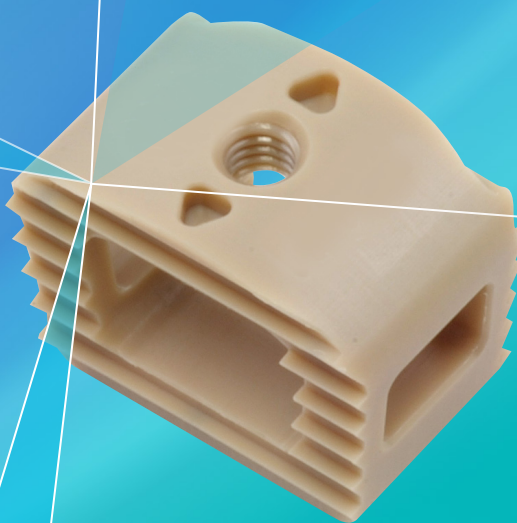


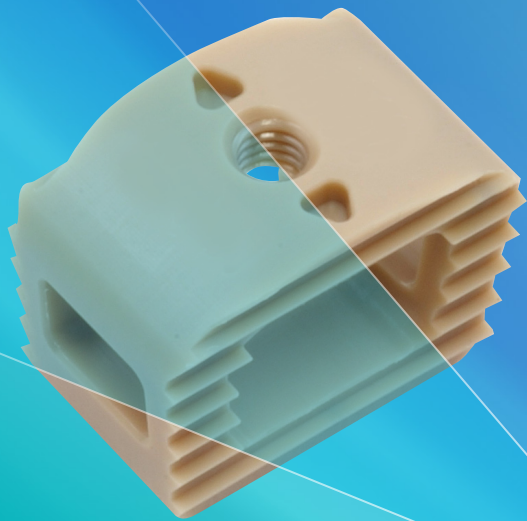


CORNERSTONE[®] PSR

Cervical Fusion System

Surgical Technique







CORNERSTONE® PSR

Cervical Fusion System

Surgical Technique

Patient Positioning / Approach	2
Exposure	3
Discectomy	4
End-plate Preparation	6
Implant Placement	8
Application of Anterior Cervical Plate	10
Explantation	12
Ordering Information	13
Important Product Information	15

Patient Positioning/Approach

The patient is placed in the supine position with the neck in slight extension. The posterior cervical spine is supported to establish and maintain normal lordosis. The surgeon selects a right- or left-sided approach to the cervical spine (**Figure 1**).

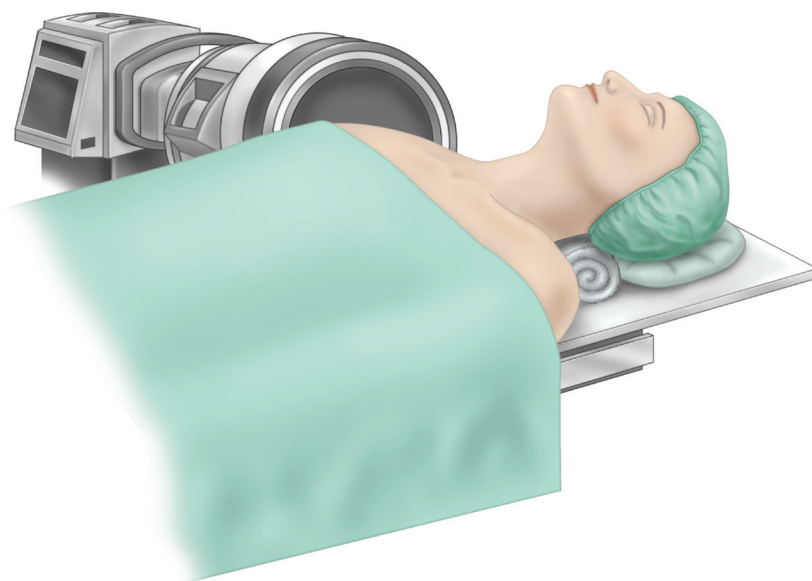


Figure 1

The platysma muscle is split. The superficial layer of the deep cervical fascia is opened along the anterior border of the sternocleidomastoid muscle. Using finger dissection, the plane between the trachea and esophagus medially and the carotid sheath laterally is established to expose the prevertebral fascia. Hand-held retractors are utilized to provide initial exposure of the anterior vertebral column and the adjacent longus colli muscles. (**Figure 2**).

