

## **IMPORTANT PRODUCT INFORMATION FOR Aero™-AL ANTERIOR LUMBAR CAGE AND FIXATION SYSTEM**

**STERILE PRODUCT**

### **DESCRIPTION**

The Aero™-AL Cage is a hollow, box-shaped PEEK cage surrounded by a titanium alloy jacket. The PEEK cage portion consists of three closed pockets for graft containment and has serrations on the superior and inferior surfaces of the cage. The cage is designed to be used with the integrated fixation provided (Aero™-AL Fixation Anchors) in addition to supplemental fixation systems cleared for use in the lumbosacral spine. The Aero™-AL Fixation Anchors are constructed from titanium alloy and feature rails that mate with dovetail channels located within the Aero™-AL PEEK cage. Once fully seated into the channels, the anchors are designed to lock into the titanium jacket.

### **MATERIAL**

All components of the system are manufactured out of the following materials:

- Cage: Polyetheretherketone (PEEK Optima® LT1) (ASTM F2026) and Titanium Alloy Ti6Al4V (ISO 5832-3, ASTM F136)
- Fixation Anchors: Titanium Alloy Ti6Al4V (ISO 5832-3, ASTM F136)

### **INDICATIONS**

#### **USA and CANADA Indications:**

The Stryker Spine Aero™-AL is an intervertebral body fusion device indicated for use with autogenous bone graft in patients with degenerative disc disease (DDD) at one level or two contiguous levels from L2 to S1.

DDD is defined as back pain of discogenic origin with degeneration of the disc confirmed by history and radiographic studies. The DDD patients may also have up to Grade I spondylolisthesis at the involved level(s). These patients should be skeletally mature and have six months of nonoperative therapy.

The Aero™-AL Lumbar Cage System is to be implanted via an anterior approach.

The Aero™-AL Lumbar Cage System is intended to be used with supplemental spinal fixation systems that have been cleared for use in the lumbosacral spine (e.g., posterior pedicle screw and rod systems) in addition to the included fixation anchors.

#### **Indications outside USA and CANADA:**

The Stryker Spine Aero™-AL is an intervertebral body fusion device indicated for the treatment of spondylolisthesis, degenerative spine disorders, and discal and vertebral instability, and may also be used in cases of spine revision surgery. Packing bone graft material within the implant is recommended.

The Aero™-AL Lumbar Cage System is to be implanted via an anterior approach.

The Aero™-AL Lumbar Cage system may be used as a stand-alone device or in conjunction with supplemental fixation. The Aero™-AL Lumbar Cage must be used with the four fixation anchors provided.

## **GENERAL CONDITIONS OF USE**

The implantation of intervertebral body fusion devices must be performed only by experienced spinal surgeons having undergone the necessary specific training in the use of such systems because this is a technically demanding procedure presenting a risk of serious injury to the patient.

The information contained in the Package Insert is necessary but not sufficient for the use of this device. This information is in no sense intended as a substitute for the professional judgment, skill and experience of the surgeon in careful patient selection, preoperative planning and device selection, knowledge of the anatomy and biomechanics of the spine, understanding of the materials and the mechanical characteristics of the implants used, training and skill in spinal surgery and the use of associated instruments for implantation, securing the patient's cooperation in following an appropriately defined post-operative management program and conducting scheduled post-operative follow-up examinations.

