# Instructions for Use: coflex® Interlaminar Technology

**Caution: Federal law restricts this device to sale by or on the order of a physician**

| How Supplied |
| --- |
| Implant Components – Sterile<br>Surgical instruments – Non-Sterile (unless otherwise noted on the package label) |

## DEVICE DESCRIPTION

The coflex® Interlaminar Technology is an interlaminar functionally dynamic implant designed to impart a stabilization effect at the operative level(s). It consists of a single, U-shaped component, fabricated from medical grade titanium alloy (Ti6Al4V, per ASTM F136 and ISO 5832-3). In clinical use, the "U" is positioned horizontally, with its apex oriented anteriorly and the two long arms of the "U" paralleling the long axis of the spinal processes. The bone-facing surfaces are ridged to provide resistance to migration.

A set of two wings extends vertically from the superior long arm of the "U", with a second set of wings extending below the inferior long arm. Both sets of wings have serrated bone-facing surfaces, which are designed to further stabilize the coflex® device to the superior and inferior spinous processes, respectively, at the treated level. In addition, the opposing wing surfaces are spaced such that they surround the midportion of the spinous process between the base and the tip, but are more narrowly set (after intraoperative crimping, if necessary) than the flared posterior tip of the spinous process. Spacing of the superior and inferior wing sets is staggered, preventing overlapping of the wings if the coflex® device is implanted at adjacent levels.

To properly fit into the space between the spinous processes in a range of patient anatomies, the coflex® implant is manufactured in five sizes: 8, 10, 12, 14 and 16mm. The size corresponds to the size of the "U" as measured from opposing long arms. The number of teeth and the dimensions of the teeth are the same for all device sizes. The "gap" between the upper and lower arms of the "U" is 5mm for the size 8 device, 7mm for the size 10, 9mm for the size 12, 11mm for the size 14, and 13mm for the size 16.

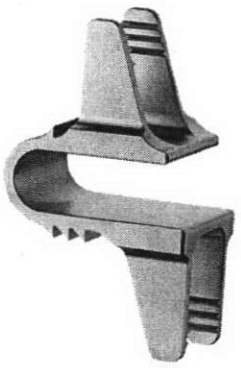


**Figure 1: coflex® Interlaminar Technology**

During surgery, trial implants (trials) are inserted to determine the appropriate implant size. Manufactured from medical grade acetal co-polymers, these trials are also used as

impactors, i.e., one end of the instrument is a sizer while the opposite end holds the implant in place during insertion. The trials are color coded according to size, and are supplied in five colors corresponding to the five sizes of the coflex® implant. The 8mm is gray; the 10mm is yellow; the 12mm is dark green; the 14mm is red; and the 16mm is dark blue. A second option of trials is offered with guide and x-ray marker to provide greater guidance, support and visibility during implantation.

Two sets of specially designed pliers are used during implantation of the coflex® implants: the coflex® bending pliers and the coflex® crimping pliers. The coflex® bending pliers are used to open the wings of the implant, and the coflex® crimping pliers are used to close the wings in place to conform to the spinous process. In addition, revision pliers are available if needed to assist in the removal of the coflex® implant during a revision surgery. A general purpose mallet may also be included to aid in insertion of the coflex® device.

## INDICATIONS FOR USE

The coflex® Interlaminar Technology is an interlaminar stabilization device indicated for use in one or two level lumbar stenosis from L1-L5 in skeletally mature patients with at least moderate impairment in function, who experience relief in flexion from their symptoms of leg/buttocks/groin pain, with or without back pain, and who have undergone at least 6 months of non-operative treatment. The coflex® is intended to be implanted midline between adjacent lamina of 1 or 2 contiguous lumbar motion segments. Interlaminar stabilization is performed after decompression of stenosis at the affected level(s).

## CONTRAINDICATIONS

The coflex® is contraindicated in patients with:

- Prior fusion or decompressive laminectomy at any index lumbar level.
- Radiographically compromised vertebral bodies at any lumbar level(s) caused by current or past trauma or tumor (e.g., compression fracture).
- Severe facet hypertrophy that requires extensive bone removal which would cause instability.
- Grade II or greater spondylolisthesis.
- Isthmic spondylolisthesis or spondylolysis (pars fracture).
- Degenerative lumbar scoliosis (Cobb angle of greater than 25°).
- Osteoporosis.
- Back or leg pain of unknown etiology.
- Axial back pain only, with no leg, buttock, or groin pain.
- Morbid obesity defined as a body mass index > 40.
- Active or chronic infection – systemic or local.
- Known allergy to titanium alloys or MR contrasting agents.
- Cauda equina syndrome defined as neural compression causing neurogenic bowel or bladder dysfunction.

**WARNINGS:**

The coflex® Interlaminar Technology should only be used by surgeons who are experienced and have undergone hands-on training in the use of this device. Only surgeons who are familiar with the implant components, instruments, procedure, clinical applications, biomechanics, adverse events, and risks associated with the coflex® Interlaminar Technology should use this device. A lack of adequate experience and/or training may lead to a higher incidence of adverse events.

Data has demonstrated that spinous process fractures can occur with coflex® implantation. Potential predictors for spinous process fractures include:

- Over-decompression during surgery leading to instability in the spine,
- Resection of the spinous process to $\leq$ 14 mm,
- Height of the spinous process $\leq$23 mm pre-operatively,
- Osteopenia or osteoporosis, and
- "Kissing" spinous processes.

If a spinous process fracture occurs during the surgical procedure, the surgeon should assess if sufficient bone stock exists for coflex® implantation.

**PRECAUTIONS**

- Prior to use, thoroughly read these Instructions for Use and become familiar with the Surgical Technique. Never use or process damaged or defective instruments. Contact your local representative or dealer for repair or replacement.
- The coflex® Interlaminar Technology is provided sterile. Do not resterilize.
- Selection of appropriate implant size is essential towards obtaining proper function of the device and good clinical results.
- The use of an instrument for tasks other than those for which they are intended may result in damaged/broken instruments or patient injury.
- Avoid the use of excessive force when using a trial. Use of such force may result in injury to the patient and/or failure of a trial.
- Do not use the trial to remove the coflex® device. Such use may result in damage to the coflex®, the trial, or both.
- Use only the surgical pliers provided in the coflex® instrument set to adjust the wings of the device. Use of other instruments may lead to wing damage or breakage.
- Do not implant a broken or damaged coflex® device.
- Keep the instructions for use accessible to all staff.
- The operating surgeon must have a thorough command of both the hands-on and conceptual aspects of the established operating techniques.
- Proper surgical performance of the implantation is the responsibility of the operating surgeon.
- Under no circumstances may modular implant components from different suppliers be combined with this device.
- Each patient's record shall document the implant used (name, article number, lot number).
- During the postoperative phase, in addition to mobility and muscle training, it is of particular importance that the physician keeps the patient well informed about post-surgical regimen.

- Damage to the weight-bearing structures can give rise to loosening, dislocation and migration, as well as other complications. To ensure the earliest possible detection of implant dysfunction, the implant must be checked periodically postoperatively using appropriate techniques.
- A recent study (Kim et al, 2012) has identified an association between degenerative spondylolisthesis and spinous process fracture in patients undergoing interspinous process spacer surgery (e.g., X-Stop, Aspen). This study did not include the coflex® Interlaminar Technology.
- Never reuse an implant. Although the implant may appear undamaged, previous stresses may have created non-visible damage that could result in implant failure.
- Never use implants if the packaging is damaged.
- An implant with damaged packaging might be damaged itself and thus may not be used.
- The safety and effectiveness of the coflex® Interlaminar Technology has not been evaluated in patients with the following:
  - More than two vertebral levels requiring surgical decompression.
  - Prior surgical procedure that resulted in translatory instability of the lumbar spine [as defined by White & Panjabi].
  - More than one surgical procedure at any combination of lumbar levels.
  - Disc herniation at any lumbar level requiring surgical intervention.
  - Osteopenia.
  - Pregnancy.
  - Chronically taking medications or any drug known to potentially interfere with bone/soft tissue healing (e.g., steroids), not including a medrol dose pack.
  - History of significant peripheral neuropathy.
  - Significant peripheral vascular disease (e.g., with diminished dorsalis pedis or posterior tibial pulses).
  - Unremitting back pain in *any* position.
  - Uncontrolled diabetes.
  - Known history of Paget's disease, osteomalacia, or any other metabolic bone disease (excluding osteopenia, which is addressed above).
  - Fixed and complete motor, sensory, or reflex deficit.
  - Rheumatoid arthritis or other autoimmune diseases.
  - Known or documented history of communicable disease, including AIDS, HIV, active Hepatitis
  - Active malignancy and/or patients with a primary bony tumor.
  - History of substance abuse (e.g., recreational drugs, narcotics, or alcohol).

**POTENTIAL ADVERSE EVENTS**

Below is a list of the potential adverse effects (e.g., complications) associated with the use of the coflex® Interlaminar Technology identified from the coflex® clinical study results, approved device labeling for other interlaminar devices, and published scientific literature including: (1) those associated with any surgical procedure; (2) those associated with decompressive procedures and posterolateral fusion for the treatment of spinal stenosis and instability; and (3) those associated with an interlaminar stabilization device, including the coflex® Interlaminar Technology. In

addition to the risks listed below, there is also the risk that surgery may not be effective in relieving symptoms, or may cause worsening of symptoms. Additional surgery may be required to correct some of the adverse effects.

1. Risks associated with any surgical procedure include: infection; pneumonia; atelectasis; septicemia; injury to blood vessels; soft tissue damage; phlebitis, thromboembolus, or pulmonary embolus; hemorrhage; respiratory distress; pulmonary edema; reactions to the drugs or anesthetic agent used during and after surgery; reactions to transfused blood; failure of the tissue to heal properly (e.g., hematoma, seroma, dehiscence, etc.) which may require drainage, aspiration, or debridement or other intervention; incisional pain; heart attack; stroke; and death.

2. Risks associated with decompressive procedures and posterolateral fusion for treatment of spinal stenosis and instability include: damage to nerves leading to sensory or motor deficits; paralysis; parasthesia; cauda equina syndrome; damage to nerves, blood vessels, and nearby tissues; epidural bleeding, hematoma, or fibrosis; instability; blindness secondary to pressure on the eye during surgery; osteolysis; injury to the spinal cord or the nerves leaving or entering the cord; loss of bowel or bladder function; retrograde ejaculation, sexual dysfunction, or sterility; disc herniation; injury to blood vessels; dural violation, with or without CSF leakage; impaired muscle or nerve function; hemorrhage; epidural injection reaction; epidural injection failure; fracture of the vertebrae, spinous process, or other damage to bony structures during or after surgery; postoperative muscle and tissue pain; surgery may not reduce the preoperative pain experienced; pain and discomfort associated with the presence of implants used to aid in the fusion surgery or reaction to the metal used in the implant, as well as the cutting and healing of tissues; failure of the fusion to heal or spontaneous fusion; the spine may undergo adverse changes or deterioration including loss of proper spinal curvature, correction, height, and/or reduction, or malalignment, and another surgery may be required; and adverse bone/implant interface reaction.

3. Risks associated with an interlaminar stabilization device, including the coflex® Interlaminar Technology, include: implant malposition or incorrect orientation; allergies to implant materials; possible wear debris, implantation at the wrong spinal level; fracture of the vertebrae, spinous process, or other damage to bony structures during or after surgery; the implant may loosen, deform, break, fatigue, or move, which may necessitate another surgery to correct the problem; and instruments also may break or malfunction in use, which may cause damage to the operative site or adjacent structures.

## SAFETY PRECAUTIONS

- The manufacturer is not responsible for any complications arising from incorrect diagnosis, choice of incorrect implant, incorrect operating techniques, the limitations of treatment methods or inadequate asepsis.
- Patient compliance with post-operative instructions from his/her surgeon is very important for success of the treatment. Non-compliance could lead to failure of the device and/or of the surgery.

## CLINICAL STUDY

The applicant performed a clinical study to establish a reasonable assurance of safety and effectiveness of coflex® Interlaminar Technology for the treatment of moderate to severe spinal stenosis with back pain in the US under IDE #G060059. Data from this clinical study were the basis for the PMA approval decision. A summary of the clinical study is presented below.

A. Study Design

Patients were treated between October 2006 and March 2010. The database for this PMA reflected data collected through March 2012. A total of 384 patients were enrolled consisting of up to 40 non-randomized "roll-in" patients and 344 randomized patients. Excluding 22 protocol violators, 215 randomized coflex® patients and 107 randomized control patients were enrolled. There were 21 investigational sites.

The study was a prospective, randomized, multi-center, concurrently controlled clinical study. Surgeons were blinded prior to patient randomization, and patients were blinded until after surgery. The control group was posterolateral fusion with autograft bone and pedicle screw fixation, following surgical decompression. Based on the well-established performance of posterolateral fusion in the medical literature, a 2:1 randomization ratio was applied with block randomization and a randomly changing block size. A Bayesian statistical plan utilizing Jeffries non-informative priors and a single late-information time interim analysis (Maislin, 2011) was used to analyze the success of the device. After 70% of patients were evaluable for month 24 composite clinical success, the Bayesian posterior probability was to be computed and compared to 0.975. If larger than 0.975, the interim analysis sample was to be used to support approval. If not, the data on the remaining patients would be included in the analysis cohort after they complete 24 months of follow-up and again the posterior probability would be compared to 0.975 in a final analysis. Subsequently, FDA requested submission of the patient data for the entire cohort.

An independent Data Safety Monitoring Board (DSMB) evaluated all safety events on a quarterly basis during the course of the study to ensure patient safety was not compromised. All adverse events were independently reviewed and adjudicated by a Clinical Events Committee (CEC), with their decision binding on the study sponsor. All radiographs were analyzed by an independent core lab (Medical Metrics, Inc.).

The control group was the accepted standard of care for this indication, posterolateral fusion with pedicle screw fixation. The systems utilized were the Expedium™ (Johnson and Johnson, Inc.) and the CD Horizon Legacy™ (Medtronic, Inc.).

1. Clinical Inclusion and Exclusion Criteria

Enrollment in the coflex® study was limited to patients who met the following inclusion criteria.