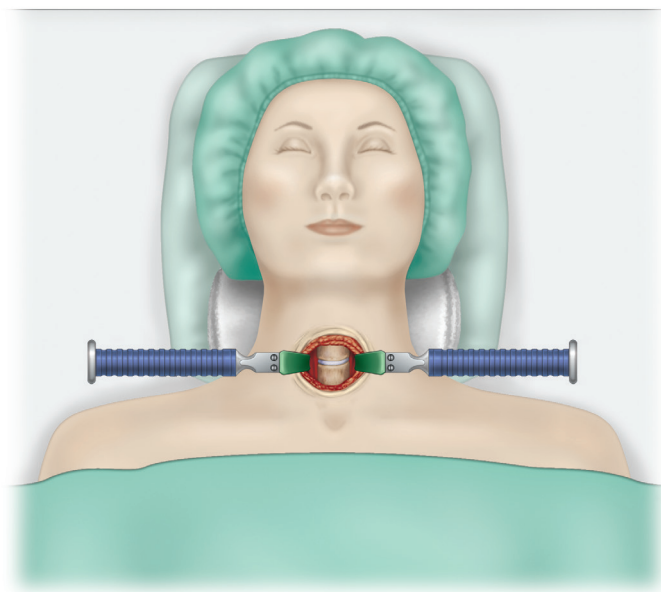


Figure 2

Exposure

After the prevertebral fascia has been opened, the disc space level is confirmed on x-ray. The longus colli muscles are subperiosteally elevated, and self-retaining retractor blades are securely positioned beneath them. A slotted blade may be used if an anterior osteophyte prevents proper positioning. A longitudinal self-retaining

retractor may be placed to provide optimal visualization. If distraction pins are used, they are positioned midline in the vertebral bodies adjacent to the disc. The distractor is placed over the pins, and gentle distraction is applied (**Figure 3**). Alternatively, a cervical halter and weights may be used for traction.

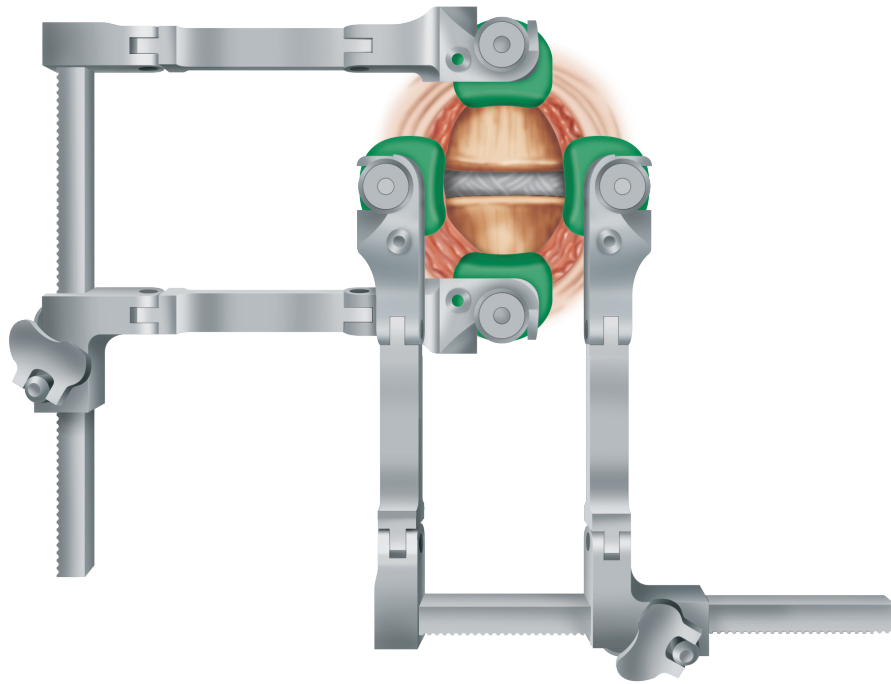


Figure 3

Discectomy

Pituitaries, curettes, and thin-footed Kerrison rongeurs may be used to remove the disc material and cartilage to expose the posterior longitudinal ligament (**Figures 4 and 5**).