## **CAUTION**

- Federal law (U.S.A.) restricts this device to sale by or on the order of a licensed physician.
- This device is not intended for posterior surgical implantation.
- This device is NOT intended to be used without the Aero™-AL fixation anchors provided. Should removal of the Aero™-AL Fixation Anchors be necessary during the surgery, the Aero™-AL cage should NOT be implanted alone, without the support of the Aero™-AL fixation anchors.
- Once an Aero™-AL implant has been inserted and removed, another Aero™-AL implant cannot be placed at that level.
- This device is provided STERILE. Do not use if package is opened or damaged or after the "Use by" date on the label has expired.
- The Aero™-AL Lumbar Cages have not been evaluated for safety and compatibility in the MR environment. Aero™-AL Lumbar Cages have not been tested for heating or migration in the MR environment.
- Based on the fatigue testing results, the physician/surgeon must consider the levels of implantation, patient weight, patient activity level, other patient conditions, etc. which may impact the performance of the intervertebral body fusion device.
- The implantation of the intervertebral body fusion device must be performed only by experienced spinal surgeons with specific training in the use of this device because this is a technically demanding procedure presenting a risk of serious injury to the patient.
- Potential risks identified with the use of this intervertebral body fusion device, which may require additional surgery, include: device component fracture, loss of fixation, pseudoarthrosis (i.e. non-union), fracture of the vertebrae, neurological injury, and vascular or visceral injury.
- Patients with previous spinal surgery at the level(s) to be treated may have different clinical outcomes compared to those without a previous surgery.
- The components of the system should not be used with components of any other system or manufacturer. Any such use will negate the responsibility of Stryker Spine for the performance of the resulting mixed component implant.
- Do not mix metals (e.g. Titanium based devices with stainless steel items). Some corrosion occurs on all implanted metals and alloys. Contact of dissimilar metals, however, may accelerate corrosion. Corrosion may accelerate fatigue fracture of implants, and cause metal compounds to be released into the body.

## **INFECTION**

Transient bacteremia can occur in daily life. Dental manipulation, endoscopic examination and other minor surgical procedures have been associated with transient bacteremia. To help prevent infection at the implant site, it may be advisable to use antibiotic prophylaxis before and after such procedures.

## **INSTRUMENTS**

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Instruments are provided by STRYKER Spine and must be used to assure accurate implantation of the device. While rare, intraoperative fracture or breakage of instruments can occur. Instruments which have experienced extensive use or extensive force are more susceptible to fracture depending on the operative precaution, number of procedures, and disposal attention. Instruments must be examined for wear or damage prior to surgery.

### **REUSE**

Never reuse or re-implant spinal surgical implants. These could become contaminated resulting in infection. In addition, even though the device appears undamaged, it may have small defects which could compromise structural integrity reducing its service life and/or leading to patient injury.

Surgeons must verify that the instruments are in good condition and operating order prior to use during surgery.

### **HANDLING**

Correct handling of the implant is extremely important. The operating surgeon must avoid notching or scratching the device.

### **ALLERGY AND HYPERSENSITIVITY TO FOREIGN BODIES**

When hypersensitivity is suspected or proven, it is highly recommended that the tolerance of the skin to the materials that make up the implants be checked before they are implanted.

### **CONTRA-INDICATIONS**

Contraindications may be relative or absolute. The choice of a particular device must be carefully weighed against the patient's overall evaluation. Circumstances listed below may reduce the chances of a successful outcome:

- The Aero™-AL Lumbar Cage should not be implanted in patients with an active infection at the operative site.
- The Aero™-AL Lumbar Cage is not intended for use except as indicated.
- Marked local inflammation.
- Any abnormality present which affects the normal process of bone remodeling including, but not limited to, severe osteoporosis involving the spine, bone absorption, osteopenia, primary or metastatic tumors involving the spine, active infection at the site or certain metabolic disorders affecting osteogenesis.
- Any mental or neuromuscular disorder which would create an unacceptable risk of fixation failure or complications in postoperative care.
- Open wounds.
- Pregnancy.
- Inadequate tissue coverage over the operative site.
- Any neuromuscular deficit which places an unsafe load level on the device during the healing period.
- Obesity. An overweight or obese patient can produce loads on the spinal system which can lead to failure of the fixation of the device or to failure of the device itself.
- A condition of senility, mental illness, or substance abuse. These conditions, among others, may cause the patient to ignore certain necessary limitations and precautions in the use of the implant, leading to failure or other complications.
- Foreign body sensitivity. Where material sensitivity is suspected, appropriate tests must be made prior to material selection or implantation.
- Other medical or surgical condition which would preclude the potential benefit of spinal implant surgery, such as the presence of tumors, congenital abnormalities, elevation of sedimentation rate

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unexplained by other diseases, elevation of white blood cell count (WBC), or marked left shift in the WBC differential count.