- Radiographic confirmation of at least moderate lumbar stenosis, which narrows the central spinal canal at one or two contiguous levels from L1-L5 that require surgical decompression. Moderate stenosis is defined as > 25% reduction of the antero-posterior dimension compared to the next adjacent normal level, with nerve root crowding compared to the normal level, as determined by the investigator on CT Scan or MRI. The patient may have, but is not required to have for inclusion in the study:
  - Facet hypertrophy and subarticular recess stenosis at the affected level(s);
  - Foraminal stenosis at the affected level(s);
  - Up to Grade I stable degenerative spondylolisthesis (Meyerding classification) or equivalent retrolisthesis as determined by flexion/extension X-ray:
    - For single level disease, there may be up to a Grade I stable spondylolisthesis or equivalent retrolisthesis at the affected level as determined on flexion/extension films by the investigator.
    - For two level disease, there may be up to a Grade I stable spondylolisthesis or equivalent retrolisthesis at only one of the two contiguous affected levels as determined on flexion/extension films by the investigator. Patients with up to Grade I stable spondylolisthesis at two contiguous levels are excluded, but patients with up to Grade I stable spondylolisthesis at one level and equivalent retrolisthesis at the adjacent level may be included.
  - Mild lumbar scoliosis (Cobb angle up to 25°)
- Radiographic confirmation of the absence of angular or translatory instability of the spine at index or adjacent levels (instability as defined by White & Panjabi: Sagittal plane translation >4.5mm or 15% or sagittal plane rotation >15° at L1-L2, L2-L3, and L3-L4; >20° at L4-L5 based on standing flexion/extension X-rays)
- VAS back pain score of at least 50 mm on a 100 mm scale.
- Neurogenic claudication as defined by leg/buttocks or groin pain that can be relieved by flexion such as sitting in a chair.
- Patient has undergone at least one epidural injection at any prior time point, AND at least 6 months of prior conservative care without adequate and sustained symptom relief.
- Age between 40 to 80 years.
- Oswestry Low Back Pain Disability Questionnaire score of at least 20/50 (40%).
- Appropriate candidate for treatment using posterior surgical approach.

- Psychosocially, mentally, and physically able to fully comply with this protocol, including adhering to scheduled visits, treatment plan, completing forms, and other study procedures.
    - Personally signed and dated informed consent document prior to any study-related procedures indicating that the patient has been informed of all pertinent aspects of the trial.

Patients were not permitted to enroll in the coflex® study if they met any of the following exclusion criteria:

- More than two vertebral levels requiring surgical decompression.
- Prior surgical procedure that resulted in translatory instability of the lumbar spine [as defined by White & Panjabi].
- More than one surgical procedure at any combination of lumbar levels.
- Prior fusion, implantation of a total disc replacement, complete laminectomy, or implantation of an interspinous process device at any lumbar level.
- Radiographically compromised vertebral bodies at any lumbar level(s) caused by current or past trauma or tumor (e.g., compression fracture).
- Severe facet hypertrophy that requires extensive bone removal which would cause instability.
- Isthmic spondylolisthesis or spondylolysis (pars fracture).
- Degenerative lumbar scoliosis (Cobb angle of greater than 25°).
- Disc herniation at any lumbar level requiring surgical intervention.
- Osteopenia: A screening questionnaire for osteopenia, SCORE (Simple Calculated Osteoporosis Risk Estimation), will be used to screen patients who require a DEXA bone mineral density measurement. If DEXA is required, exclusion will be defined as a DEXA bone density measured T score of $\leq$ -1.0 (The World Health Organization definition of osteopenia).
- Back or leg pain of unknown etiology.
- Axial back pain only, with no leg, buttock, or groin pain.
- Morbid obesity defined as a body mass index > 40.
- Pregnant or interested in becoming pregnant in the next three years.
- Known allergy to titanium, titanium alloys, or MR contrast agents.
- Active or chronic infection – systemic or local.
- Chronically taking medications or any drug known to potentially interfere with bone/soft tissue healing (e.g., steroids), not including a medrol dose pack.
- History of significant peripheral neuropathy.
- Significant peripheral vascular disease (e.g., with diminished dorsalis pedis or posterior tibial pulses).
- Unremitting back pain in *any* position.
- Uncontrolled diabetes.
- Known history of Paget's disease, osteomalacia, or any other metabolic bone disease (excluding osteopenia, which is addressed above).
- Cauda equina syndrome, defined as neural compression causing neurogenic bowel (rectal incontinence) or bladder (bladder retention or incontinence) dysfunction.
- Fixed and complete motor, sensory, or reflex deficit.

- Rheumatoid arthritis or other autoimmune diseases.
- Known or documented history of communicable disease, including AIDS, HIV, active Hepatitis
- Active malignancy: a patient with a history of any invasive malignancy (except nonmelanoma skin cancer), unless he/she has been treated with curative intent and there has been no clinical signs or symptoms of the malignancy for at least five years. Patients with a primary bony tumor are excluded as well.
- Prisoner or ward of the state.
- Subject has a history of substance abuse (e.g., recreational drugs, narcotics, or alcohol).
- Subject is currently involved in a study of another investigational product for similar purpose.
- Currently seeking or receiving workman's compensation.
- In active spinal litigation.

2. Follow-up Schedule

All patients were scheduled to return for follow-up examinations at 6 weeks, 3 months, 6 months, 12 months, 18 months, and 24 months postoperatively.

Patients were evaluated for Oswestry Disability Index (ODI), Zurich Claudication Questionnaire (ZCQ), SF-12, back and leg pain (via visual analog scale (VAS)), and neurological assessment at preoperative visit and at all postoperative visits. Radiographic evaluation was performed at all timepoints. Adverse events and complications were recorded at all visits.

The key time points are shown below in the tables summarizing safety and effectiveness.

3. Clinical Endpoints

The safety of the coflex® Interlaminar Technology was assessed by comparing adverse event incidence, epidural steroid injections, reoperations, revisions, and neurological function in comparison to the posterolateral fusion control group.

The effectiveness of the coflex® Interlaminar Technology was assessed by evaluating clinical pain and function (evaluated by ODI) compared to the posterolateral fusion control group.

Per the protocol, an individual patient was considered a Composite Clinical Success (CCS) if all of the following criteria were met at 24 months:

- Improvement of at least 15 points in the Oswestry Low Back Pain Disability Index (ODI) at 24 months compared to baseline;
- No reoperations, revisions, removals, or supplemental fixation; and
- No major device-related complications, including but not limited to permanent new or increasing sensory or motor deficit at 24 months; and
- No epidural steroid injections in the lumbar spine.

Overall study success criteria were based on a comparison of individual patient success rates, such that the patient success rate for the coflex® investigational group must be non-inferior to that of the posterolateral fusion control group. Bayesian statistical methods were used to obtain the posterior probabilities of non-inferiority and superiority. According to the statistical analysis plan, if non-inferiority was demonstrated, then superiority would be evaluated as defined more specifically in the analysis plan. The posterior probability threshold of 0.975 was used to determine non-inferiority.

Secondary effectiveness evaluations specified in the protocol included comparisons of the following: ZCQ Symptom Severity, ZCQ Physical Function, ZCQ Patient Satisfaction, Leg and Back Pain (via VAS), SF-12, time to recovery, and patient satisfaction.

In addition, several radiographic endpoints were considered in evaluating both safety and effectiveness, including index level and adjacent level range of motion, translation, instability, and device-related effects (e.g., device fracture or migration, fusion/non-fusion, spinous process fracture).

B. Accountability of PMA Cohort

At the time of database lock (March 11, 2012), of 322 per protocol patients (215 coflex® and 107 fusion) enrolled in PMA study 95.7% (204 coflex® and 104 fusion) had data available for analysis at the completion of the study. Patient accountability is shown in Table 1, a patient accounting tree is shown in Figure 2, and a summary of data available at 24 months for each specific evaluation is provided in Table 2.

**Table 1: Patient Accounting and Follow-Up Compliance Table – Efficacy Evaluable (PP) coflex® (I) and Fusion Control Patients (C)**

| Date of data transfer 03/11/2012 | Pre-Op | | Week 6 | | Month 3 | | Month 6 | | Month 12 | | Month 18 | | Month 24 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | C | I | C | I | C | I | C | I | C | I | C | I | C |
| (1) Theoretical follow-up | 215 | 107 | 215 | 107 | 215 | 107 | 215 | 107 | 215 | 107 | 215 | 107 | 215 | 107 |
| (2) Cumulative deaths | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (3) Cumulative 'Study Failures' | 0 | 0 | 8 | 3 | 11 | 6 | 20 | 10 | 26 | 12 | 35 | 17 | 42 | 18 |
| (4) Not Yet Overdue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| (5) Deaths+failures among theoretical due | 0 | 0 | 8 | 3 | 11 | 6 | 20 | 10 | 26 | 12 | 35 | 17 | 42 | 18 |
| (6) Expected due for clinic visit[6] | 215 | 107 | 207 | 104 | 204 | 101 | 195 | 97 | 189 | 95 | 180 | 90 | 172 | 89 |
| (7) Failures among theoretical due | 0 | 0 | 8 | 3 | 11 | 6 | 20 | 10 | 26 | 12 | 35 | 17 | 42 | 18 |
| (8) Expected due+failures among theoretical due | 215 | 107 | 215 | 107 | 215 | 107 | 215 | 107 | 215 | 107 | 215 | 107 | 214 | 107 |
| **All Evaluated Accounting (Actual[B]) Among Expected Due Procedures** | | | | | | | | | | | | | | |
| | I | C | I | C | I | C | I | C | I | C | I | C | I | C |
| (9) # of procedures with any clinical data in interval | 215 | 107 | 205 | 104 | 200 | 99 | 189 | 95 | 176 | 94 | 163 | 83 | 162 | 86 |
| (10) All Evaluated Visit Compliance (%) | 100.0% | 100.0% | 99.0% | 100.0% | 98.0% | 98.0% | 96.9% | 97.9% | 93.1% | 98.9% | 90.6% | 92.2% | 94.2% | 96.6% |
| (11) Change in Oswestry Disability Score | 215 | 107 | 202 | 102 | 196 | 96 | 187 | 95 | 176 | 92 | 163 | 83 | 162 | 86 |
| (12) Radiographic evaluation | 215 | 107 | 202 | 102 | 196 | 98 | 186 | 95 | 171 | 93 | 149 | 79 | 139 | 68 |
| (13) CCS at Month 24 | | | | | | | | | | | | | 204 | 104 |
| (14) Actual[B] % Follow-up for CCS at Month 24 or for change in ODI at other times. | 100.0% | 100.0% | 97.6% | 98.1% | 96.1% | 95.0% | 95.9% | 97.9% | 93.1% | 96.8% | 90.6% | 92.2% | 95.3% | 97.2% |
| **Within Window Accounting (Actual[A]) Among Expected Due** | | | | | | | | | | | | | | |
| | I | C | I | C | I | C | I | C | I | C | I | C | I | C |
| (15) Change in Oswestry Disability Score | 215 | 107 | 184 | 93 | 187 | 92 | 165 | 82 | 168 | 88 | 151 | 72 | 149 | 78 |
| (16) Radiographic evaluation | 215 | 107 | 183 | 94 | 188 | 94 | 162 | 82 | 164 | 88 | 137 | 69 | 131 | 63 |
| (17) CCS at Mos. 24 | | | | | | | | | | | | | 191 | 95 |
| (18) ActualA% Follow-up for CCS at Month 24 or and change in ODI at other times. | 100.0% | 100.0% | 88.9% | 89.4% | 91.7% | 91.1% | 84.6% | 84.5% | 88.9% | 92.6% | 83.9% | 80.0% | 89.3% | 88.8% |

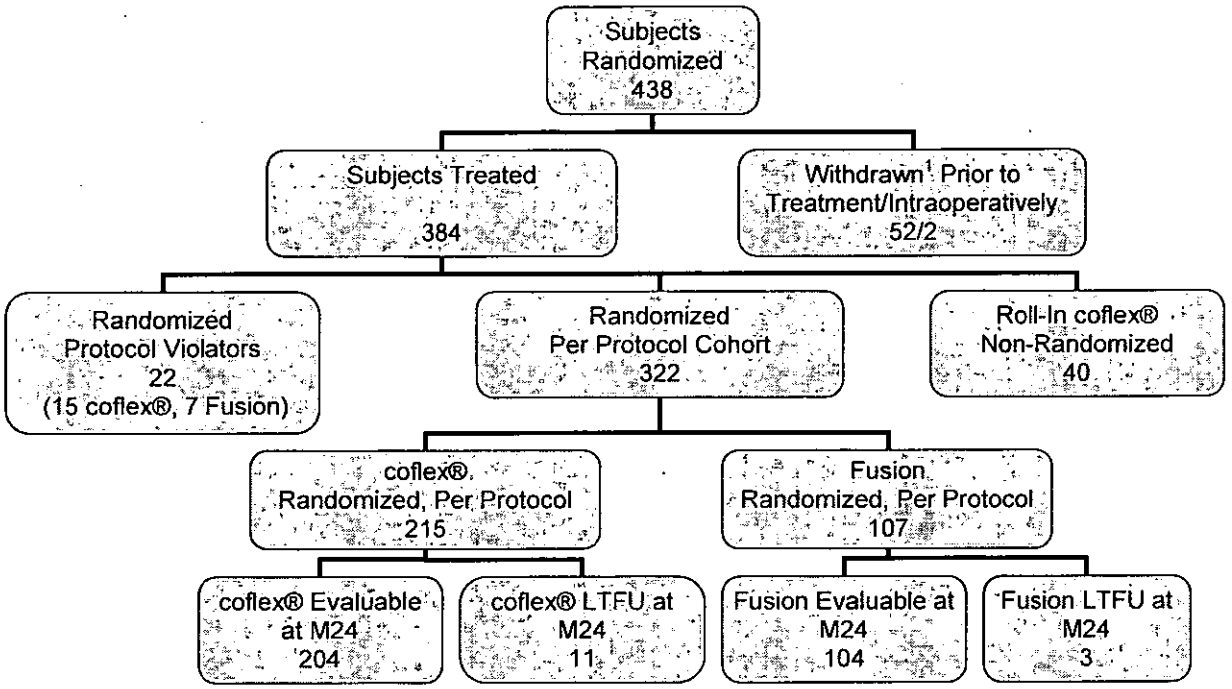



**Figure 2: Patient Accounting Tree for coflex® IDE Study**

[1]Reasons for withdrawal prior to treatment: 17 patients failed to meet inclusion and exclusion criteria, 22 patients withdrew consent, and 13 patients elected not to have surgery.