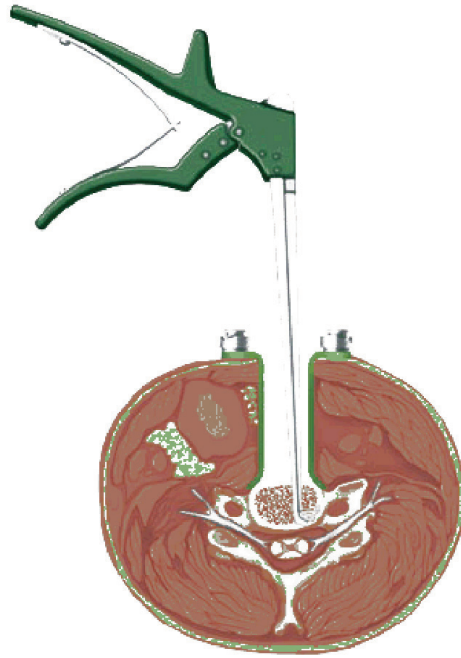


Figure 4

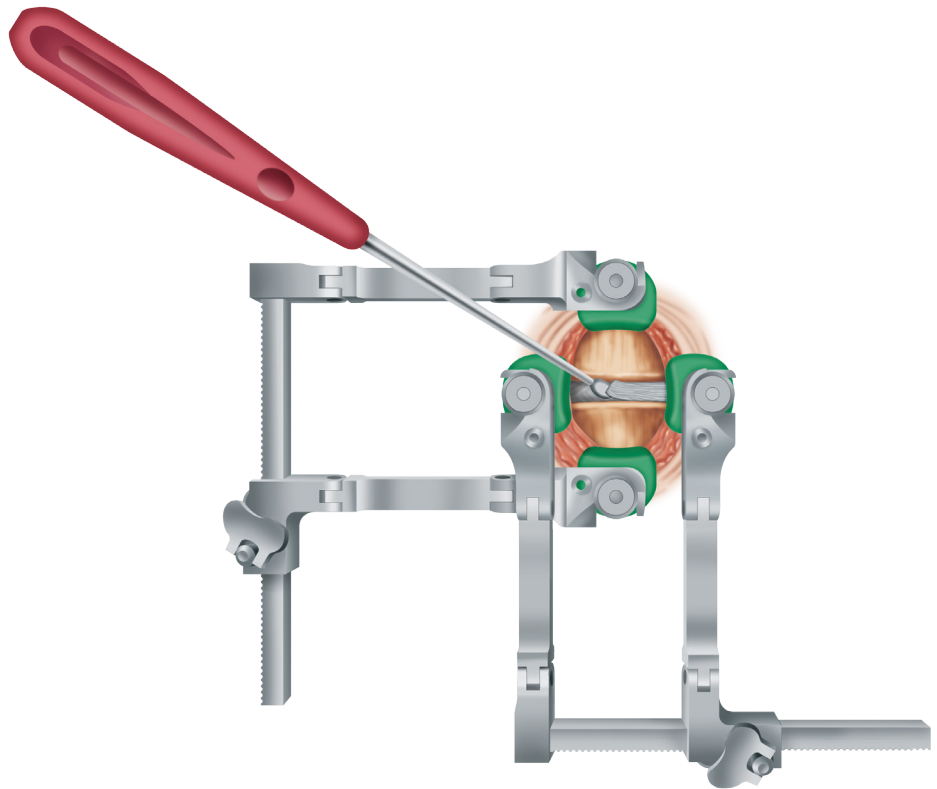


Figure 5

Discectomy *continued*

A high-speed drill with a burr (match tip/round) may be utilized for removal of the posterior disc and osteophytes to achieve neural decompression (**Figure 6**). The posterior longitudinal ligament and osteophytes are then carefully removed.

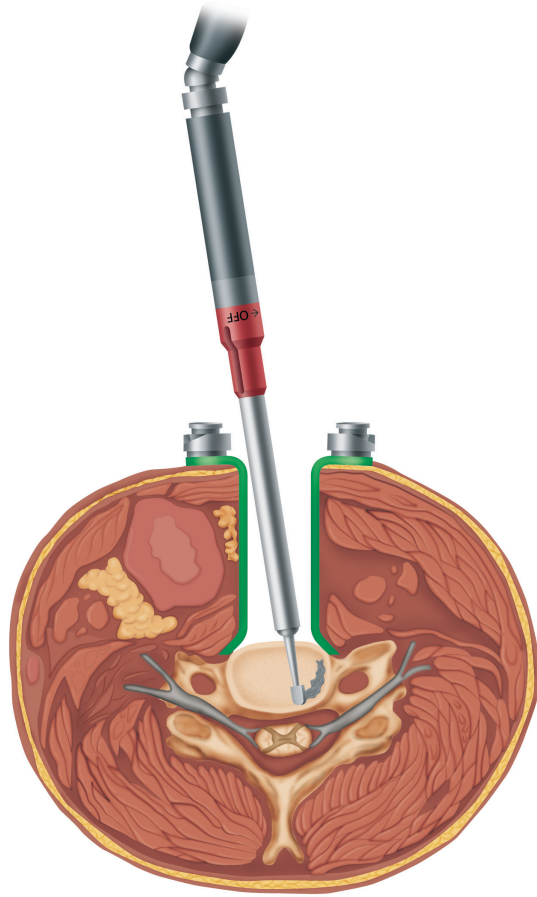


Figure 6

End-plate Preparation

Once the decompression and end-plate preparation are completed, the CORNERSTONE® PSR spacer sizing is determined by selecting the lordotic trial that provides the most satisfactory fit in the prepared disc space (**Figures 7 and 8**). The trial should fit flush against the end plates and produce a tight interference fit while restoring and maintaining adequate interbody height. If it does not, choose a taller trial and/or re-evaluate the end-plate preparation. The trials come in three "footprints;" 11mm wide by 11mm deep (purple trials), 14mm wide by 11mm deep (green trials), and 14mm wide by 14mm deep (blue). Choose the footprint that best matches the width and depth of the prepared interbody space. The trials within the CORNERSTONE® PSR Cervical Fusion System match the geometry of the cervical spacers in the system.