- Prior fusion at the levels to be treated.

These contra-indications can be relative or absolute and must be taken into account by the physician when making his decision. The above list is not exhaustive. Surgeons must discuss the relative contraindications with the patients.

### **INFORMATION FOR PATIENTS**

The surgeon must discuss all physical and psychological limitations inherent to the use of the device with the patient. This includes the rehabilitation regimen, physical therapy, and wearing an appropriate orthosis as prescribed by the physician. Particular discussion should be directed to the issues of premature weight bearing, activity levels, and the necessity for periodic medical follow-up.

The surgeon must warn the patient of the surgical risks and make them aware of possible adverse effects. The surgeon must warn the patient that the device cannot and does not replicate the flexibility, strength, reliability or durability of normal healthy bone, that the implant can break or become damaged as a result of strenuous activity or trauma, and that the device may need to be replaced in the future. If the patient is involved in an occupation or activity which applies inordinate stress upon the implant (e.g., substantial walking, running, lifting, or muscle strain) the surgeon must advise the patient that resultant forces can cause failure of the device. Patients who smoke have been shown to have an increased incidence of non-unions. Such patients should be advised of this fact and warned of the potential consequences. For patients with degenerative disease, the progression of degenerative disease may be so advanced at the time of implantation that it may substantially decrease the expected useful life of the appliance. In such cases, orthopaedic devices may be considered only as a delaying technique or to provide temporary relief. Patients with previous spinal surgery at the level(s) to be treated may have different clinical outcomes compared to those without a previous surgery.

### **PRE-OPERATIVE PRECAUTIONS**

The surgical indication and the choice of implants must take into account certain important criteria such as:

- Patients involved in an occupation or activity that applies excessive loading upon the implant (e.g., substantial walking, running, lifting, or muscle strain) may be at increased risk for failure of the fusion and/or the device.
- Surgeons must instruct patients in detail about the limitations of the implants, including, but not limited to, the impact of excessive loading through patient weight or activity, and be taught to govern their activities accordingly. The procedure will not restore function to the level expected with a normal, healthy spine, and the patient should not have unrealistic functional expectations.
- A condition of senility, mental illness, chemical dependence or alcoholism. These conditions among others may cause the patients to ignore certain necessary limitations and precautions in the use of the implant, leading to failure and other complications.
- Foreign body sensitivity. Where material sensitivity is suspected appropriate tests should be made prior to material implantation.
- Surgeons must advise patients who smoke have been shown to have an increased incidence of non-unions. Such patients must be advised of this fact and warned of the potential consequences.
- Care must be taken to protect the components from being marred, nicked, or notched as a result of contact with metal or abrasive objects.

### **THE CHOICE OF IMPLANTS**

The choice of proper shape, size and design of the implant for each patient is crucial to the success of the surgery. The surgeon is responsible for this choice, which depends on each patient.

Patients who are overweight may be responsible for additional stresses and strains on the device

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which can speed up implant fatigue and/or lead to deformation or failure of the implants.

The size and shape of the bone structures determine the size, shape and type of the implants. Once implanted, the implants are subjected to stresses and strains. These repeated stresses on the implants must be taken into consideration by the surgeon at the time of the choice of the implant, during implantation as well as in the post-operative follow-up period. Indeed, the stresses and strains on the implants may cause fatigue, fracture or deformation of the implants, before the bone graft has become completely consolidated. This may result in further side effects or necessitate the early removal of the osteosynthesis device.

### **INTRA-OPERATIVE PRECAUTIONS**

- The insertion of the implants must be carried out using instruments designed and provided for this purpose and in accordance with the specific implantation instructions for each implant. Those detailed instructions are provided in the surgical technique brochure supplied by STRYKER Spine.
- Discard all damaged or mishandled implants.
- Never reuse an implant, even though it may appear undamaged.