**Table 2: 24 Month Data Accounting for coflex® IDE**

| Parameter | coflex® | Fusion Control |
|---|---|---|
| Randomized | 262 | 136 |
| Withdrawn Prior to Treatment | 32 | 22 |
| Subjects Treated (mITT) | 230 | 114 |
| Protocol Violators | 15 | 7 |
| Per Protocol Cohort | 215 | 107 |
| Radiologic Assessments:<br>• Foraminal Height*<br>• ROM<br>• Translation<br>• Fusion† | <br>• 180 (83.7%)<br>• 187 (87.0%)<br>• 185 (86.0%)<br>• n/a | <br>• n/a<br>• 102 (95.3%)<br>• 95 (88.8%)<br>• 102 (95.3%) |
| Clinical Failures Among Implanted[1] | 42 | 18 |
| Expected (Per Protocol) | 172 | 89 |
| ODI | 162 (94.2%) | 86 (96.6%) |
| ZCQ | 161 (93.6%) | 86 (96.6%) |
| VAS Leg and Back Pain | 162 (94.2%) | 85 (95.5%) |
| SF-12:<br>• Physical Component Score<br>• Mental Component Score | <br>• 132 (76.7%)<br>• 139 (80.8%) | <br>• 70 (78.7%)<br>• 75 (84.3%) |

*This measurement taken only on coflex® patients

†This measurement taken only on fusion patients and defined as bridging bone

[1]Patients with Reoperations, Revisions, and Epidural Steroid Injection

In the tables that follow throughout this summary, the randomized per protocol cohort is used for safety and efficacy analyses, unless otherwise indicated.

C. Study Population Demographics and Baseline Parameters

The clinical study sites represent a mix between academic and community hospital settings, urban and regional settings of care, and were selected from varied geographic regions of the country.

**Table 3: Summary of Baseline and Demographic Variables - coflex® and Fusion Control Efficacy Evaluable (PP) Cohorts**

| | coflex® | | | Fusion Control | | |
|---|---|---|---|---|---|---|
| **Demographics - All** | **N** | **Mean** | **SD** | **N** | **Mean** | **SD** |
| Age at surgery (yrs) | 215 | 62.1 | 9.2 | 107 | 64.1 | 9.0 |
| Height (inches) | 215 | 67.0 | 4.1 | 107 | 66.6 | 4.1 |
| Weight (lbs) | 215 | 190.3 | 35.4 | 107 | 187.7 | 38.1 |
| BMI ($k/m^2$) | 215 | 29.7 | 4.5 | 107 | 29.6 | 4.9 |
| **Demographics - Male** | **N** | **Mean** | **SD** | **N** | **Mean** | **SD** |
| Age at surgery (yrs) | 109 | 61.7 | 9.3 | 49 | 64.2 | 10.4 |
| Height (inches) | 109 | 69.9 | 2.7 | 49 | 69.9 | 2.9 |
| Weight (lbs) | 109 | 207.1 | 27.3 | 49 | 207.6 | 32.3 |
| BMI ($k/m^2$) | 109 | 29.8 | 3.7 | 49 | 29.7 | 4.4 |
| **Demographic - Female** | **N** | **Mean** | **SD** | **N** | **Mean** | **SD** |
| Age at surgery (yrs) | 106 | 62.6 | 9.1 | 58 | 64.1 | 7.7 |
| Height (inches) | 106 | 64.0 | 2.9 | 58 | 63.8 | 2.5 |
| Weight (lbs) | 106 | 173.1 | 34.6 | 58 | 170.8 | 34.5 |
| BMI ($k/m^2$) | 106 | 29.6 | 5.2 | 58 | 29.5 | 5.4 |
| **Baseline Functional Status** | **N** | **Mean** | **SD** | **N** | **Mean** | **SD** |
| Oswestry (ODI) | 215 | 60.8 | 11.8 | 107 | 60.7 | 11.5 |
| Zurich Claudication Qx Severity | 214 | 3.6 | 0.6 | 107 | 3.6 | 0.6 |
| Zurich Claudication Qx Physical | 214 | 2.7 | 0.4 | 107 | 2.8 | 0.4 |
| SF-12 PCS (Physical) | 195 | 28.1 | 6.6 | 95 | 28.2 | 6.0 |
| SF-12 MCS (Mental Health) | 195 | 45.5 | 13.0 | 95 | 44.9 | 12.2 |
| VAS Back pain | 215 | 79.5 | 15.0 | 106 | 79.2 | 13.5 |
| VAS Leg pain (worse leg) | 215 | 76.0 | 20.4 | 106 | 78.3 | 18.4 |

**Table 4: Summary of Baseline and Demographic Categorical Variables - coflex® and Fusion Control Efficacy Evaluable (PP) Cohorts**

| | coflex® | | Control | |
|---|---|---|---|---|
| | n | % | n | % |
| **Number of subjects** | 215 | | 107 | |
| **Males** | 109 | 50.7 | 49 | 45.8 |
| **Females** | 106 | 49.3 | 58 | 54.2 |
| **Number of levels** | n | % | n | % |
| 1-level decompression | 138 | 64.2 | 68 | 63.6 |
| 2-level decompression | 77 | 35.8 | 39 | 36.4 |
| **Current smoker** | n | % | n | % |
| Yes | 22 | 10.2 | 15 | 14.0 |
| No | 193 | 89.8 | 92 | 86.0 |
| **Comorbidities** | n | % | n | % |
| Cardiovascular | 137 | 63.7 | 74 | 69.2 |
| Musculoskeletal | 112 | 52.1 | 61 | 57.0 |
| Endocrine | 55 | 25.6 | 35 | 32.7 |
| **Duration of Back Pain** | n | % | n | % |
| None | 0 | 0.0 | 0 | 0.0 |
| Fewer than 6 months | 3 | 1.4 | 1 | 0.9 |
| 6 months to a year | 24 | 11.2 | 14 | 13.1 |
| More than one year | 188 | 87.4 | 92 | 86.0 |
| **Duration of Leg Pain (maximum)** | n | % | n | % |
| None | 1 | 0.5 | 1 | 0.9 |
| Fewer than 6 months | 6 | 2.8 | 8 | 7.5 |
| 6 months to a year | 38 | 17.7 | 22 | 20.6 |
| More than one year | 170 | 79.1 | 76 | 71.0 |
| **Duration of Buttock Pain** | n | % | n | % |
| None | 32 | 14.9 | 21 | 19.6 |
| Fewer than 6 months | 11 | 5.1 | 7 | 6.5 |
| 6 months to a year | 41 | 19.1 | 22 | 20.6 |
| More than one year | 131 | 60.9 | 57 | 53.3 |
| **Duration of Groin Pain** | n | % | n | % |
| None | 157 | 73.0 | 74 | 69.2 |
| Fewer than 6 months | 6 | 2.8 | 5 | 4.7 |
| 6 months to a year | 13 | 6.0 | 12 | 11.2 |
| More than one year | 39 | 18.1 | 16 | 15.0 |

**Table 5: Summary of Baseline and Demographic Categorical Variables - coflex® and Fusion Control Efficacy Evaluable (PP) Cohorts (Continued)**

| | coflex® | | Control | |
|---|---|---|---|---|
| **Previous Conservative Treatment of the Spine** | **n** | **%** | **n** | **%** |
| None | 28 | 13.0 | 9 | 8.4 |
| Physical therapy | 132 | 61.4 | 70 | 65.4 |
| NSAIDs/ASA/Acetinomphen only | 121 | 56.3 | 65 | 60.7 |
| Chiropractic | 82 | 38.1 | 41 | 38.3 |
| Corset/Brace | 37 | 17.2 | 22 | 20.6 |
| Any narcotic use | 107 | 49.8 | 55 | 51.4 |
| Other | 34 | 15.8 | 15 | 14.0 |
| **Previous Surgical Treatment of the Spine** | **n** | **%** | **n** | **%** |
| None | 0 | 0.0 | 0 | 0.0 |
| Discectomy | 4 | 1.9 | 0 | 0.0 |
| Fusion | 3 | 1.4 | 0 | 0.0 |
| IDET | 1 | 0.5 | 1 | 0.9 |
| Epidural injections | 210 | 97.7 | 105 | 98.1 |
| Other injections | 35 | 16.3 | 18 | 16.8 |
| Laminotomy | 10 | 4.7 | 2 | 1.9 |
| **Race** | **n** | **%** | **n** | **%** |
| American Indian / Alaskan Native | 1 | 0.5 | 3 | 2.8 |
| Asian | 4 | 1.9 | 3 | 2.8 |
| Black or African American | 11 | 5.1 | 6 | 5.6 |
| White | 191 | 88.8 | 93 | 86.9 |
| Other | 8 | 3.7 | 2 | 1.9 |

D. Safety and Effectiveness Results

1. Safety Results

The analysis of safety was based on the per protocol cohort of 322 patients (215 coflex® patients and 107 fusion patients). Adverse events reported by the investigating surgeons and adjudicated by the CEC are reported in Table 6 to Table 8. The key safety outcomes for this study are presented below in Table 9 through Table 13.

**Table 6: Incidence of Adverse Events coflex® and Fusion Control Efficacy Evaluable (PP) Cohort**

| | coflex® (N=215) | | Control (N=107) | |
|---|---|---|---|---|
| | n | % | n | % |
| **Operative Site** | | | | |
| Pain; new, + frequency, worsening | 71 | 33.0% | 37 | 34.6% |
| Wound problems[1] | 30 | 14.0% | 9 | 8.4% |
| Fracture[2] | 11 | 5.1% | 2 | 1.9% |
| Other[3] | 9 | 4.2% | 3 | 2.8% |
| Component loosening | 3 | 1.4% | 4 | 3.7% |
| Component migration | 3 | 1.4% | 1 | 0.9% |
| Component breakage | 2 | 0.9% | 2 | 1.9% |
| Infection (deep) | 2 | 0.9% | 0 | 0.0% |
| Component deformation | 0 | 0.0% | 0 | 0.0% |
| Incidental durotomy (<= 5 mm) | 0 | 0.0% | 0 | 0.0% |
| Tear >5mm | 0 | 0.0% | 0 | 0.0% |
| Heterotopic ossification | 0 | 0.0% | 0 | 0.0% |
| Hematoma requiring drainage | 0 | 0.0% | 1 | 0.9% |
| **Non-Operative Site** | | | | |
| Musculoskeletal[4] | 121 | 56.3% | 65 | 60.7% |
| Neurological[5] | 51 | 23.7% | 23 | 21.5% |
| Other[6] | 29 | 13.5% | 16 | 15.0% |
| Cardiovascular | 21 | 9.8% | 11 | 10.3% |
| Gastrointestinal | 15 | 7.0% | 12 | 11.2% |
| Skin and Subcutaneous Tissue | 14 | 6.5% | 9 | 8.4% |
| Genitourinary | 13 | 6.0% | 9 | 8.4% |
| Respiratory | 9 | 4.2% | 6 | 5.6% |
| Endocrine/Metabolic | 8 | 3.7% | 4 | 3.7% |
| Cancer/Neoplasm | 6 | 2.8% | 9 | 8.4% |
| EENT | 6 | 2.8% | 4 | 3.7% |
| Hematological | 5 | 2.3% | 4 | 3.7% |
| Immune | 1 | 0.5% | 0 | 0.0% |
| Psychiatric/Substance abuse | 1 | 0.5% | 7 | 6.5% |

[1]Wound problems: Include wound drainage, superficial infections, dehiscence, seroma, and delayed healing of incision

[2]Fracture: Includes spinous process fracture, pars fracture, and other fractures of the vertebral bodies reported by investigators.

[3]Other Operative Site: Includes events not placed into a specific category by investigators, including clicking sound, spondylolisthesis, drain complications, incisional pain, spinal swelling, and cellulitis.

[4]Musculoskeletal: Includes weakness, cramping, joint pain, joint surgery or replacement, and other non-lumbar spinal musculoskeletal tissues.

[5]Neurological: Includes balance problems, headaches, numbness and/or tingling, and changes in sensation.

[6]Other Non-Operative Site: Includes psychological disorders, infectious diseases, insomnia, and fever.

Table 6 shows the comparison of percentages of complications between the coflex® and fusion Per Protocol cohorts at specific operative and non-operative sites. With the exception of wound problems, adverse events rates were

comparable between coflex® and fusion control. The numerical difference of wound complications between coflex® 14.0% (30/215) and control 8.4% (9/107) was 5.6%. This difference was not statistically significant. Table 7 demonstrates the time course of all adverse events.

**Table 7: Time Course of Adverse Events coflex® (I) and Fusion Control (C) Efficacy Evaluable (PP) Cohort**

| | Day of Surgery Relative Day 0 | | Immed. Post-Op to Month 3 (RelDay 1-90) | | >Mo. 3 to Mo 6 (RelDay 91-180) | | >Mo. 6 to Mo.12 (RelDay 181-365) | | >Mo. 12 to Mo. 24 (RelDay 365-730) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | I | C | I | C | I | C | I | C | I | C |
| **Expected Due** | 215 | 107 | 204 | 101 | 195 | 97 | 189 | 95 | 172 | 89 |
| **Operative Site** | | | | | | | | | | |
| Pain; new, + frequency, worsening | 0 | 0 | 21 | 10 | 13 | 11 | 25 | 7 | 24 | 17 |
| Wound problems | 2 | 0 | 29 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fracture | 1 | 0 | 4 | 0 | 3 | 2 | 1 | 1 | 1 | 0 |
| Other | 0 | 0 | 2 | 2 | 1 | 0 | 2 | 1 | 4 | 0 |
| Device component loosening | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 |
| Device component migration | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| Device component breakage | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 0 | 0 |
| Infection (deep) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hematoma requiring drainage | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Non-Operative Site** | | | | | | | | | | |
| Musculoskeletal | 1 | 1 | 61 | 27 | 26 | 27 | 59 | 24 | 72 | 34 |
| Neurological | 0 | 0 | 25 | 7 | 11 | 9 | 16 | 3 | 25 | 11 |
| Other | 0 | 0 | 12 | 3 | 3 | 2 | 1 | 2 | 14 | 6 |
| Cardiovascular | 1 | 1 | 2 | 4 | 5 | 0 | 8 | 4 | 9 | 3 |
| Gastrointestinal | 0 | 0 | 3 | 2 | 3 | 2 | 10 | 1 | 4 | 5 |
| Skin and Subcutaneous Tissue | 0 | 1 | 4 | 5 | 1 | 1 | 6 | 2 | 4 | 2 |
| Genitourinary | 0 | 2 | 4 | 4 | 1 | 1 | 0 | 0 | 5 | 2 |
| Respiratory | 0 | 0 | 3 | 3 | 2 | 0 | 2 | 1 | 3 | 3 |
| Endocrine/Metabolic | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 5 | 1 |
| Cancer/Neoplasm | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 5 |
| EENT | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 1 |
| Hematological | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 1 | 2 | 2 |
| Immune | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Psychiatric/Substance abuse | 0 | 0 | 0 | 3 | 1 | 1 | 0 | 0 | 0 | 2 |
| **Total** | 6 | 7 | 178 | 81 | 74 | 59 | 132 | 53 | 180 | 96 |