Figure 7

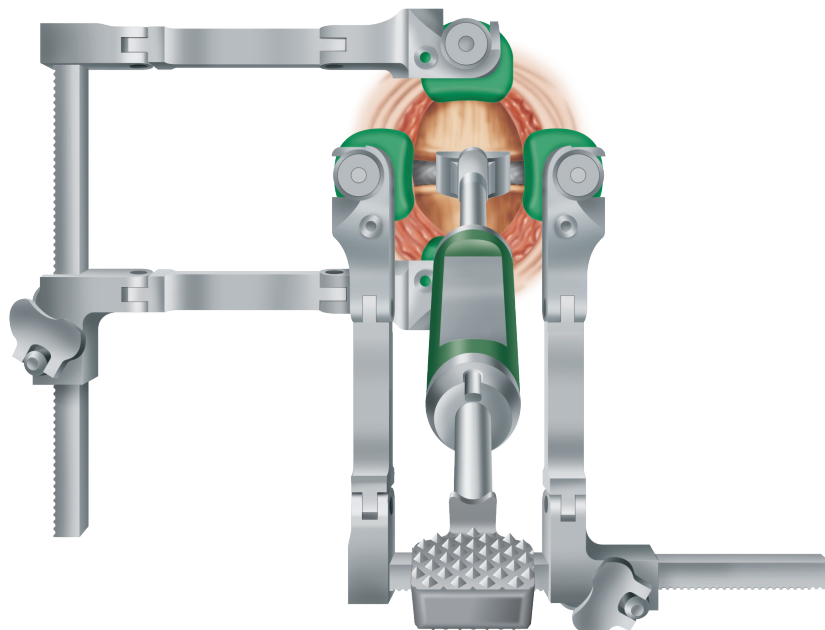


Figure 8

End-plate Preparation *continued*

Final end-plate preparation may be carried out with a rasp. Select the rasp that will decorticate the end plates with minimal bone removal. The rasp will help ensure end-plate preparation is complete. (**Figures 9 and 10**).



Figure 9

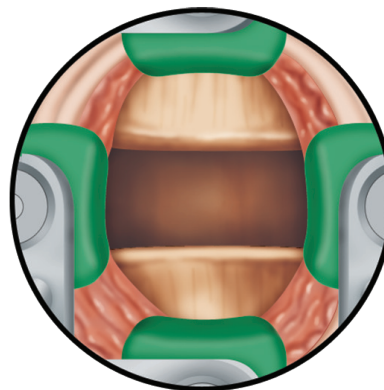


Figure 10

Implant Placement

Select the CORNERSTONE® PSR Cervical Fusion Spacer that corresponds to the final trial.

Placement of CORNERSTONE® PSR Cervical Fusion Spacer without lateral ports

The CORNERSTONE® PSR Cervical Fusion Spacer is held in place using the Lateral Holder Inserter. The inserter grips the spacer on the lateral sides (**Figure 11**). The device is oriented with the curved surface positioned anteriorly. The center of the implant is then packed with autogenous bone graft.

Important

The implant without lateral ports can only be inserted using the LATERAL HOLDER INSERTER.



Figure 11

Placement of CORNERSTONE® PSR Cervical Fusion Spacer with lateral ports

The CORNERSTONE® PSR Cervical Fusion Spacer with lateral ports is attached to the Endcap Threaded Inserter (**Figure 12**). May also be inserted using the Lateral Holder Inserter which grips the spacer on the lateral sides. The device is oriented with the curved surface positioned anteriorly. The center of the implant is then packed with autogenous bone graft.



Figure 12

Implant Placement *continued*

The implant is introduced into the prepared interbody space and gently tapped into position using a mallet. A tamp may be used for final positioning (**Figure 13**).

If necessary, the spacer can be repositioned by reattaching the Endcap Threaded Insert.



Figure 13

Application of Anterior Cervical Plate

Select an anterior cervical plate with the appropriate length (**Figure 14**). Ensure that the plate contour matches the desired lordosis. If the lordosis of the plate needs adjusting, use the plate bender to increase or decrease the lordotic curve (**Figure 15**).