### **PATIENT CARE FOLLOWING TREATMENT**

Prior to adequate maturation of the fusion mass, implanted spinal instrumentation may need additional help to accommodate full load bearing. External support may be recommended by the physician from two to four months postoperatively or until x-rays or other procedures confirm adequate maturation of the fusion mass; external immobilization by bracing or casting may be employed. Surgeons must instruct patients regarding appropriate and restricted activities during consolidation and maturation for the fusion mass in order to prevent placing excessive stress on the implants which may lead to fixation or implant failure and accompanying clinical problems. Surgeons must instruct patients to report any unusual changes of the operative site to his/her physician. The physician must closely monitor the patient if a change at the site has been detected.

### **ADVERSE EFFECTS**

Include but are not limited to:

- Late bone fusion or no visible fusion mass and pseudarthrosis;
- While the expected life of spinal implant components is difficult to estimate, it is finite. These components are made of foreign materials which are placed within the body for the potential fusion of the spine and reduction of pain. However, due to the many biological, mechanical and physicochemical factors which affect these devices but cannot be evaluated in vivo, the components cannot be expected to indefinitely withstand the activity level and loads of normal healthy bone;
- Superficial or deep-set infection and inflammatory phenomena;
- Allergic reactions to the implanted materials, although uncommon, can occur;
- Decrease in bone density due to stress shielding;
- Dural leak requiring surgical repair;
- Peripheral neuropathies, nerve damage, heterotopic bone formation and neurovascular compromise, including paralysis, loss of bowel or bladder function, or foot-drop may occur.
- Cessation of growth of the fused portion of the spine;
- Loss of proper spinal curvature, correction, height and/or reduction;
- Delayed Union or Nonunion: Internal fixation appliances are load sharing devices which are used to obtain alignment until normal healing occurs. In the event that healing is delayed, does not occur, or failure to immobilize the delayed/nonunion results, the implant will be subject to excessive and repeated stresses which can eventually cause loosening, bending or fatigue fracture. The degree or success of union, loads produced by weight bearing, and activity levels will, among other conditions, dictate the longevity of the implant. If a nonunion develops or if the implants loosen, bend or break, the device(s) must be revised or removed immediately before serious injury occurs;

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- Neurological and spinal dura mater lesions from surgical trauma;
- Early loosening may result from inadequate initial fixation, latent infection, premature loading of the device or trauma. Late loosening may result from trauma, infection, biological complications or mechanical problems, with the subsequent possibility of bone erosion, or pain.
- Serious complications may occur with any spinal surgery. These complications include, but are not limited to, genitourinary disorders; gastrointestinal disorders; vascular disorders, including thrombus; bronchopulmonary disorders, including emboli; bursitis, hemorrhage, myocardial infarction, infection, paralysis or death.
- Inappropriate or improper surgical placement of this device may cause distraction or stress shielding of the graft or fusion mass. This may contribute to failure of an adequate fusion mass to form.
- Intraoperative fissure, fracture, or perforation of the spine can occur due to implantation of the components. Postoperative fracture of bone graft or the intervertebral body above or below the level of surgery can occur due to trauma, the presence of defects, or poor bone stock.

Adverse effects may necessitate reoperation or revision.

The surgeon must warn the patient of these adverse effects as deemed necessary.

## REMOVAL

If fusion / bone graft growth occurs, the device will be deeply integrated into the bony tissues. As a result, the Aero™-AL is not intended to be removed unless the management of a complication or adverse event requires the removal. Any decision by a physician to remove the device should take into consideration such factors as:

- The risk to the patient of the additional surgical procedure as well as the difficulty of removal.
- Migration of the implant, with subsequent pain and/or neurological, articular or soft tissue lesions
- Pain or abnormal sensations due to the presence of the implants
- Infection or inflammatory reactions
- Reduction in bone density due to the different distribution of mechanical and physiological stresses and strains.