Table 8: Numbers of Specific Device and Surgery Related Complications by Time of Occurrence
coflex® (I) and Fusion Control (C) Efficacy Evaluable (PP) Cohort

| Type of Adverse Event/Complication | Day of Surgery Relative Day 0 | | Immed. Post-Op to Mth 3 (Day 1-90) | | >Mth 3 to Mth 6 (Day 91-180) | | >Mth 6 to Mth 12 (Day 181-365) | | >Mth 12 to Mth 24 (Day 365-730) | | Overall | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Treatment Group (I = coflex®, C = control) | I | C | I | C | I | C | I | C | I | C | I (%) | C (%) |
| # Patients at each Follow-Up Interval | 215 | 107 | 204 | 101 | 195 | 97 | 189 | 95 | 172 | 89 | (N=215) | (N=107) |
| **DEVICE-RELATED ADVERSE EVENTS**[1] | | | | | | | | | | | | |
| Device migration | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 (0.9%) | 1 (0.9%) |
| Device breakage | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 2 (0.9%) | 3 (2.8%) |
| Device loosening | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 3 (1.4%) | 2 (1.9%) |
| Fracture | 0 | 0 | 3 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 5 (2.3%) | - |
| **SUBTOTAL** | 1 | 0 | 5 | 0 | 1 | 2 | 3 | 3 | 2 | 1 | 12 (5.6%) | 6 (5.6%) |
| **SURGERY-RELATED ADVERSE EVENTS**[1] | | | | | | | | | | | | |
| Wound problems | 2 | 0 | 28 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 30 (14.0%) | 7 (6.5%) |
| Decompression-Related Fracture | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 (0.9%) | - |
| Hematoma requiring drainage | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | 1 (0.9%) |
| Infection (deep) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 (0.9%) | - |
| Pain, Back | 0 | 0 | 9 | 7 | 6 | 6 | 14 | 7 | 18 | 11 | 47 (21.9%) | 31 (29.0%) |
| Pain, Leg/Buttock and Back | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 (1.4%) | - |
| Pain, Leg /Buttock | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 (0.9%) | - |
| Pain, Back & Leg | 0 | 0 | 5 | 0 | 2 | 4 | 1 | 0 | 4 | 4 | 12 (5.6%) | 8 (7.5%) |
| Pain, Back & Buttock | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 (0.5%) | - |
| Pain, Buttock | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 (0.9%) | - |
| Pain, Leg | 0 | 0 | 3 | 3 | 4 | 1 | 4 | 0 | 2 | 0 | 13 (6.0%) | 4 (3.7%) |
| Pain, Hip | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | - | 1 (0.9%) |
| **SUBTOTAL** | 2 | 1 | 53 | 18 | 14 | 11 | 21 | 7 | 24 | 15 | 114 (53.0%) | 52 (48.6%) |
| **TOTAL # of Events** | 3 | 1 | 58 | 18 | 15 | 13 | 24 | 10 | 26 | 16 | 126 (58.6%) | 58 (54.2%) |

[1]Selected adverse events are described in more detail in Table 8.

**Spinous Process Fractures:**

Spinous process fractures were observed by the core radiographic laboratory in 30 coflex® patients (14.0%) and 8 fusion patients (11.9% of patients with spinous processes retained by partial laminectomy). Spinous process fractures were also observed by the investigator surgeons. The incidence of fractures observed by the surgeons differed from that observed by the core radiographic laboratory, as 8 coflex® patients (3.7%) and no fusion patients (0.0%) had spinous process fractures noted by the investigational sites. 83% of patients in the coflex® group and 75% of patients in fusion group who had spinous process fractures observed by the radiographic laboratory did not have any associated symptoms at the time the fracture was observed. Table 9 and Table 10 detail the incidence of spinous process fractures in coflex® and fusion patients.

**Table 9: Spinous Process Fracture Incidence in coflex® IDE Study**

| | coflex® | | Fusion Control | |
|---|---|---|---|---|
| | n/N | % | n/N | % |
| Spinous Process Fracture | 30/215 | 14.0% | 8/67[1] | 11.9% |

[1] Fusion patients with spinous processes retained by partial laminectomy.

**Table 10: Time Course of Spinous Process Fracture Incidence in coflex® IDE Study**

| Group | Time of Initial Fracture Observation | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | Post-op | 6 W | 3 M | 6 M | 12 M | 18 M | 24 M | |
| coflex® | 5 | 13 | 6 | 1 | - | - | 5[1] | 30 |
| Fusion Control | 4 | 2 | 2 | - | - | - | - | 8 |

[1] 3 out of the 5 observations at 24 months had unreadable or missing 6 week, 3 month, 6 month, 12 month, and 18 month X-rays.

By month 24, 48% of the coflex® spinous process fractures were resolved. Of the unresolved spinous process fractures, 75% were asymptomatic and resulted in no clinical sequelae or loss of foraminal height during the study. None (0%) of the fusion spinous process fractures were resolved by month 24, and 75% of these patients were asymptomatic.

The adverse event rate associated with spinous process fractures was not significantly higher than the patients without spinous process fractures. The long term effects of these spinous process fractures past 24 months are unknown.

## Surgery and Hospitalization Data:

**Table 11: Summary of Operative Details Continuous Variables coflex® and Fusion Control Efficacy Evaluable (PP) Cohorts**

| | coflex® | | | | Fusion Control | | | |
|---|---|---|---|---|---|---|---|---|
| **1- and 2-level procedures** | **N** | **Mean** | **SD** | **95% CI (LB, UB)** | **N** | **Mean** | **SD** | **95% CI (LB, UB)** |
| Hospital LOS (days) | 215 | 1.90 | 1.08 | (1.75, 2.04) | 107 | 3.19 | 1.61 | (2.88, 3.50) |
| Estimated blood loss (cc) | 215 | 109.7 | 120.0 | (93.5, 125.8) | 105 | 348.6 | 281.8 | (294.0, 403.1) |
| Operative time (minutes) | 214 | 98.0 | 41.1 | (92.5, 103.6) | 107 | 153.2 | 55.5 | (142.5, 163.8) |
| **1-level procedures** | **N** | **Mean** | **SD** | **95% CI (LB, UB)** | **N** | **Mean** | **SD** | **95% CI (LB, UB)** |
| Hospital LOS (days) | 138 | 1.86 | 1.14 | (1.66, 2.05) | 68 | 2.87 | 1.45 | (2.52, 3.22) |
| Estimated blood loss (cc) | 138 | 98.0 | 96.3 | (81.8, 114.3) | 66 | 290.9 | 207.0 | (240.0, 341.8) |
| Operative time (minutes) | 137 | 90.8 | 44.0 | (83.4, 98.2) | 68 | 142.0 | 56.0 | (128.4, 155.5) |
| **2-level procedures** | **N** | **Mean** | **SD** | **95% CI (LB, UB)** | **N** | **Mean** | **SD** | **95% CI (LB, UB)** |
| Hospital LOS (days) | 77 | 1.97 | 0.95 | (1.76, 2.19) | 39 | 3.74 | 1.74 | (3.18, 4.31) |
| Estimated blood loss (cc) | 77 | 130.5 | 152.1 | (95.9, 165.0) | 39 | 446.2 | 358.4 | (330.0, 562.3) |
| Operative time (minutes) | 77 | 110.9 | 31.8 | (103.7, 118.1) | 39 | 172.7 | 49.3 | (156.7, 188.7) |

The 95% confidence interval is provided as a measure of the statistical precision of the estimated treatment group mean or percentage. Non-overlapping confidence intervals imply statistically reliable device group differences.

Table 11 demonstrates that the average operating time in the fusion patients was 55.2 minutes greater than the coflex® patients. Average blood loss in fusion patients was 238.9 cc greater in the fusion patients than in coflex® patients. The average hospital length of stay was 1.29 days longer in the fusion patients.

## Reoperations and Revisions:

Through 24 months of follow up, the overall reoperation rate was 10.7% in the coflex® group and 7.5% in the fusion control. Reoperations where the device was maintained are summarized in Table 12 and revision surgeries are summarized in Table 13.

**Table 12: Reoperation Events in the coflex® Clinical Trial**

| Reoperation Type | Treatment Group | Event Time Course (months) | | | | | | | Total (events) | Reasons |
|---|---|---|---|---|---|---|---|---|---|---|
| | | <1.5 | 1.5-3 | 3-6 | 6-12 | 12-24 | 24-36 | 36-48 | | |
| Irrigation and Debridement | coflex® | 4 | - | - | - | - | - | - | 4 | 2 wound dehiscence, 2 deep infections |
| Supplemental Decompression | coflex® | - | - | - | 1 | 1 | 1 | 1 | 4 | 3 leg and/or low back pain, 1 herniation |
| CSF Repair | coflex® | 1 | - | - | - | - | - | - | 1 | 1 CSF leak |
| Non-Index Lumbar Fusion | coflex® | - | - | - | - | - | 1 | 1 | 2 | 2 leg and/or low back pain |
| Hematoma Drainage | Fusion | 1 | - | - | - | - | - | - | 1 | 1 wound hematoma |
| Irrigation and Debridement | Fusion | - | - | - | - | - | 2 | - | 2 | 2 deep infections[1] |
| Supplemental Decompression | Fusion | - | - | - | - | - | 1 | 1 | 2 | 1 synovial cyst, 1 herniation |

[1]A single fusion patient had 2 operations for deep infection

**Table 13: Revision Events in the coflex® Clinical Trial**

| Revision Type | Treatment Group | Event Time Course (months) | | | | | | | Total (events) | Reasons |
|---|---|---|---|---|---|---|---|---|---|---|
| | | <1.5 | 1.5-3 | 3-6 | 6-12 | 12-24 | 24-36 | 36-48 | | |
| Device replacement (with coflex®) | coflex® | - | 2 | - | - | - | - | - | 2 | 1 bone-related fracture, 1 seroma |
| Decompression and Device Removal | coflex® | - | - | - | 1 | 1 | - | - | 2 | 2 leg and/or low back pain |
| Transition to fusion | coflex® | - | - | 2 | 4 | 7 | 6 | 3 | 22 | 14 leg and/or low back pain[2], 4 bone-related fracture, 2 component loosening, 1 herniation, 1 synovial cyst |
| Debridement and Device Removal | coflex® | 1 | - | - | - | - | - | - | 1 | 1 deep infection[2] |
| Device Removal | Fusion | - | - | - | - | - | - | 2 | 2 | 1 component loosening, 1 back and/or leg pain |
| Device replacement | Fusion | - | - | - | 1 | 3 | - | 1 | 5 | 2 broken pedicle screws[1], 3 component loosening |
| Adjacent level extension | Fusion | | 1 | 1 | 1 | 2 | 3 | 2 | 10 | 7 back and/or leg pain, 2 pseudoarthrosis, 1 bone-related fracture |

[1]A single fusion patient had 2 revisions for broken pedicle screws
[2]Three coflex® patients had a transition to fusion after a previous reoperation or replacement of coflex®.

Through 24 months, the reoperations and revisions in the coflex® group included 5 irrigation and debridement procedures (including 1 cerebrospinal fluid leak), 2 supplemental decompression surgeries retaining the device, 2 revisions for coflex® removal & replacement, 2 decompressions and device removal, 1 debridement and device removal, and 13 (6.0%, 13/215) conversions to primary fusion. Two patients had a reoperation prior to a revision. There were no revisions related to device breakage.

Through 24 months, the reoperations and revisions in the fusion control group included 1 reoperation due to post-operative hematoma, 4 revisions of the fusion system due to device breakage or component loosening, and 5 extensions of the fusion to an adjacent level.

Between 24 months and 48 months of follow up, there were 13 additional reoperations or revisions in 12 coflex® patients (6.3% (12/192)) and 12 additional reoperations or revisions in 10 fusion patients (10.1% (10/99)). One of each of the coflex® and fusion revisions was in a patient who had a reoperation prior to 2 years. Based on available patient data through 48 months, the coflex® revision rate is 15.8% and the fusion control revision rate is 15.9%.

2. Effectiveness Results

**Primary Effectiveness Analysis:**

The analysis of effectiveness was based on the per protocol cohort of 322 patients (215 coflex® patients and 107 fusion patients) evaluable at the 24-month time point. Key effectiveness outcomes are presented in Table 14 through Table 29.

**Table 14: Posterior Probabilities of Success at 24 Months in coflex® Clinical Trial**

| | Number and Percentage Achieving Month 24 CCS* | | | | | | Posterior Probability of Non-Inferiority |
|---|---|---|---|---|---|---|---|
| | coflex® | | | Fusion Control | | | |
| | N | n | % | N | n | % | |
| Month 24 | 204 | 135 | 66.2% | 104 | 60 | 57.7% | 0.999 |

*Composite Clinical Success

Non-inferiority of the coflex® group compared to the control group was demonstrated for the Composite Clinical Success (CCS) at 24 months.

**Table 15: Posterior Means and 95% Credible Intervals for Month 24 CCS**

| | Mean[1] | SD | 95% Bayesian Credible Interval |
|---|---|---|---|
| coflex® | 66.2% | 3.3% | 59.5% to 72.4% |
| fusion | 57.7% | 4.8% | 48.1% to 66.9% |
| difference | 8.5% | 5.8% | -2.9% to 20.0% |

[1] Mean, SD, and 95% Bayesian Credible Interval computed as the mean, standard deviation, 2.5th percentile, and 97.5th percentile of 10,000 draws from the posterior distributions

The Bayesian posterior means, standard deviations, and 95% credible intervals were determined from 10,000 draws from the posterior distributions based on the final per protocol population. The credible intervals are defined so that there is a 0.95 probability that the true success likelihoods are contained within the interval. The estimated difference is 8.5%. The lower bound of Bayesian posterior credible interval for the device group difference in success rates is equal to -2.9%, which is larger than the pre-specified non-inferiority margin of -10%.

The Statistical Analysis Plan specified that primary non-inferiority evaluation would be performed in a per protocol population. All protocol violations (PV) were confirmed by an Independent Clinical Events Committee. Among the 230 randomized patients receiving coflex®, 15 (6.5%) had a protocol violation leading to exclusion. Similarly, among the 114 randomized patients undergoing fusion, 7 (6.1%) had a protocol violation leading to exclusion. The primary efficacy variable

was evaluable for all 22 PVs in this study. Among 15 coflex® PVs, 6 (40.0%) met the study success criterion. Similarly, among 7 fusion PVs, 3 (42.9%) met the study success criterion. The clinical results for the PVs were pooled with the per protocol population to construct a modified Intent-to-Treat (mITT) population defined as all randomized patients receiving a study procedure. The Bayesian posterior probability that coflex® is clinically non-inferior to fusion is 0.999, essentially the same as in the primary per protocol population

**Table 16: Posterior Probabilities of Success at 24 Months in coflex® Clinical Trial (mITT Cohort)**

| | Number and Percentage Achieving Month 24 CCS | | | | | | Posterior Probability of Non-Inferiority |
|---|---|---|---|---|---|---|---|
| | coflex® | | | Fusion Control | | | |
| | N | n | % | N | n | % | |
| Month 24 | 219 | 141 | 64.4% | 111 | 63 | 56.8% | 0.999 |

Non-inferiority of the coflex® group compared to the control group was demonstrated for the CCS at 24 months in the mITT cohort.