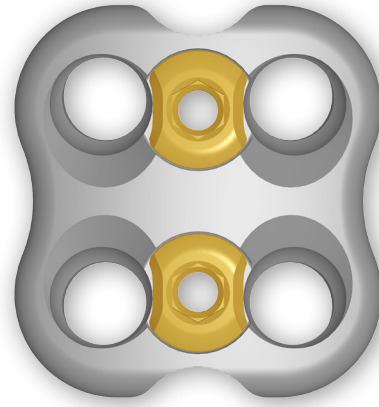


Figure 14



Figure 15

Application of Anterior Cervical Plate *continued*

Secure the plate with prefixation pins. Select the drill guide to begin drilling, tapping, and inserting the screws (**Figure 16**). Ensure that screws are locked into the plate with the anti-back out mechanism for the appropriate plate. Refer to the appropriate supplemental fixation surgical technique for proper construct insertion.

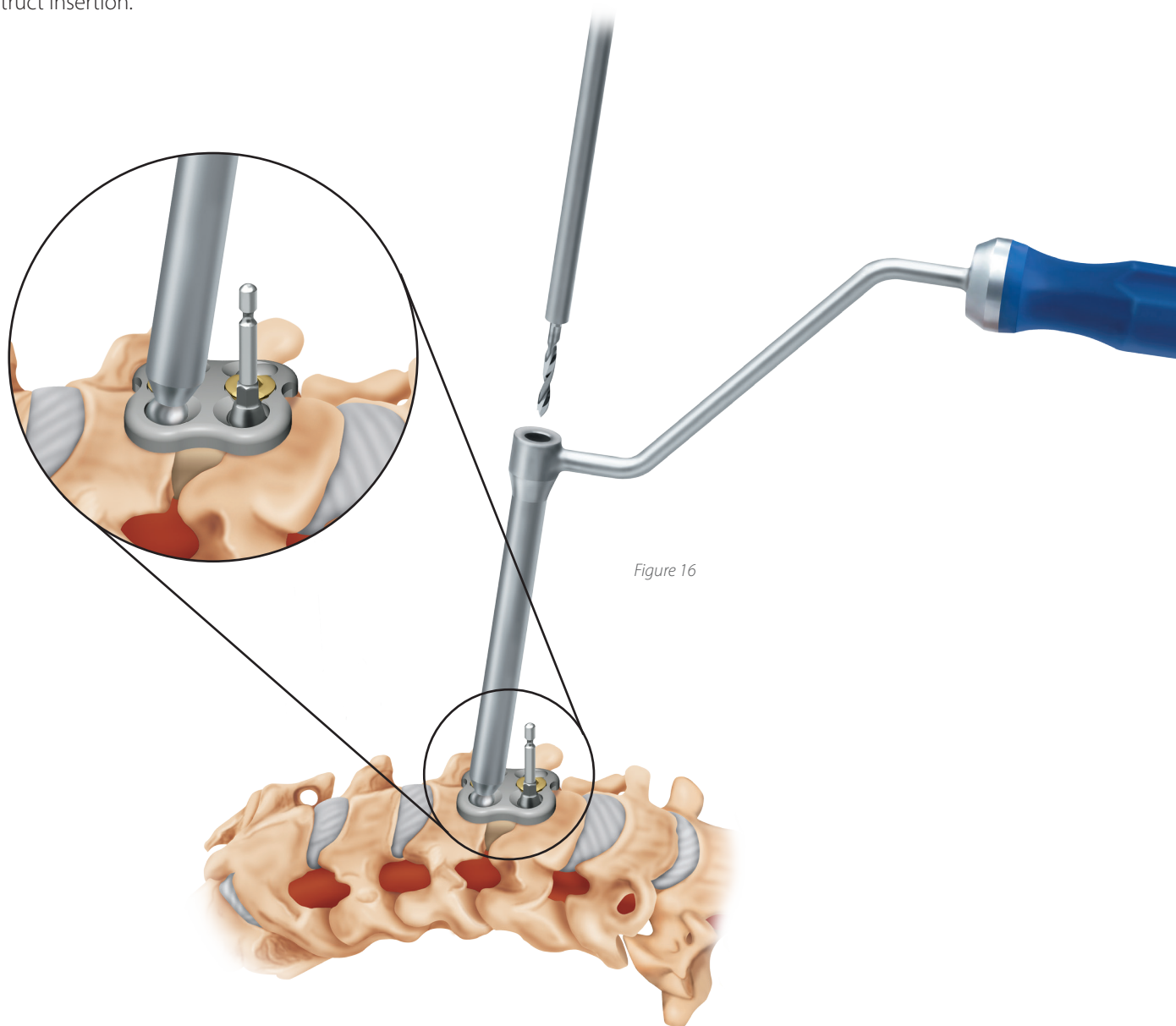


Figure 16

Explantation

First remove the plate. Removal of the implant can be accomplished by using a high-speed burr to resect the implant. The spacer can be removed intact by exposing the anterior surface of the implant and creating a clear plane around the implant by removing surrounding

bone with a high-speed burr or osteotomes. The implant inserter/holder can then be reattached to the spacer, and the implant can be removed intact with an in-line slap hammer.