## PACKAGING

- The implants are single-use devices, provided sterile.
- Implants sold sterile are always presented in individual packaging and are clearly labeled as “sterile” on the package label. The sterilization method applied is indicated on the product label. Before utilization, it is recommended to verify the sterility expiration date. Stryker Spine cannot be held responsible for use of its products after their expiration date. It is recommended to verify the integrity of the original package before use. Sterility is ensured only if there is no trace of damage to the packaging. In case of damage to the packaging, or after opening of the packaging, re-sterilization of the implant is strictly forbidden, regardless of the method that might be employed.
- The instruments are reusable devices, provided non-sterile, and delivered in individual packages. The typical packaging used is clear plastic tubes and polyethylene bags. The packages must be intact at the time of receipt.
- Instruments must be removed entirely from their packaging prior to sterilization.
- The instruments may also be supplied as a complete set: instruments are arranged on trays and placed in specially designed storage boxes.

## RECOMMENDATIONS FOR IMPLANTS PROVIDED STERILE

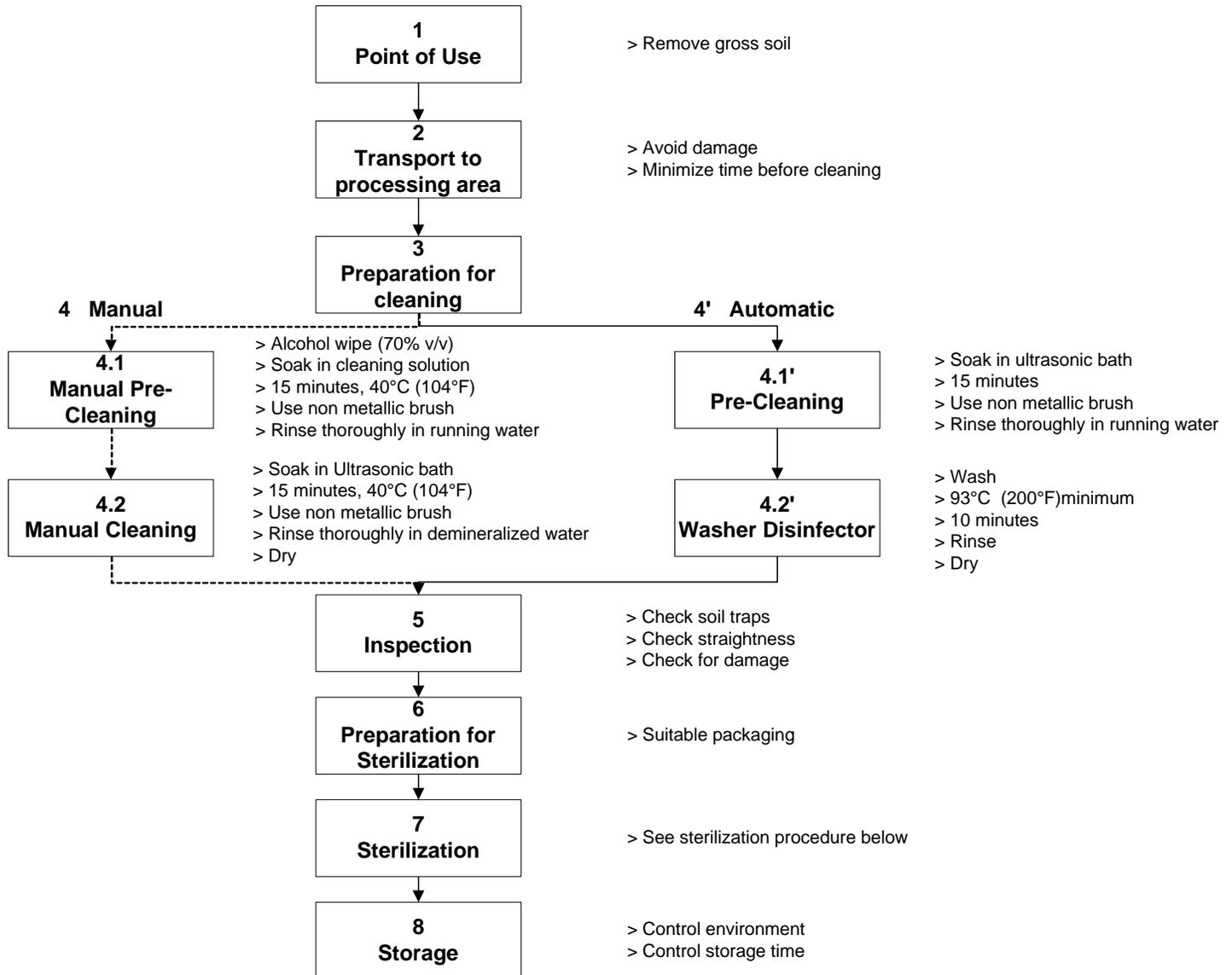
- Products delivered sterile have been exposed to a minimum of 25 kGy of gamma radiation process. Sterile products may be stored at room temperature and withstand the normal transportation conditions.
- Do not use if package is opened or damaged or after the “Use by” date on the label has expired.

