and an image machine is rotated approximately 45 degrees in the same plane either to the left or the right. A point just anterior to the superior articular process is identified and a needle is placed from the corresponding point on the skin through the soft tissues, under the superior articular process and into the disc. An incision is made incorporating the needle into the incision and serial dilators of increasing size are placed over the needle and into the disc. The needle is removed, and an assessment is made that the trajectory of the dilators is acceptable.

The working cannula is then placed over the dilators, into the proximal aspect of the disc and then the dilators are removed and the disc is prepared with the various instruments, removing disc material from the disc and preparing the endplates for fusion.

A radio opaque expandable wire is bent, and the bent end is placed into the cannula and pushed into the disc space to the maximum amount without kinking the wire. The length of the wire being pre-measured and the length of the cannula being pre-measured, the desired circumference of the sac to be chosen may be determined. Once the circumference has been determined, a desired disc height is chosen.

The bag is inserted into the disc. The bag is then filled with grafting material, and additional structural elements if desired, and then the bag is closed, closing the external opening into the disc space, the annulotomy.

The distraction on the screws is adjusted and contralateral instrumentation may be added if desired.

The objective of the procedure is that over time, bone will grow between the endplates and the original two vertebral segments will essentially become one and there will be no motion. Additionally, the openings where the nerves exit the spinal canal, the foramina, will be larger, putting less pressure on the exiting nerves. The combination of the two should alleviate pain in the spine and the corresponding extremities.

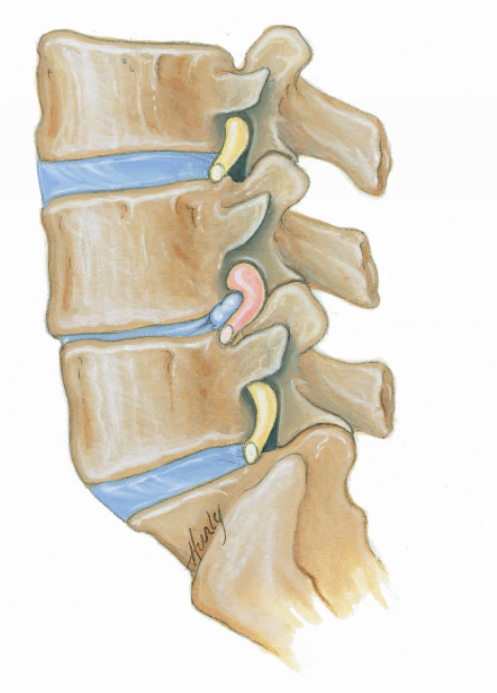
The advantages of the procedure over conventional open and other minimally invasive procedures include less operating time, less soft tissue trauma, less blood loss, less chance of nerve injury, less chance of infection, less pain, and less postoperative hospital stay. And there is less chance of fusion failure caused by absorption of the graft.

(a) The following description is provided as an aid to understanding Dr. Pflum's innovations and inventions described in US Patent # 8,226,722 B2 and US Patent Application Publication # US 2015/0238321 A1. Reference should be made to the claims of the aforementioned patent and application for a complete understanding of the claimed subject matter.

METHOD DESCRIBED FOR FUSION OF THE LUMBAR SPINE

[Transforaminal Approach with Instrumentation]

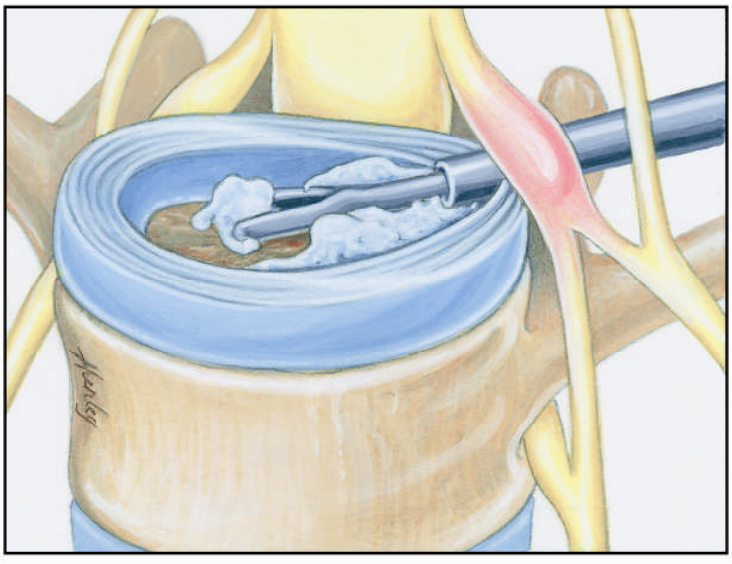
The Problem:



Disc Disease when the symptomology is back pain with or without lower extremity pain. The pathology is disc collapse with narrowing of the foramina, resulting in pinching of the nerves, causing leg pain, and arthritis of the facet joints, causing back pain.

The goal of a fusion is to elevate the disc space, decompress the nerves, and prevent motion at the facet joints.