Ordering Information

CORNERSTONE® PSR 11 × 11 IMPLANT SET

(with lateral ports)

Product Number	Description	Total Internal Volume
7270411	11mmx11mmx4mm	0.11cc
6284511	11mmx11mmx5mm	0.17cc
6284611	11mmx11mmx6mm	0.22cc
6284711	11mmx11mmx7mm	0.27cc
6284811	11mmx11mmx8mm	0.31cc
6284911	11mmx11mmx9mm	0.36cc
6284011	11mmx11mmx10mm	0.41cc
6284111	11mmx11mmx11mm	0.45cc
6284211	11mmx11mmx12mm	0.50cc
6284311	11mmx11mmx13mm	0.55cc

CORNERSTONE® PSR 11mm × 11mm IMPLANT SET

(without lateral ports)

Product Number	Description	Total Internal Volume
7270411	11mmx11mmx4mm	0.11cc
7270511	11mmx11mmx5mm	0.14cc
7270611	11mmx11mmx6mm	0.17cc
7270711	11mmx11mmx7mm	0.20cc
7270811	11mmx11mmx8mm	0.23cc
7270911	11mmx11mmx9mm	0.26cc
7271011	11mmx11mmx10mm	0.29cc
7271111	11mmx11mmx11mm	0.31cc
7271211	11mmx11mmx12mm	0.34cc
7271311	11mmx11mmx13mm	0.37cc

CORNERSTONE® PSR 14 × 11 IMPLANT SET

(with lateral ports)

Product Number	Description	Total Internal Volume
7270441	14mmx11mmx4mm	0.17cc
6284541	14mmx11mmx5mm	0.25cc
6284641	14mmx11mmx6mm	0.31cc
6284741	14mmx11mmx7mm	0.38cc
6284841	14mmx11mmx8mm	0.44cc
6284941	14mmx11mmx9mm	0.50cc
6284041	14mmx11mmx10mm	0.57cc
6284141	14mmx11mmx11mm	0.63cc
6284241	14mmx11mmx12mm	0.69cc
6284441	14mmx11mmx13mm	0.76cc

CORNERSTONE® PSR 14mm × 11mm IMPLANT SET

(without lateral ports)

Product Number	Description	Total Internal Volume
7270441	14mmx11mmx4mm	0.17cc
7270541	14mmx11mmx5mm	0.22cc
7270641	14mmx11mmx6mm	0.26cc
7270741	14mmx11mmx7mm	0.31cc
7270841	14mmx11mmx8mm	0.35cc
7270941	14mmx11mmx9mm	0.40cc
7271041	14mmx11mmx10mm	0.45cc
7271141	14mmx11mmx11mm	0.49cc
7271241	14mmx11mmx12mm	0.54cc
7271341	14mmx11mmx13mm	0.58cc

CORNERSTONE® PSR 14 × 14 IMPLANT SET

(with lateral ports)

Product Number	Description	Total Internal Volume
7270444	14mmx14mmx4mm	0.27cc
6284544	14mmx14mmx5mm	0.40cc
6284644	14mmx14mmx6mm	0.51cc
6284744	14mmx14mmx7mm	0.61cc
6284844	14mmx14mmx8mm	0.71cc
6284944	14mmx14mmx9mm	0.81cc
6284044	14mmx14mmx10mm	.91cc
6284144	14mmx14mmx11mm	1.02cc
6284244	14mmx14mmx12mm	1.12cc
6284344	14mmx14mmx13mm	1.22cc

CORNERSTONE® PSR 14mm × 14mm IMPLANT SET

(without lateral ports)

Product Number	Description	Total Internal Volume
7270444	14mmx14mmx4mm	0.27cc
7270544	14mmx14mmx5mm	0.34cc
7270644	14mmx14mmx6mm	0.41cc
7270744	14mmx14mmx7mm	0.48cc
7270844	14mmx14mmx8mm	0.55cc
7270944	14mmx14mmx9mm	0.62cc
7271044	14mmx14mmx10mm	0.69cc
7271144	14mmx14mmx11mm	0.76cc
7271244	14mmx14mmx12mm	0.83cc
7271344	14mmx14mmx13mm	0.90cc