**Table 17: Posterior Means and 95% Credible Intervals for Month 24 CCS (mITT Cohort)**

| | Mean[1] | SD | 95% Bayesian Credible Interval |
|---|---|---|---|
| coflex® | 64.4% | 3.2% | 57.9% to 70.5% |
| fusion | 56.8% | 4.7% | 47.4% to 65.7% |
| difference | 7.6% | 5.6% | -3.4% to 18.9% |

[1] Mean, SD, and 95% Bayesian Credible Interval computed as the mean, standard deviation, 2.5th percentile, and 97.5th percentile of 10,000 draws from the posterior distributions

For the per protocol population, Table 18 demonstrates the time course of success in the coflex® clinical trial.

**Table 18: Time Course of Composite Clinical Success[1] in coflex® Clinical Trial**

| | Number and Percentage Meeting Criteria with 95% CI[2] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | coflex® | | | | Fusion Control | | | |
| | N | n | % | 95% CI (LB, UB) | N | n | % | 95% CI (LB, UB) |
| Week 6 | 210 | 172 | 81.9% | (76.7%, 87.1%) | 105 | 69 | 65.7% | (56.6%, 74.8%) |
| Month 3 | 207 | 171 | 82.6% | (77.4%, 87.8%) | 102 | 72 | 70.6% | (61.7%, 79.4%) |
| Month 6 | 207 | 162 | 78.3% | (72.6%, 83.9%) | 105 | 81 | 77.1% | (69.1%, 85.2%) |
| Month 12 | 202 | 151 | 74.8% | (68.8%, 80.7%) | 104 | 74 | 71.2% | (62.4%, 79.9%) |
| Month 18 | 198 | 135 | 68.2% | (61.7%, 74.7%) | 100 | 68 | 68.0% | (58.9%, 77.1%) |
| Month 24 | 204 | 135 | 66.2% | (59.7%, 72.7%) | 104 | 60 | 57.7% | (48.2%, 67.2%) |

**Notes:**
[1] The composite clinical success criteria at times points prior to Month 24 did not include the 'no persistent new or worsening sensory or motor deficit' since 'persistence' was established by identifying new or worsening deficits at Month 18 that did not resolve by Month 24; otherwise the CCS criteria at earlier time points were consistent with the primary Month 24 CCS.
[2]The 95% confidence interval is provided as a measure of the statistical precision of the estimated treatment group mean or percentage. Non-overlapping confidence intervals imply statistically reliable device group differences.

Table 18 demonstrates the CCS at each timepoint. The CCS at 24 months is determined by the ODI improvement compared to baseline, absence of secondary surgeries or epidural pain management and neurologic success. It should be noted that neurologic success endpoint is based on comparing changes from baseline to both Month 18 and Month 24, and thus is not definable prior to the 24 month timepoint. ODI measurements and success may fluctuate over time, while discrete events endpoints such as secondary surgeries and epidural injections were assessed as time to event variables.

Patients in the coflex® group demonstrated a 81.9% CCS at 6 weeks which increased to 82.6% at 3 months and gradually fell to 66.2% at 24 months. Patients in the control group demonstrated 65.7% CCS at 6 weeks which rose gradually from 6 Weeks to 6 Months to 77.1%. CCS fell to 57.7% at 24 months. At every assessment time period, the percentage of coflex® patients achieving CCS was greater than fusion, with the largest differences occurring at week 6 and month 3, demonstrating statistical significance at those time points. The final CCS at 24 months demonstrates numerical success that is 8.5% higher in the coflex® group when compared to the fusion control.

Table 19: Treatment Success at 24 Month Follow-Up in coflex® Clinical Trial

| | Number and Percentage Meeting Criteria | | | | | |
|---|---|---|---|---|---|---|
| | coflex® | | | Fusion Control | | |
| | N | n | % | N | n | % |
| **Improvement of at least 15 points in ODI at Month 24 compared to baseline** | **162** | **139** | **85.8** | **86** | **66** | **76.7** |
| **No reop or epidural (Up to Day 730)** | **215** | **173** | **80.5** | **107** | **89** | **83.2** |
| No reoperations, revisions, removals, or supplemental fixation | 215 | 192 | 89.3 | 107 | 99 | 92.5 |
| No epidural injection at any lumbar level | 215 | 190 | 88.4 | 107 | 94 | 87.9 |
| **No persistent new or increasing sensory or motor deficit at 24 months** | **179** | **169** | **94.4** | **97** | **89** | **91.8** |
| No persistent new or increasing sensory deficit at 24 mo. | 199 | 191 | 96.0 | 99 | 96 | 97.0 |
| No persistent new or increasing motor deficit at 24 mo. | 180 | 177 | 98.3 | 97 | 91 | 93.8 |
| **No major device-related complications** | 215 | 212 | 98.6 | 107 | 103 | 96.3 |
| **Composite Clinical Success** | **204** | **135** | **66.2** | **104** | **60** | **57.7** |

With regard to the functional parameter of the CCS, the coflex® device group demonstrated a greater proportion of patients with a clinically significant improvement in ODI score compared to the fusion control. In the neurological and device related complications components of the primary endpoint, the coflex® group demonstrated similar or higher patient success percentages compared to the fusion control. Success in the reoperations and revisions component of the primary endpoint is higher in the fusion control group than in the coflex® group. This difference was not statistically significant.

## Sensitivity Analysis:

Table 20: Posterior Probabilities of Success at 24 Months in coflex® Clinical Trial

| | Number and Percentage Achieving Month 24 CCS | | | | | | Posterior Probability of Non-Inferiority |
|---|---|---|---|---|---|---|---|
| | coflex® | | | Fusion Control | | | |
| | N | n | % | N | n | % | |
| **Per Protocol Analysis** | 204 | 135 | **66.2%** | 104 | 60 | **57.7%** | **0.999** |
| Unresolved Spinous Process Fractures as Failures[1] | 204 | 119 | 58.3% | 104 | 56 | 53.8% | 0.993 |

[1]Unresolved Spinous Process fractures counted as failures regardless of clinical significance. 83% of patients in the coflex® group and 75% of patients in fusion group who had spinous process fractures observed by the radiographic laboratory did not have any associated symptoms at the time the fracture was observed.

In sensitivity analyses, the 24 Month Composite Clinical Success endpoint was modified to include as failures patients with an unresolved spinous process fracture at 24 months. Review of the spinous process fractures and the resolution of these fractures were performed by an independent radiographic core laboratory for the

purpose of this analysis. With this modification in the success definition, the Composite Clinical Success rate decreased from 66% (135 of 204) to 58% (119 of 204) in the coflex® group and from 58% (60 of 104) to 54% (56 of 104) in the fusion group, and the Bayesian posterior probability changed from 0.999 to 0.993, still meeting the *a priori* defined criterion for success. Therefore, including unresolved spinous process fractures in the failure definition had no appreciable impact on the comparison between the devices.

A tipping point analysis was also performed to determine the effect on the primary endpoint of missing Month 24 data. Results of the tipping point analysis demonstrated that the finding of non-inferiority was insensitive to missing data at Month 24.

**Poolability Analysis:**

Analyses were conducted to assess poolability of data across sites and between patients with 1 versus 2 level implants. There was no statistical evidence of site-to-site differences in the comparisons between coflex® and fusion. Similarly, patients receiving 2 level implants had clinical outcomes that were generally comparable to those receiving a 1 level implant.

**Secondary Effectiveness Analysis:**

In addition to the components of the primary endpoint presented above, secondary effectiveness variables were also assessed and the results are provided below. The following secondary endpoints were specified:

- ZCQ Symptom Severity
- ZCQ Physical Function
- ZCQ Composite Success
- VAS Leg Pain
- VAS Back Pain
- SF-12

ZCQ Symptom Severity

**Table 21: ZCQ Symptom Severity at 24 Month Follow-Up in coflex® Clinical Trial**

| | Number and Percentage Meeting Criteria with 95% CI[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | coflex® | | | | Fusion Control | | | |
| | N | n | % | 95% CI (LB, UB) | N | n | % | 95% CI (LB, UB) |
| ZCQ Symptom Severity Improvement >0.5 points | 161 | 142 | 88.2% | (83.2%, 93.2%) | 86 | 67 | 77.9% | (69.1%, 86.7%) |

[1]The 95% confidence interval is provided as a measure of the statistical precision of the estimated treatment group mean or percentage. Non-overlapping confidence intervals imply statistically reliable device group differences.

Table 21 shows the subjects achieving success, defined as a decrease in ZCQ Symptom Severity of at least 0.5 points, in the Per Protocol cohort. Month 24 data

demonstrates a higher percentage of coflex® patients meeting the success threshold compared to the fusion control (88.2% vs. 77.9%).

ZCQ Physical Function

**Table 22: ZCQ Physical Function at 24 Month Follow-Up in coflex® Clinical Trial**

| | Number and Percentage Meeting Criteria with 95% CI[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | coflex® | | | | Fusion Control | | | |
| | N | n | % | 95% CI (LB, UB) | N | n | % | 95% CI (LB, UB) |
| Month 24 | 161 | 138 | 85.7% | (80.3%, 91.1%) | 86 | 63 | 73.3% | (63.9%, 82.6%) |

[1]The 95% confidence interval is provided as a measure of the statistical precision of the estimated treatment group mean or percentage. Non-overlapping confidence intervals imply statistically reliable device group differences.

Table 22 shows the subjects achieving success, defined as a decrease in ZCQ Physical Function of at least 0.5 points, in the Per Protocol cohort. Month 24 data demonstrates a higher percentage of coflex® patients meeting the success threshold compared to fusion (85.7 vs. 73.3%).

ZCQ Composite Success

**Table 23: ZCQ Composite Success at 24 Month Follow-Up in coflex® Clinical Trial**

| | Number and Percentage Meeting Criteria with 95% CI[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | coflex® | | | | Fusion Control | | | |
| | N | n | % | 95% CI (LB, UB) | N | n | % | 95% CI (LB, UB) |
| ZCQ Physical Function Improvement >0.5 points | 161 | 138 | 85.7% | (80.3%, 91.1%) | 86 | 63 | 73.3% | (63.9%, 82.6%) |

[1]The 95% confidence interval is provided as a measure of the statistical precision of the estimated treatment group mean or percentage. Non-overlapping confidence intervals imply statistically reliable device group differences.

Table 23 shows the subjects achieving a Composite ZCQ Success in the Per Protocol cohort, defined as a decrease in ZCQ Physical Function of at least 0.5 points, a decrease in ZCQ Symptom Severity of at least 0.5 points, and ZCQ Satisfaction score >2.5. Month 24 data demonstrates a higher percentage of coflex® patients meeting the success threshold compared to the fusion control (78.3% vs. 67.4%).

VAS Leg Pain

**Table 24: VAS Leg Pain Success at 24 Month Follow-Up in coflex® Clinical Trial**

| | Number and Percentage Meeting Criteria with 95% CI[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | coflex® | | | | Fusion Control | | | |
| | N | n | % | 95% CI (LB, UB) | N | n | % | 95% CI (LB, UB) |
| Decrease of at least 20 mm VAS leg Pain (Max) | 162 | 134 | 82.7% | (76.9%, 88.5%) | 85 | 67 | 78.8% | (70.1%, 87.5%) |

[1]The 95% confidence interval is provided as a measure of the statistical precision of the estimated treatment group mean or percentage. Non-overlapping confidence intervals imply statistically reliable device group differences.

Table 24 shows the subjects achieving success, defined as a decrease in VAS Leg Pain of at least 20mm in the Per Protocol cohort. Month 24 data demonstrates a higher percentage of coflex® patients meeting the success threshold compared to the fusion control (82.7% vs. 78.8%).

VAS Back Pain

**Table 25: VAS Back Pain at 24 Month Follow-Up in coflex® Clinical Trial**

| | Number and Percentage Meeting Criteria with 95% CI[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | coflex® | | | | Fusion Control | | | |
| | N | n | % | 95% CI (LB, UB) | N | n | % | 95% CI (LB, UB) |
| Decrease of at least 20 mm VAS Back Pain | 162 | 143 | 88.3% | (83.3%, 93.2%) | 85 | 68 | 80.0% | (71.5%, 88.5%) |

[1]The 95% confidence interval is provided as a measure of the statistical precision of the estimated treatment group mean or percentage. Non-overlapping confidence intervals imply statistically reliable device group differences.

Table 25 shows the subjects achieving success, defined as a decrease in VAS Back Pain of at least 20mm, in the Per Protocol cohort. Month 24 data demonstrates a higher percentage of coflex® patients meeting the success threshold compared to the fusion control (88.3% vs. 80.0%).

SF-12

**Table 26: SF-12 Success at 24 Month Follow-Up in coflex® Clinical Trial**

| | Number and Percentage Meeting Criteria with 95% CI[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | coflex® | | | | Fusion Control | | | |
| | N | n | % | 95% CI (LB, UB) | N | n | % | 95% CI (LB, UB) |
| Maintenance or improvement in SF-12 MCS | 132 | 92 | 69.7% | (61.9%, 77.5%) | 70 | 48 | 68.6% | (57.7%, 79.4%) |
| Maintenance or improvement in SF-12 PCS | 132 | 121 | 91.7% | (87.0%, 96.4%) | 70 | 58 | 82.9% | (74.0%, 91.7%) |

[1]The 95% confidence interval is provided as a measure of the statistical precision of the estimated treatment group mean or percentage

Table 26 shows the percentages of subjects meeting success, defined as maintaining or improving in the SF-12 Physical Function and Mental Health components of the per protocol cohort. The percentage of patients meeting SF-12 Physical Function success criterion is higher for coflex® at month 24 compared to the fusion control (91.7% vs. 82.9%).

**Radiographic Assessments**

Maintenance or improvement of foraminal height was a radiographic endpoint in the study. This is a measure of the mechanism of action of the coflex® device which is to maintain foraminal height. coflex® was able to improve or maintain foraminal height in 100% of patients measured at 24 months. This measurement was taken only on the coflex® patients.

Range of motion at the index level was measured at 24 months. The average range of motion was 4.5° in the coflex® group and less than 2° in the control. The analysis of the mean range of motion at the index and adjacent levels demonstrates that motion was maintained in the coflex® patients.