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- Stryker shall not be responsible for the use of products presenting package deterioration or expiration of shelf life.
- Re-sterilization of implants is strictly prohibited.
- Care must be taken to prevent contamination of implant after opening of package.

**PRE-CLEANING / CLEANING AND STERILIZATION PROCEDURE RECOMMENDED FOR NON-STERILE MEDICAL DEVICES**

For maintenance, reusable instruments must be pre-cleaned, cleaned and sterilized immediately after surgery following the sequence of steps described in the following chart.



## **STEAM STERILIZATION PROCEDURE RECOMMENDED FOR NON-STERILE MEDICAL DEVICES**

Medical Devices should be sterilized in their container with water vapor in an autoclave in accordance with standard hospital procedure. The sterilization method suggested has been validated according to the AAMI ST 79 in order to obtain a Sterility Assurance Level (SAL) of  $10^{-6}$ .

### **Steam sterilization with FDA-cleared sterilization wraps**

The following ranges of parameters have been validated on wrapped containers in fully-loaded autoclaves.

#### **STERILIZATION CONDITIONS:**

##### **Prevacuum (Porous Load) steam sterilization autoclave:**

- Temperature: 132°C (270°F)
- Exposure Time: 4 Minutes
- Dry Time: 30 Minutes

##### **Gravity Displacement steam sterilization autoclave:**

- Temperature: 132°C (270°F)
- Exposure Time: 15 Minutes
- Dry time: 30min.

**CAUTION:** It is recommend that an FDA-cleared sterilization wrap is used when wrapping the containers

The autoclave must be validated by the hospital and regularly checked to guarantee the recommended sterilization temperature is reached for the entire exposure time.

If after having followed this sterilization method there is still water in the sterilization containers or on/inside the device, the device must be dried and sterilization repeated.

### **FURTHER INFORMATION**

A surgical technique brochure is available on request through your STRYKER representative or directly from STRYKER Spine. Users with brochures that are over two years old at the time of surgery are advised to ask for an updated version.

### **COMPLAINTS**

Any health professional having a complaint or grounds for dissatisfaction relating to the identity, quality, durability, reliability, safety, effectiveness or performance of a device should notify STRYKER Spine or its representative. Moreover, if a device has malfunctioned, or is suspected of having malfunctioned, STRYKER Spine or its representative must be advised immediately.

If a STRYKER Spine product has ever worked improperly and could have caused or contributed to the death of or serious injury to a patient, the distributor or STRYKER Spine must be informed as soon as possible by telephone, fax or in writing.

For all complaints, please include the name and reference along with the batch number of the component(s), your name and address and an exhaustive description of the event to help STRYKER Spine understand the causes of the complaint.

For further information regarding services, please contact:

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