Ordering Information *continued*

4° Trasps Instrument Set List

Product Number	Description
6274441	PSR TRASP 4mm × 14mm × 11mm
6274541	PSR TRASP 5mm × 14mm × 11mm
6274641	PSR TRASP 6mm × 14mm × 11mm
6274741	PSR TRASP 7mm × 14mm × 11mm
6274841	PSR TRASP 8mm × 14mm × 11mm
6274941	PSR TRASP 9mm × 14mm × 11mm
6274041	PSR TRASP 10mm × 14mm × 11mm
6274141	PSR TRASP 11mm × 14mm × 11mm
6274241	PSR TRASP 12mm × 14mm × 11mm
6274341	PSR TRASP 13mm × 14mm × 11mm
875-782	Lateral Holder Inserter
875-725	TAMP Curved
6274411	PSR Trasp 4mm × 11mm × 11mm
6274511	PSR TRASP 5mm × 11mm × 11mm
6274611	PSR TRASP 6mm × 11mm × 11mm
6274711	PSR TRASP 7mm × 11mm × 11mm
6274811	PSR TRASP 8mm × 11mm × 11mm
6274911	PSR TRASP 9mm × 11mm × 11mm
6274011	PSR TRASP 10mm × 11mm × 11mm
6274111	PSR TRASP 11mm × 11mm × 11mm
6274211	PSR TRASP 12mm × 11mm × 11mm
6274311	PSR TRASP 13mm × 11mm × 11mm
6274344	PSR TRASP 13mm × 14mm × 14mm
6274244	PSR TRASP 12mm × 14mm × 14mm
6274144	PSR TRASP 11mm × 14mm × 14mm
6274044	PSR TRASP 10mm × 14mm × 14mm
6274944	PSR TRASP 9mm × 14mm × 14mm
6274844	PSR TRASP 8mm × 14mm × 14mm
6274744	PSR TRASP 7mm × 14mm × 14mm
6274644	TRASP 6mm × 14mm × 14mm 4DEG
6274544	TRASP 5mm × 14mm × 14mm
6274444	TRASP 4mm × 14mm × 14mm
6279002	Threaded Inserter
875-716	Mallet

Important Product Information

SUMMARY OF IMPORTANT PRODUCT INFORMATION FOR THE CORNERSTONE® PSR INTERBODY FUSION DEVICE

PURPOSE

This device is a fusion device intended for stabilization use and to promote bone fusion during the normal healing process following surgical correction of disorders of the spine. The product should be implanted only by a physician who is thoroughly knowledgeable in the implant's material and surgical aspects and who has been instructed as to its mechanical and material applications and limitations. This device is manufactured from medical grade POLYETHERETHERKETONE (PEEK) with tantalum or titanium alloy wire markers and is provided sterile.

DESCRIPTION

The CORNERSTONE® PSR Cervical Fusion System consists of cages of various widths and heights, which can be inserted between two cervical vertebral bodies to give support and correction during cervical interbody fusion surgeries. The hollow geometry of the implants allows them to be packed with autogenous bone graft in cervical fusion procedures. The CORNERSTONE® PSR device is to be used with supplemental instrumentation and is to be implanted via an open, anterior approach.

No warranties express or implied, are made. Implied warranties of merchantability and fitness for a particular purpose or use are specifically excluded. See the MDT Catalog or price list for further information about warranties and limitations of liability.

Medical grade titanium and medical grade PEEK may be used together. **Never use titanium or titanium alloy implants with stainless steel in the same construct.**

INDICATIONS

The CORNERSTONE® PSR device is indicated for cervical interbody fusion procedures in skeletally mature patients with cervical disc disease at one level from the C2–C3 disc to the C7–T1 disc. Cervical disc disease is defined as intractable radiculopathy and/or myelopathy with herniated disc and/or osteophyte formation on posterior vertebral endplates producing symptomatic nerve root and/or spinal cord compression confirmed by radiographic studies. This device is to be used in patients who have had six weeks of non-operative treatment. The CORNERSTONE® PSR device is to be used with supplemental fixation. The CORNERSTONE® PSR device is also required to be used with autograft.

CONTRAINDICATIONS

The CORNERSTONE® PSR device is not intended for posterior surgical implantation. Contraindications also include, but are not limited to:

- Any case not described in the indications.
- Any medical or surgical condition which would preclude the potential benefit of spinal implant surgery, such as the presence of tumors or congenital abnormalities, elevation of sedimentation rate unexplained by other diseases, elevation of white blood count (WBC), or a marked left shift in the WBC differential count.
- Any patient having inadequate tissue coverage over the operative site or where there is inadequate bone stock, bone quality, or anatomical definition.
- Any patient unwilling to co-operate with postoperative instructions.
- Fever or leukocytosis.
- Infection local to the operative site and/or signs of local inflammation.
- Mental illness.
- Morbid obesity.
- Pregnancy.
- Any case not requiring fusion.
- Suspected or documented allergy or intolerance to the component materials.
- This device must not be used for pediatric cases, or where the patient still has general skeletal growth.
- Patients with a known hereditary or required bone friability or calcification problem should not be considered for this type of surgery.
- Prior fusion at the level to be treated.
- Any patient in which implant utilization would interfere with anatomical structures or expected physiological performance.
- Spondylolisthesis unable to be reduced to Grade 1.
- Any case that requires the mixing of metals from two different components or systems.