Translational motion as a measure of instability was assessed at 24 months in both coflex® and fusion patients. At the index level, the sagittal plane translation is reduced with fusion. The coflex® group maintained a similar sagittal plane translation from pre-op to 24 months. (see Table 27 and Table 28 for radiographic results).

The control group received the current standard of care, posterolateral fusion with pedicle screws. The radiographic endpoint in this group, the presence of fusion, was compared to the absence of bridging trabecular bone in the coflex® group. No coflex® patients had bridging bone at 24 months. 67.3% of control patients had radiographic fusion at 24 months. There were 32.7% of control patients who were not fused at 24 months and 20.2% of control patients had screw loosening; however, many of these patients were asymptomatic.

The device condition through 24 months demonstrated 1 device wing fracture of coflex®; and 3 device breakages and 21 patients with loose screws in the control patients.

As discussed above, during the study a number of spinous process fractures were observed in the coflex® patients by the independent radiologists which were asymptomatic at the timepoint and not observed by the investigator surgeons.

**Table 27: Range of Motion Results in coflex® IDE Study (°, Flexion to Extension)**

| | Number and Percentage Meeting Criteria with 95% CI[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | coflex® | | | | Fusion Control | | | |
| | At Level(s) of Implant (per level) | | | | | | | |
| | N | Mean | SD | 95% CI (LB, UB) | N | Mean | SD | 95% CI (LB, UB) |
| Pre-Op | 281 | 4.55 | 3.86 | (4.10, 5.01) | 145 | 4.15 | 3.33 | (3.61, 4.70) |
| Month 24 | 254 | 4.17 | 3.90 | (3.69, 4.65) | 140 | 1.59 | 1.97 | (1.26, 1.92) |

| | Above Level of Implant (per patient) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | N | Mean | SD | 95% CI (LB, UB) | N | Mean | SD | 95% CI (LB, UB) |
| Pre-Op | 207 | 4.17 | 3.49 | (3.69, 4.65) | 104 | 3.68 | 2.99 | (3.10, 4.26) |
| Month 24 | 186 | 4.08 | 3.57 | (3.56, 4.59) | 102 | 5.60 | 4.62 | (4.70, 6.51) |

| | Below Level of Implant (per patient) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | N | Mean | SD | 95% CI (LB, UB) | N | Mean | SD | 95% CI (LB, UB) |
| Pre-Op | 195 | 5.81 | 4.14 | (5.22, 6.39) | 101 | 5.65 | 3.84 | (4.89, 6.41) |
| Month 24 | 176 | 6.53 | 4.66 | (5.84, 7.22) | 96 | 6.95 | 4.42 | (6.05, 7.84) |

[1]The 95% confidence interval is provided as a measure of the statistical precision of the estimated treatment group mean or percentage. Non-overlapping confidence intervals imply statistically reliable device group differences.

**Table 28: Translation Results in coflex® IDE Study (mm, Flexion to Extension)**

| | Number and Percentage Meeting Criteria with 95% CI[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | coflex® | | | | Fusion Control | | | |
| | At Level(s) of Implant (per level) | | | | | | | |
| | N | Mean | SD | 95% CI (LB, UB) | N | Mean | SD | 95% CI (LB, UB) |
| Pre-Op | 274 | 0.97 | 0.88 | (0.86, 1.07) | 134 | 0.97 | 0.85 | (0.83, 1.12) |
| Month 24 | 251 | 0.93 | 0.89 | (0.82, 1.04) | 130 | 0.39 | 0.50 | (0.30, 0.48) |

| | Above Level of Implant (per patient) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | N | Mean | SD | 95% CI (LB, UB) | N | Mean | SD | 95% CI (LB, UB) |
| Pre-Op | 202 | 0.87 | 0.74 | (0.77, 0.97) | 96 | 0.77 | 0.76 | (0.62, 0.92) |
| Month 24 | 184 | 0.89 | 0.82 | (0.77, 1.01) | 95 | 1.08 | 0.94 | (0.89, 1.27) |

| | Below Level of Implant (per patient) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | N | Mean | SD | 95% CI (LB, UB) | N | Mean | SD | 95% CI (LB, UB) |
| Pre-Op | 190 | 0.56 | 0.53 | (0.48, 0.63) | 93 | 0.55 | 0.46 | (0.45, 0.64) |
| Month 24 | 174 | 0.65 | 0.57 | (0.56, 0.73) | 89 | 0.80 | 0.85 | (0.62, 0.98) |

[1]The 95% confidence interval is provided as a measure of the statistical precision of the estimated treatment group mean or percentage. Non-overlapping confidence intervals imply statistically reliable device group differences.

Table 27 and Table 28 reflect the radiographic Range of Motion and Translation analyses by the core radiographic laboratory, and they demonstrate coflex® preserves index and adjacent level motion compared to pedicle screw fusion.

3. Subgroup Analyses

Preoperative characteristics were evaluated for potential association with overall success outcomes, as demonstrated in Table 29.

**Table 29: Composite Clinical Success at 24 Month Follow-Up in coflex® Clinical Trial by Preoperative Characteristics**

| | Number and Percentage Achieving Month 24 CCS | | | | | |
|---|---|---|---|---|---|---|
| | coflex® | | | Fusion Control | | |
| | N | n | % | N | n | % |
| Central stenosis (CS) alone | 18 | 13 | 72.2% | 4 | 2 | 50.0% |
| CS + foraminal stenosis | 57 | 38 | 66.7% | 21 | 14 | 66.7% |
| CS + subarticular stenosis | 32 | 21 | 65.6% | 22 | 11 | 50.0% |
| CS + formaminal + subarticular | 97 | 63 | 64.9% | 57 | 33 | 57.9% |
| Levels Treated: One | 130 | 83 | 63.8% | 65 | 38 | 58.5% |
| Levels Treated: Two | 74 | 52 | 70.3% | 39 | 22 | 56.4% |
| Males | 104 | 69 | 66.3% | 48 | 31 | 64.6% |
| Females | 100 | 66 | 66.0% | 56 | 29 | 51.8% |
| Age 40 to 60 | 90 | 54 | 60.0% | 39 | 22 | 56.4% |
| Age > 60 | 114 | 81 | 71.1% | 65 | 38 | 58.5% |
| Height < 67 inches | 90 | 61 | 67.8% | 57 | 29 | 50.9% |
| Height >= 67 inches | 114 | 74 | 64.9% | 47 | 31 | 66.0% |
| Weight < 191 | 109 | 75 | 68.8% | 61 | 34 | 55.7% |
| Weight >= 191 | 95 | 60 | 63.2% | 43 | 26 | 60.5% |
| BMI < 29 | 95 | 62 | 65.3% | 42 | 22 | 52.4% |
| BMI >= 29 | 109 | 73 | 67.0% | 62 | 38 | 61.3% |
| Prior Surgery | 202 | 134 | 66.3% | 102 | 58 | 56.9% |
| No prior surgery | 2 | 1 | 50.0% | 2 | 2 | 100.0% |
| Smoker | 22 | 13 | 59.1% | 14 | 6 | 42.9% |
| Non Smoker | 182 | 122 | 67.0% | 90 | 54 | 60.0% |
| Spondylolisthesis-Grade I | 94 | 59 | 62.8% | 48 | 30 | 62.5% |
| None | 110 | 76 | 69.1% | 56 | 30 | 53.6% |
| Any severe complication | 70 | 33 | 47.1% | 46 | 19 | 41.3% |
| No severe complication | 134 | 102 | 76.1% | 58 | 41 | 70.7% |

There were 40 non-randomized roll-in patients enrolled in the coflex® study, consisting of first one or two patients treated at each site. Of these 40 patients, 6 patients were designated as protocol violators by the independent Clinical Events Committee. Thirty-two (32, 94.1%) per protocol patients had Composite Clinical Success data at 24 Months. The per protocol roll-in patient cohort achieved a 56.3% Composite Clinical Success at Month 24.

**Overall Conclusions:**
Among 204 coflex® patients, 135 (66.2%) achieved Month 24 CCS, while among 104 fusion patients, 60 (57.7%) achieved Month 24 CCS. Statistical analysis demonstrated that coflex® was non-inferior to fusion with a posterior probability of 0.999, which is greater than the success criterion of 0.975.

The preclinical and clinical data in this application support the reasonable assurance of safety and effectiveness of the coflex® device when used in accordance with the Indications for Use. Based on the clinical study results, it is reasonable to conclude that a significant portion of the indicated patient population will achieve clinically significant results. The clinical benefits of the use of the coflex® device in terms of functional improvement, reduction in pain and maintenance or improvement in neurological status outweigh the risks associated with the device and surgical procedure through 2 years follow-up when used in the indicated population and in accordance with the directions for use. In conclusion, the coflex® device represents a reasonable alternative to posterolateral fusion for the treatment of spinal stenosis.

## STERILIZATION, STORAGE, AND INSPECTION

The implant is sterilized with gamma sterilization (25 kGy minimum).

The implant is individually packed in protective packaging that is labeled according to its contents.

- Always store the implant in the original protective packaging.
- Do not remove the implant from the packaging until immediately before use.
- The implant should be stored in ambient temperature in a secure location.

Both inner and out packaging, including seals, should be thoroughly inspected prior to implantation.

## MRI COMPATIBILITY

Non-clinical testing has demonstrated that the coflex® Interlaminar Technology is MR Conditional. It can be scanned safely under the following conditions:

- Static magnetic field of 1.5-Tesla (1.5T) or 3.0-Tesla (3.0T).
- Spatial gradient field of up to:
    - 11,230 G/cm (112.3 T/m) for 1.5T systems
    - 5,610 G/cm (56.1 T/m) for 3.0T systems.
- Maximum whole body averaged specific absorption rate (SAR) of:
    - 2.0 W/kg for 15 minutes of scanning in Normal Operating Mode at 1.5T.
    - 2.0 W/kg for 15 minutes of scanning in Normal Operating Mode at 3.0T.

***3.0T RF heating***

In non-clinical testing with body coil excitation, the coflex® Interlaminar Technology produced a temperature rise of less than 3.5°C at a maximum whole body averaged specific absorption rate (SAR) of 2.0 W/kg, as assessed by calorimetry for 15 minutes of scanning in a 3.0T Siemens Trio (MRC20587) MR scanner with SYNGO MR A30 4VA30A software.

*1.5T RF heating*
In non-clinical testing with body coil excitation, the coflex® Interlaminar Technology produced a temperature rise of less than 3.5°C at a maximum whole body averaged specific absorption rate (SAR) of 2.0 W/kg, as assessed by calorimetry for 15 minutes of scanning in a 1.5T Siemens Espree (MRC30732) MR scanner with SYNGO MR B17 software.

Caution: The RF heating behavior does not scale with static field strength. Devices which do not exhibit detectable heating at one field strength may exhibit high values of localized heating at another field strength.

*MR Artifact*
In testing using a 3.0T system with spin-echo sequencing, the shape of the image artifact follows the approximate contour of the device and extends radially up to 19 mm from the implant.

**DISINFECTION/CLEANING**
The implant is not designed to be disinfected or cleaned by the user.

For instrument cleaning instructions, please refer to the coflex® Sterilization Tray Instructions for Use.

**RESTERILIZATION**
The implant is not intended for reuse. Resterilization of the implant is not permitted.

For instrument sterilization instructions, please refer to the coflex® Sterilization Tray Instructions for Use.

**PROCEDURE**
The coflex® implant must be implanted only with the applicable coflex® instrumentation. The coflex® instrumentation is available from the manufacturer at any time. A surgical technique is available to instruct the user on proper implantation techniques. The user must be familiar with the recommended surgical technique prior to implanting a coflex® device. Please consult the surgical technique for further information on the coflex® implantation procedure.

**POSTOPERATIVE CONSIDERATIONS**
As with other spinal implants, Paradigm Spine recommends using post-operative antibiotics with the coflex® device. Lumbar drains are recommended at the discretion of the treating surgeon.

**IMPLANT REMOVAL**
The coflex® implant is intended for permanent implantation and is not intended for removal. Please refer to the explant protocol for instructions when device explant is necessary.

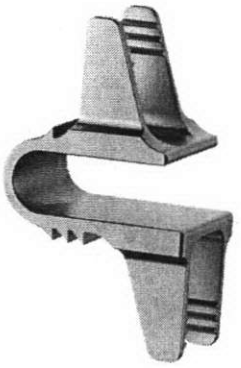
**FOR FURTHER INFORMATION**

Please contact Paradigm Spine if further information on this product is needed.

| | |
|---|---|
| **Paradigm Spine:**<br>**505 Park Avenue, 14th floor**<br>**New York, NY 10022**<br>**Tel: (212) 583-9700**<br>**Fax:** | **Manufacturer**<br>Paradigm Spine GmbH<br>Eisenbahnstraße 84<br>78573 Wurmlingen<br>Germany<br>Phone: +49 (7461) 963599-0<br>Fax: +49 (7461) 963599-20 |

PARADIGM SPINE
*the movement in spine care*

# coflex® Interlaminar Technology



**Caution:** Federal Law restricts this device to sale by or on the order of a physician.

This brochure will provide you with information about the coflex® Interlaminar Technology, a new treatment for lumbar spinal stenosis.

Your doctor will answer any questions you have regarding lumbar spinal stenosis and the coflex® as a treatment for you.

Paradigm Spine, LLC
505 Park Avenue, 14th Floor
New York, NY 10022
212-583-9700

# Table of Contents

## INTRODUCTION

After reviewing your medical history, x-rays, and other tests, your doctor has decided that you need surgery for the relief of back or leg pain. This brochure can help you make a better choice on how to treat your pain.

## WHAT IS coflex®?

The coflex® is a titanium alloy implant that fits between the spinous processes of the bones in your lower back (please see Figure 2 below). The coflex® device can help relieve your back pain symptoms by stabilizing the movement of your spine. This may help reduce the pain in your back, groin or legs. The coflex® can stay in place by clamping onto bones in your spine. Titanium alloy is often used in bone repair in the body.