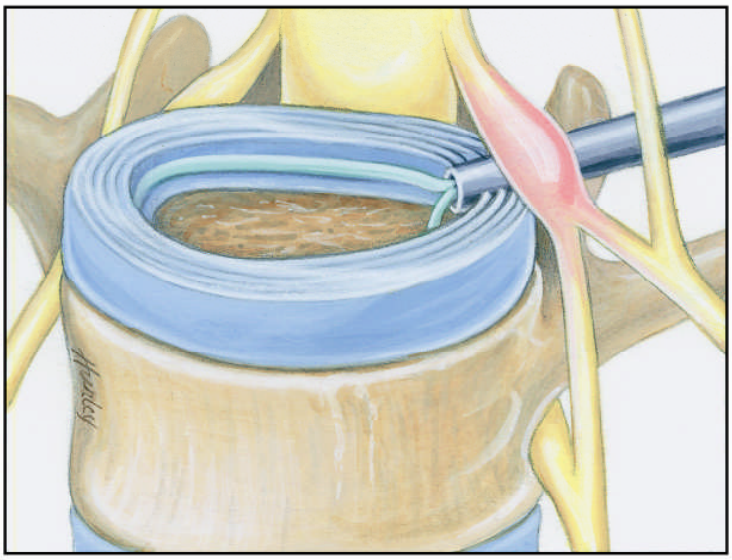
The Solution:



Through an incision, place a cannula through soft tissue down to and into the disc space, and then, with various instruments, remove the inner aspects of the disc and prepare the endplates.

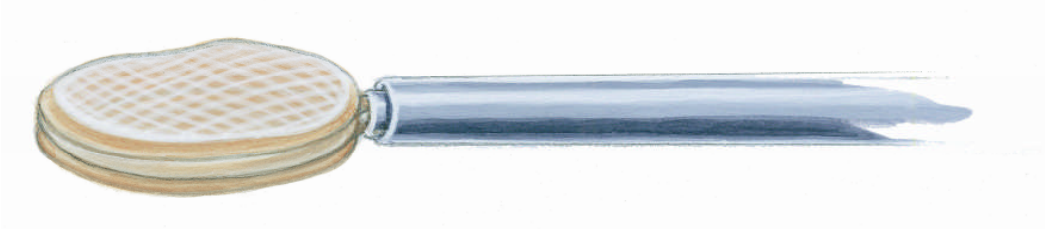
The approach to the disc may vary, for instance, directly posterior, from far lateral transforaminal approach, from anterior, or from lateral. The transforaminal is the most popular at this time.

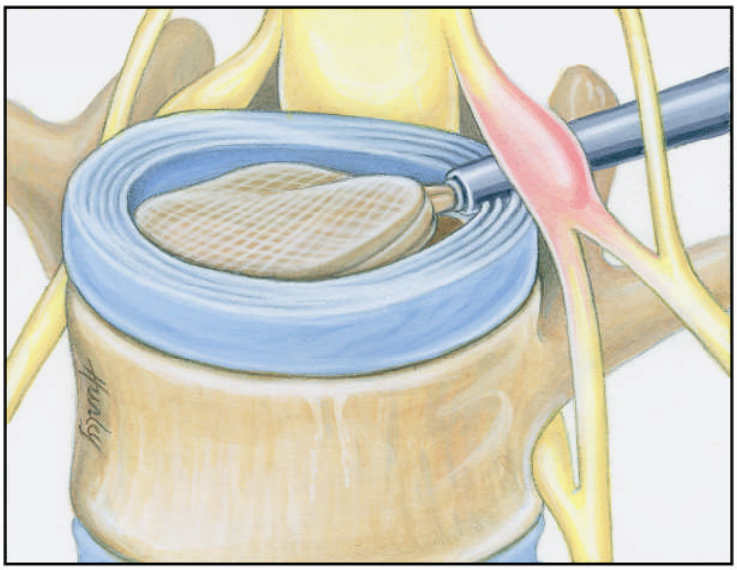
Next Step:



Once prepared, the periphery of the area to be replaced is measured by passing an expandable wire of premeasured length into the disc space. The desired length is determined by subtracting the length of the cannula and the remaining wire length from the original measurement.

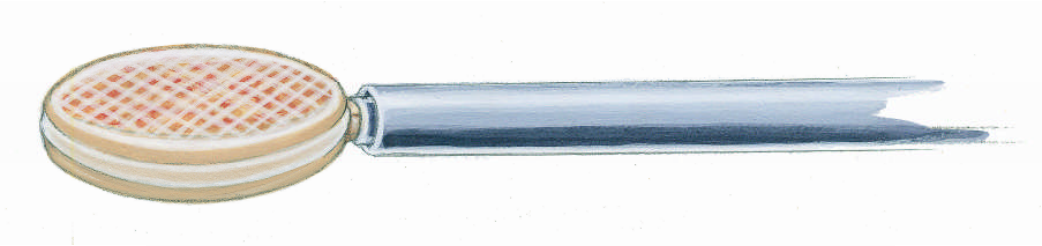
Dr. Pflum's Invention:

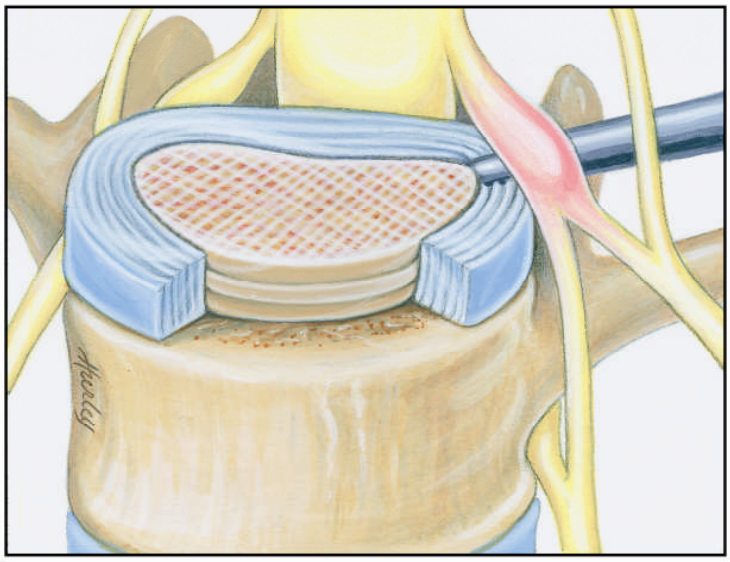




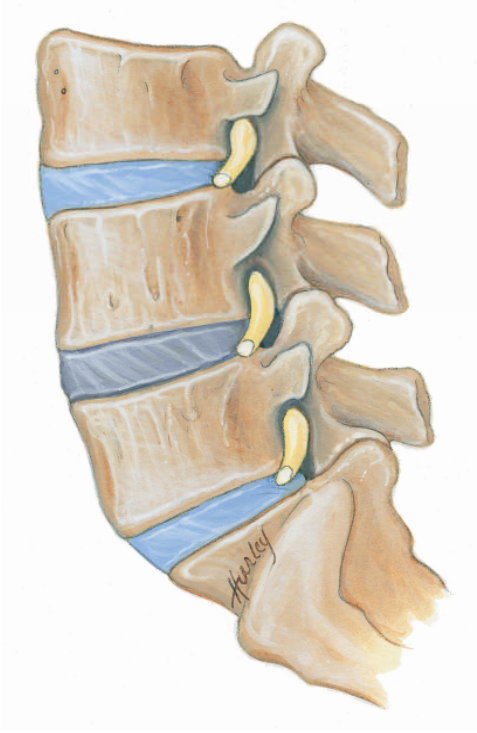
The invention is a compressible sac that is pre-sized and pre-shaped, most commonly, in the shape of a pill. This sac has a porous upper and lower surface to abut the endplates of the prepared vertebrae and a non-porous periphery; the periphery may have an enclosed expandable wire incorporated in its equator.

The expandable wire deploys, once the sac is in the disc space.



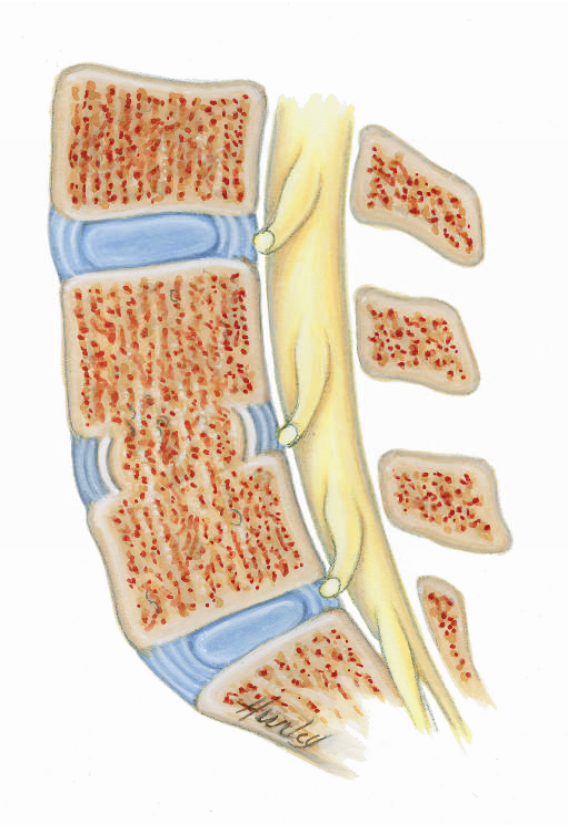


The sac is then filled with grafting material, elevating the disc space while still confined inside the sac. The porous surfaces allow ingrowth and fusion from one endplate to the other. And the non-porous sides prevent premature absorption of the graft and collapse of the sac.



The disc height is increased and the foramina are enlarged, decompressing the entrapped nerves and decreasing motion of the facet joints.

The Finished Product:



The sagittal view demonstrates fusion from the vertebrae above to the vertebrae below with the periphery intact.

Inventor: Francis A. Pflum, MD
US Patent # 8,226,722 B2 and **Canadian counterpart Patent # 2654570**
US Patent Application Publication #: US 2015/0238321 A1