NOTA BENE: Although not absolute contraindications, conditions to be considered as potential factors for not using this device include:

- Severe bone resorption.
- Osteomalacia.
- Severe osteoporosis.

POTENTIAL ADVERSE EVENTS

All of the possible adverse events or complications associated with spinal fusion surgery without instrumentation are possible. With instrumentation, a listing of possible adverse events or complications includes, but is not limited to:

- Bone loss or decrease in bone density possibly caused by stress shielding.
- Cauda equina syndrome, neuropathy, neurological deficits (transient or permanent), paraplegia, paraparesis, reflex deficits, arachnoiditis, and/or muscle loss.
- Loss of spinal mobility or function and inability to perform the activities of daily living.
- Change in mental status.
- Death.
- Development of respiratory problems (e.g. pulmonary embolism, atelectasis, bronchitis, pneumonia, etc.).
- Disassembly, bending, and/or breakage of any or all of the components.
- Dural tears, pseudomeningocele, fistula, persistent CSF leakage, meningitis.
- Early or late loosening of the components.
- Implant migration.
- Foreign body (allergic) reaction to the implants, debris, corrosion products including metallosis, staining, tumor formation and/or autoimmune disease.
- Fracture, microfracture, resorption, damage, penetration, and/or retropulsion of any spinal bone, of the autograft, or at the bone graft harvest site at, above, and/or below the level of surgery.
- Ileus, gastritis, bowel obstruction or other types of gastrointestinal complications.
- Graft donor site complications including pain, fracture, infection, or wound healing problems.
- Hemorrhage, hematoma, occlusion, seroma, edema, embolism, stroke, excessive bleeding, phlebitis, damage to blood vessels, or cardiovascular system compromise, and wound necrosis or wound dehiscence.
- Herniated nucleus pulposus, disc disruption or degeneration at, above, or below the level of surgery.
- Infection.
- Loss of neurological function including paralysis (complete or incomplete), dysesthesia, hyperesthesia, anesthesia, paraesthesia, appearance or radiculopathy, and/or the development or continuation of pain, numbness, neuroma, tingling sensation, sensory loss, and/or spasms.
- Non-union (or pseudarthrosis), delayed union, and mal-union.
- Postoperative change in spinal curvature, loss of correction, height, and/or reduction.
- Scar formation possibly causing neurological compromise around nerves and/or pain.
- Subsidence of the device into vertebral body(ies).
- Tissue or nerve damage, irrigation, and/or pain caused by improper positioning and placement of implants or instruments.

NOTE: Additional surgery may be necessary to correct some of these anticipated adverse events

WARNING(S)

A successful result is not always achieved in every surgical case. This fact is especially true in spinal surgery where other patient conditions may compromise the results. Use of this product in cervical interbody fusion procedures without autograft may not be successful. No spinal implant can withstand body loads without the support of bone. In this event, bending, loosening, disassembly, and/or breakage of the device(s) will eventually occur.

Preoperative and operating procedures including knowledge of surgical techniques, proper selection and placement of the implant, and good reduction are important considerations in the success of surgery.

Patients with previous spinal surgery at the levels to be treated may have different clinical outcomes compared to those without a previous surgery.

Further, the proper selection and compliance of the patient will greatly affect the results. Patients who smoke have been shown to have an increased incidence of non-unions. These patients should be advised of this fact and warned of this consequence. Obese, malnourished, and/or alcohol abuse patients are also poor candidates for spine fusion.

PRECAUTION(S):

PHYSICIAN NOTE: Although the physician is the learned intermediary between the company and the patient, the important medical information given in this document should be conveyed to the patient.

This device was designed for single patient use only. Do not reuse, reprocess, or resterilize this product. Reuse, reprocessing, or resterilization may compromise the structural integrity of the device and/or create a risk of contamination of the device, which could result in patient injury, illness, or death.

USA FOR US AUDIENCES ONLY

CAUTION: FEDERAL LAW (USA) RESTRICTS THESE DEVICES TO SALE BY OR ON THE ORDER OF A PHYSICIAN.

Please contact Customer Service or your Sales Representative for the most up-to-date revision of the package insert for current indications, warnings, precautions and other important medical information.

Notes

Notes

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The surgical technique shown is for illustrative purposes only. The technique(s) actually employed in each case will always depend upon the medical judgment of the surgeon exercised before and during surgery as to the best mode of treatment for each patient.

Please see the package insert for the complete list of indications, warnings, precautions, and other important medical information.