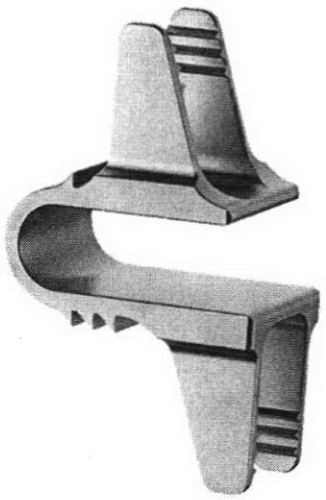


**Figure 1: The coflex® Interlaminar Technology. The U shaped implant fits between the spinous processes and the wings are designed to prevent the implant from moving**

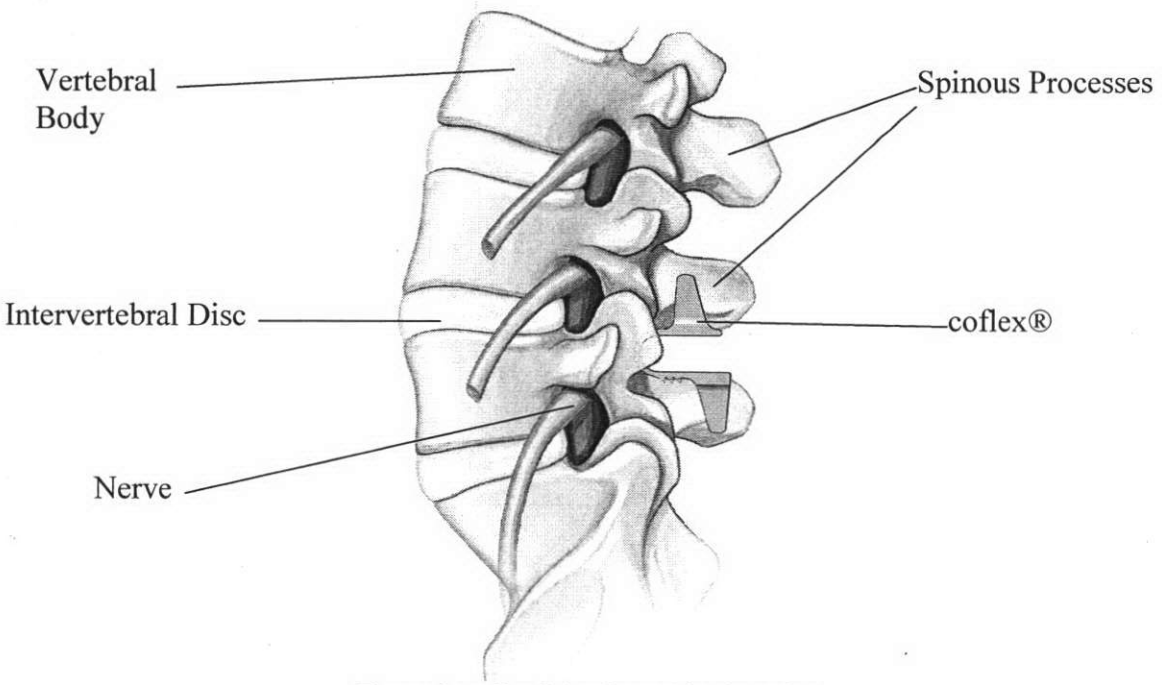



**Figure 2: coflex® implanted in the spine**

## WHAT IS SPINAL STENOSIS?

Spinal stenosis is a narrowing of the spinal canal. Thickening of tissue that connects two bones (ligaments), bulging of discs, or overgrowth of bone can cause it. The spinal cord and nerve fibers that exit the spinal canal (nerve roots) can become crowded and pinched. This may lead to pain, numbness, tingling, and/or weakness in the back and legs. This pain is especially noted when you walk.

## WHAT ARE MY TREATMENT OPTIONS?

There are ways to treat spinal stenosis. Some are:

- Non-surgical ways
    - Your doctor can inject you with a drug (steroids) to lower swelling and treat pain in your hips or down the leg. Pain relief from this may not last long. You should not have more than three injections in a six month time.
    - You can rest.
    - You can take physical therapy and exercise.
- Surgical ways
    - Decompression surgery only. This surgery removes the bone around your nerves causing the pain. This surgery helps relieve pressure on your spinal nerves.
    - Decompression and an interlaminar spacer like coflex®
    - Implantation of an interspinous device like X-Stop with no surgical decompression.

- Direct decompression and spinal fusion. In spinal fusion, your doctor puts some of your bone (bone graft) between two bones in the area of the decompression surgery. Your doctor uses screws and rods to hold the bones in place. The bone graft is usually either spinal bone removed during the decompression surgery or bone from your hip removed through a separate cut. The purpose of the bone graft is to grow bone between the two bones. This is supposed to stop motion in that portion of the spine. The rods and screws are usually left in your spine unless a problem happens. If this happens, the device is removed or replaced.

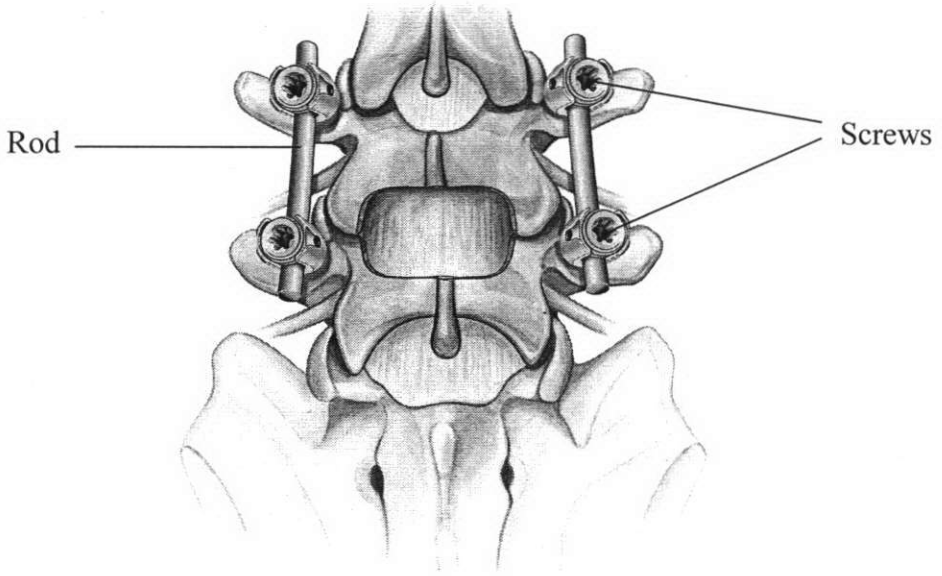



**Figure 3: Stenosis Treatment with Spinal Fusion**

Discuss your alternatives with your physician and select the treatment method that best seems to meet your current pain level and lifestyle.

## ARE YOU A CANDIDATE FOR THE coflex® PROCEDURE?

To be a candidate for treatment with decompression and coflex®:

- You must be skeletally mature.
- You must have moderate to severe spinal stenosis in your lower back. One sign of having moderate to severe spinal stenosis is it is hard to walk a long way, such as ½ mile. Another sign is having pain in your lower back while standing that goes away when you bend forward.
- You must have been treated by a doctor for at least 6 months with "non-surgical treatments" like those described on page 4.

## WHO SHOULD NOT RECEIVE coflex®? (CONTRAINDICATIONS)

Do not choose coflex® if any of these is true:

- You have had a prior fusion or decompressive laminectomy in your back. The coflex® may not function properly in this event, and you may need additional surgery to relieve your pain. Tell your doctor if you have ever had surgery for your back.
- You have compromised vertebral bodies in your back caused by current or past trauma or cancer (e.g., compression fracture), as determined by your doctor. The coflex® may not function properly in this event, and you may need additional surgery to relieve your pain.
- You have severe facet hypertrophy (overgrowth of bone in the facet joint between each vertebral body) that requires significant bone removal which would cause instability, as determined by your doctor. The coflex® may not function properly in this event, and you may need additional surgery to relieve your pain.
- You have spinal anatomy or instability that would not allow use of coflex®. Examples of this are scoliosis or a severe slipped disc. The coflex® may not function properly and you may need additional surgery to relieve your pain. Tell your doctor if you have ever had a problem with your back.
- You have bone fractures or reduced bone density (osteoporosis). These conditions may lead to more bone fractures in your back. Tell your doctor if you have ever had a broken bone or have problems with bone density.
- You have back or leg pain that has an unknown cause or you have back pain only, with no leg, buttock, or groin pain. The coflex® may not function properly and you may need additional surgery to relieve your pain. Tell your doctor if you have ever had a problem with going to the bathroom due to your back pain or weakness in your legs.
- You are morbidly obese. This means that you have a body mass index (BMI) above 40, as determined by your doctor. Obesity may lead to more complications during and following surgery.
- You have any infection. Tell your doctor if you have any infection. Patients with infections are at risk for a deep infection if they have coflex® implanted. They would need another surgery to remove it.
- You are allergic to titanium or titanium alloy. Patients who are allergic might have to have more surgery to remove the coflex®. Tell your doctor if you think you ever had a reaction to a metal or an implant. You may not know if you are allergic to coflex®.
- You have cauda equina syndrome. This is a severe spinal nerve compression that causes loss of bowel or bladder function, loss of sensation in the buttocks and groin, and weakness in the legs. Tell your doctor if you have ever had a problem with going to the bathroom due to your back pain or weakness in your legs. Patients with cauda equina syndrome would not benefit from the coflex® device.

## WHAT WARNINGS SHOULD I KNOW ABOUT WHEN coflex® IS USED?

Do not do any strenuous physical activity for 6 weeks after your surgery. Examples of strenuous physical include lifting more than 10 pounds. Don't do sports until your doctor tells you that you can. Sports include swimming, golf, tennis, racquetball, running, and jogging. Your coflex® may move or break part of your spine if you are too active too soon after surgery. This could cause pain. You could need more surgery. Each patient is different. Ask your doctor what it is OK to do after surgery.

Tell your doctor after surgery if you have fluid leaking from your wound, redness around your wound, or separated edges at the site of the wound. These problems can lead to serious infection and require more surgery if your doctor does not treat them. You may need to ask another person to look at your wound to see if it is leaking.

Tell your doctor as soon as possible after your surgery if you have pain or swelling in your back or if you feel numbness in your legs or buttocks. These symptoms can be a sign that the coflex® is not working properly. You may need more surgery.

If you fall, tell your doctor. A fall may hurt you seriously.

## WHAT ARE PRECAUTIONS FOR THE USE OF coflex®?

Follow all of your doctor's instructions after your surgery. This will help you recover better. Each patient is different. Your doctor will know what's best for you. If you don't do what your doctor says after surgery it may delay your recovery and cause you more pain.

If a doctor sends you to have an MRI exam, tell him or her you have a coflex® device. This is important because there are special instructions for use of an MRI on someone with a coflex® device.

## WHAT PROBLEMS MAY HAPPEN FROM coflex® SURGERY? (RISKS)

There are risks with spinal implant surgery. A risk is a bad or harmful (adverse) thing together with how often it happens. In the coflex® clinical trial where 215 patients had coflex® implants, doctors anticipated that bad or harmful things might happen. Those things are listed below in the "Hazard" column of Table I. The "Harm" column shows what the "Hazard" caused. The "How Often This Hazard Harmed Them" column shows how many of those who had the "Hazard" also had that "Harm". The study did not find that patients actually had some of the "Hazards". These "Hazards" may, however, are still possible for future patients.

**Table 1. Risks of coflex® surgery.**

| Hazard | Harm | How Often This Hazard Harmed Them |
|---|---|---|
| Damage of nerves | Changes in the sensation and/or muscle weakness in patient's legs | 12 out of 100 patients; 7 of these 12 had no nerve issues at 2 years |
| | Loss of ability to move muscles with the loss of feeling also (paralysis or foot drop) | 1 out of 100 patients; 1 of this 1 had no nerve issues at 2 years |
| | A sensation of pricking, tingling, or creeping on the skin (parethesias) | 7 out of 100 patients; 6 of these 7 had no nerve issues at 2 years |
| Other Neurological Problem | Headache or migraine | 2 out of 100 patients |
| | Dizziness or Seizure | 2 out of 100 patients |
| Damage of nerves, blood vessels, and nearby tissues, for example, muscle and ligament injury | Unknown | N/A |
| Bleeding around the membrane covering the tissue surrounding the spinal cord (epidural bleeding) | a blood transfusion or another operation | N/A |
| A pocket of blood caused by a broken blood vessel or bone bleeding in the membrane covering the nerves or the tissues surrounding your spinal cord (epidural hematoma) | Unknown | N/A |
| Scar tissue formation on the membrane covering the nerves (epidural fibrosis) | Unknown | N/A |
| Instability | Unknown | N/A |
| Loss of bone around the implant | Unknown | N/A |
| Injury to the spinal cord or the nerves leaving or entering the spinal cord | Unknown | N/A |
| Slipped disc (disc herniation) | Unknown | N/A |
| Injury of the membrane (dura) surrounding the spinal nerves | leakage of spinal fluid | N/A |
| | no leakage of spinal fluid | N/A |
| Impaired muscle or nerve function | Unknown | N/A |
| Bleeding (hemorrhage) | Unknown | N/A |
| Fracture of the vertebra, fracture of the part of your spine that you can feel through the skin on your back (spinous process), or other damage to bony structures during or after surgery | Pain | 3 of 100 patients |
| | Unknown | 14 of 100 patients |

| Hazard | Harm | How Often This Hazard Harmed Them |
|---|---|---|
| Muscle and tissue pain after the surgery (postoperative) | Unknown | N/A |
| Pain and discomfort resulting from the cutting and healing of tissues, presence of implants, or reaction to the metal used in the implant | Severe pain requiring drugs and more surgery | 3 of 100 patients; 2 of these 3 had less severe pain after 2 years |
| | Unknown | 30 of 100 patients |
| Unplanned, self-generated fusion of the vertebra (spontaneous fusion) | Unknown | N/A |
| The spine changes in bad ways at the operated level(s) and/or the levels above and below including | loss of proper spinal curvature, correction, height, and/or reduction, or malalignment | N/A |
| A bad reaction where the bone and the implant meet | Another surgery | N/A |
| Bad or harmful(adverse) reaction to implant materials (possible allergic reaction to the metal) or there may be some wearing of the implant material against bone or another part of the implant that creates very small particles, it is possible that these particles may eventually cause the local tissues such as bone, nerves and nearby soft tissue to respond badly | Another surgery | N/A |
| Implant may become loose, change shape permanently (deform), fail, break, wear out, or move | Another surgery to correct the problem and/or remove the implant | 1 of 100 patients |
| Implant may sink into the bone (subsidence) | Another surgery | N/A |
| Lung infection (pneumonia) | Unknown | N/A |
| Collapsed lung (atelectasis) | Unknown | N/A |
| Blood poisoning (septicemia) | Unknown | N/A |
| Injury to blood vessels from cutting tissues | Unknown | N/A |
| Soft tissue damage from cutting tissues | Pain | N/A |
| Inflammation of the blood vessel in your leg (phlebitis) or blood clot in the legs (thromboembolus) | Unknown | N/A |
| Excessive bleeding (hemorrhage) | Unknown | N/A |
| Difficulty breathing (respiratory distress) | Unknown | N/A |
| Abnormal collection of fluid in the lungs (pulmonary edema) | Unknown | N/A |

| Hazard | Harm | How Often This Hazard Harmed Them |
|---|---|---|
| Reactions to the drugs or anesthesia used during and after surgery | Unknown | N/A |
| Reactions to blood transfusions | Unknown | N/A |
| Failure of the tissue to heal properly | Treatment with drugs, changes of wound dressings. | 15 of 100 patients |
| | Pain, noticed by patient | 2 of 100 patients |
| Heart attack (myocardial infarction) | Unknown | N/A |
| Death | Unknown | N/A |
| Did not get and understand doctor's instructions for care after surgery | Unknown | N/A |
| Other hazards | Unknown | Unknown |

*N/A: Does not apply because no patient had this hazard.

As you can see from the above table, the problems observed the most in the trial were pain, wound healing problems (such as infection or drainage), brief numbness or tingling in patient's arms or legs, and bone fracture. Some patients had illnesses or diseases not related to their surgery, like problems with their skin, problems breathing, problems with their heart, and other muscle or bone pain or soreness. In the clinical trial, similar problems were experienced with patients who had fusion.

In some patients, the coflex® surgery may not help your pain, and you may need another surgery to remove the device. It is hard to predict who will not benefit from this surgery. In the clinical study, 11 out of every 100 patients who had the coflex® had their coflex® removed and then had other procedures to try to stop their pain.

## WHY MAY coflex® WORK? (BENEFITS)

The coflex® implant is designed to keep your spine still so when you stand upright the nerves in your back will not be pinched or cause pain. In addition, the coflex® implant is intended to allow you to continue to move your back more than with a fusion surgery. With the coflex® implant in place, you should not need to bend forward to relieve your pain.

We studied the coflex® implant in a clinical trial to compare it to spinal fusion surgery. In our study of 322 patients, 215 patients had the coflex® implant and the rest had fusion surgery. 86 out of every 100 patients who had the coflex® device had a successful outcome after two years. A successful outcome meant they had relief from their pain and did not require additional surgery. A similar outcome (77 out of 100 patients) was experienced with patients who had fusion. We did not compare the coflex® device with any non-surgical method of treatment.

While pain relief happened faster (at 6 weeks) after surgery in coflex® patients (85 out of 100 patients) compared to those patients who had fusion surgery (68 out of 100 patients), your

outcome at two years, if you are treated with coflex®, is expected to be no worse than if you were treated with fusion.

We did not look at the benefit beyond two years after surgery.

## WHAT CAN I EXPECT BEFORE coflex® SURGERY?

You and your doctor may choose for you to have surgery with coflex® Interlaminar Technology. If so, there are several things you can do to help you have the best possible results for your surgery. Your doctor will give you specific instructions prior to your surgery that you should follow. You can also raise your chances of a successful outcome by eating well-balanced nutritional meals before your surgery. Poor nutrition can reduce the body's ability to heal.

## WHAT CAN I EXPECT DURING coflex® SURGERY?

The procedure may be done in the operating room at the hospital. The coflex® implant is inserted through a small cut in the skin of your back. You will be given drugs so that you will be asleep during surgery. You will be unable to feel the surgery.

You will be placed on your stomach during the surgery. This will allow your doctor to bend your spine when the coflex® is inserted. The surgery to implant the coflex® typically lasts about one to two hours.

As part of the coflex® surgery, your doctor will first remove part of the bone that is causing your pain. This step is called a decompression procedure. Following this step, the spinous processes are prepared to fit the coflex® device.

After preparation of the bones in your spine, the coflex® is placed between two spinous processes in the back of your spine. This step uses a tool that is removed after the coflex® is in place.

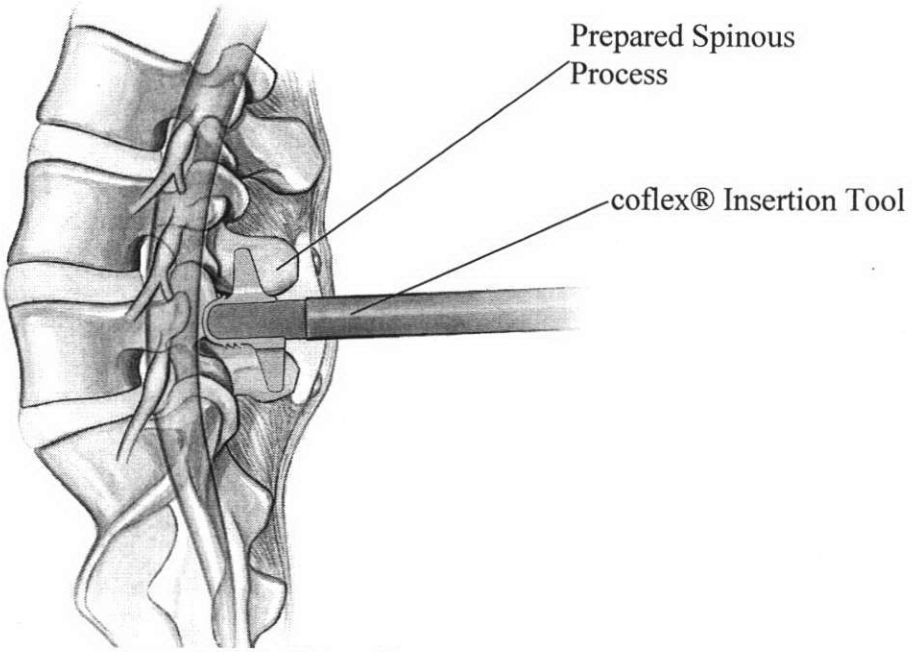



**Figure 4: coflex® Insertion**

## WHAT CAN I EXPECT AFTER coflex® SURGERY?

Based on the clinical study results, 85 out of 100 coflex® patients had significant pain relief at 6 weeks compared to those patients who had fusion surgery (68 out of 100 patients). Your outcome at two years, if you are treated with coflex®, is expected to be no worse than if you were treated with fusion. In addition, three out of four coflex® patients in the clinical study left the hospital within 24-48 hours after surgery, compared to one out of three fusion patients. In all coflex® patients in the clinical study, the hospital stay was less than a week.

Once the doctor says you can leave the hospital, you may need physical therapy. Your doctor may ask you to return for an examination about six weeks later. Your doctor may also ask you to reduce your physical activities in the first 6 weeks after your operation. In the clinical study, patients were allowed to travel and engage in light activity such as walking as soon as they felt they could. It is important for you to realize that you have had a surgical operation. You should not participate in some activities until your doctor has said you may do so. Please ask your doctor when you can start doing certain activities. Your results may be different from patients in the clinical study.

After your surgery, medication will be provided to you by your doctor. During the clinical study, walking during the first 6 weeks following surgery was usually acceptable. Please listen to your doctor's instructions on how much activity you can do and for how long after surgery.

## WHEN SHOULD I CALL MY DOCTOR?

If you continue to have pain in your back or legs, please see your doctor immediately. If you feel like the coflex® is not working, please see your doctor immediately. If your doctor thinks the coflex® needs to be removed or replaced, a new surgery will be needed.

## WHERE CAN I FIND OUT MORE INFORMATION?

If you have any questions about coflex®, you may ask your doctor. For additional information, you may call Paradigm Spine's information hotline at XXX-XXX-XXXX. You may also find additional information at ParadigmSpine.com.

## WILL MY IMPLANT SET OFF A METAL DETECTOR?

The metal in coflex® may affect MRI and metal detectors. You will be given a patient ID card by your surgeon. This card lets people know you have a coflex® implant inside you. You should show this card when you have x-rays and MRIs. When you pass through an electronic detection system, you may use this card to tell security that you have this device in your spine.

## WHAT HAVE CLINICAL STUDIES SHOWN ABOUT coflex®?

**The clinical study results show the coflex® is reasonably safe and effective for the treatment of spinal stenosis.** The coflex® was tested in a carefully controlled research study. This study took place in twenty one hospitals across the United States. A total of 322 patients were in this study. 215 patients received a coflex® device, and 107 patients had a spinal fusion surgery. Patients in this study had lumbar spinal stenosis, similar to you. These patients were treated by their doctors for at least 6 months to relieve their pain without surgery before entering the study. Patients were randomly assigned to their treatment and did not know before surgery what treatment they would get.

Please talk with your doctor for more details about the clinical study and its results.

## MORE ABOUT YOUR CONDITION

Your spine is very important. It supports the structure of your body and protects your spinal cord, which relays information to and from your brain. It is also responsible for the most basic movements of your body, such as nodding your head, sitting, standing, and walking.

Your spine consists of a column of 24 bones called vertebrae. These vertebrae extend from your skull down to your hip bones (Fig. 5). Between the vertebrae are discs of soft tissue. The vertebrae join together like links in a chain. These provide support for your head and body while the discs act as stabilizing cushions, or "shock absorbers." In addition to providing support, the spine surrounds and protects a cylinder of nerve tissues called the spinal cord. The spinal cord is surrounded by a part of the vertebrae creating a channel called the spinal canal.

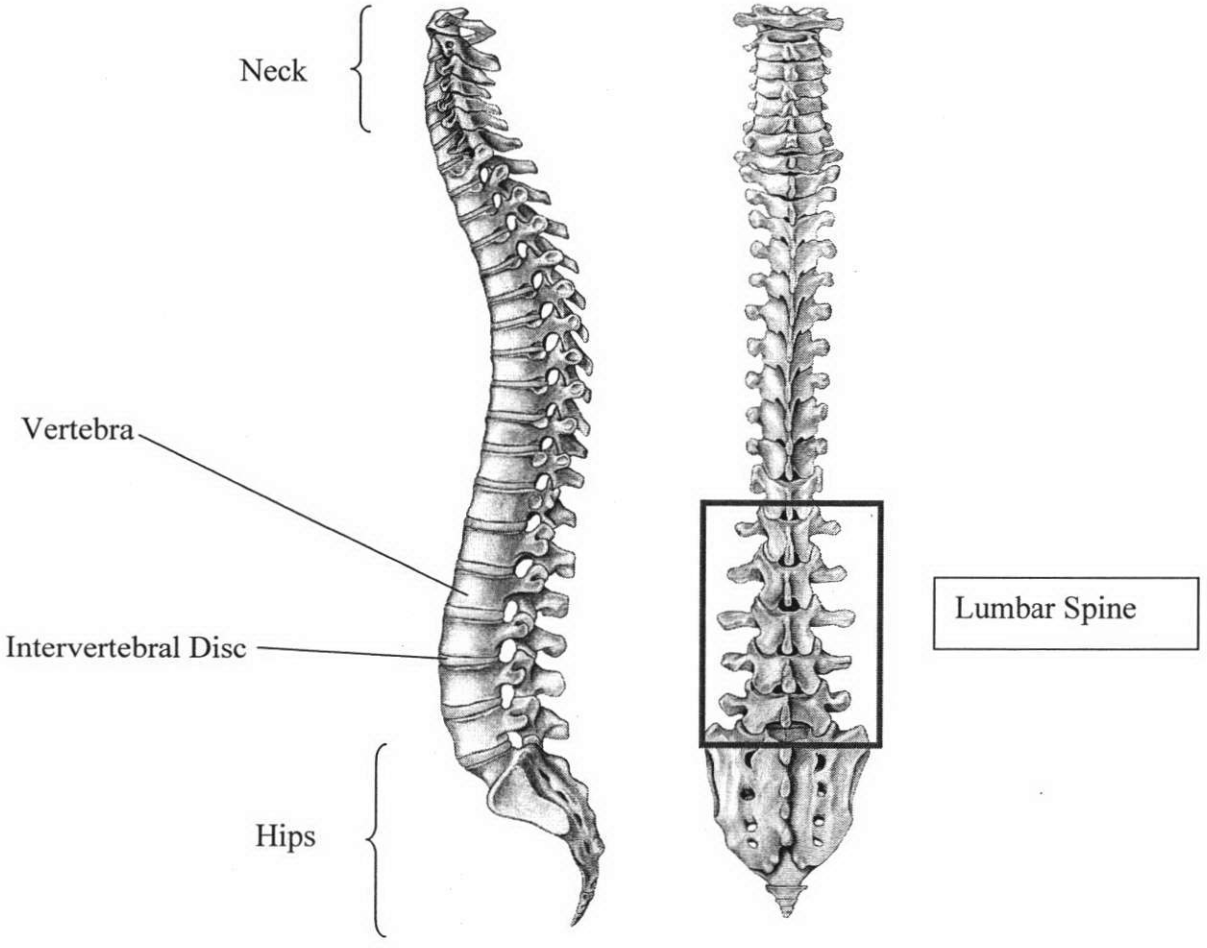



**Figure 5: The Spine**

Normally there is space between the spinal cord and the borders of the spinal canal. In this case, the nerves are free and are not pinched (Fig. 6).

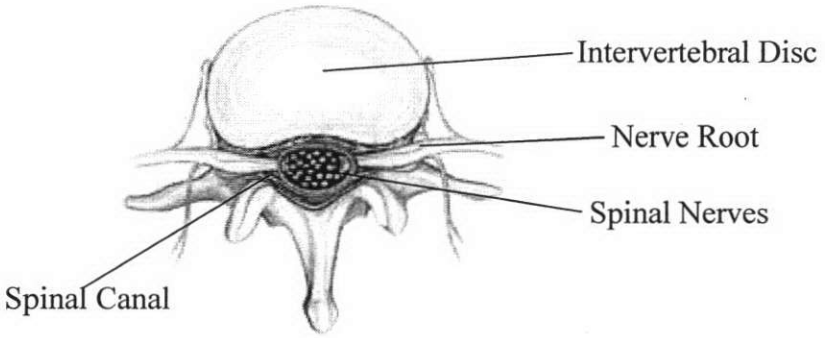



**Figure 6: Healthy Spinal Column**

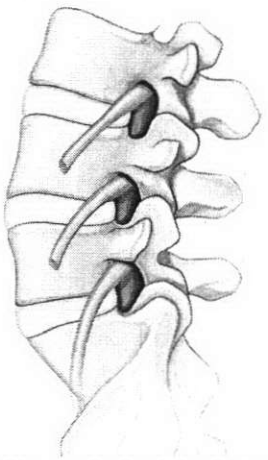


**Figure 7: Healthy Spine**

***What is Spinal Stenosis?***

Spinal stenosis is defined as a narrowing of the spinal canal. This narrowing can occur from thickening of ligaments (tissue that connects two bones), bulging of discs, or overgrowth of bone. The spinal cord and nerve fibers that exit the spinal canal (nerve roots) can become crowded and pinched. This may lead to pain, numbness, tingling, and/or weakness in the back and legs. This pain is especially noted while walking (Fig. 8).

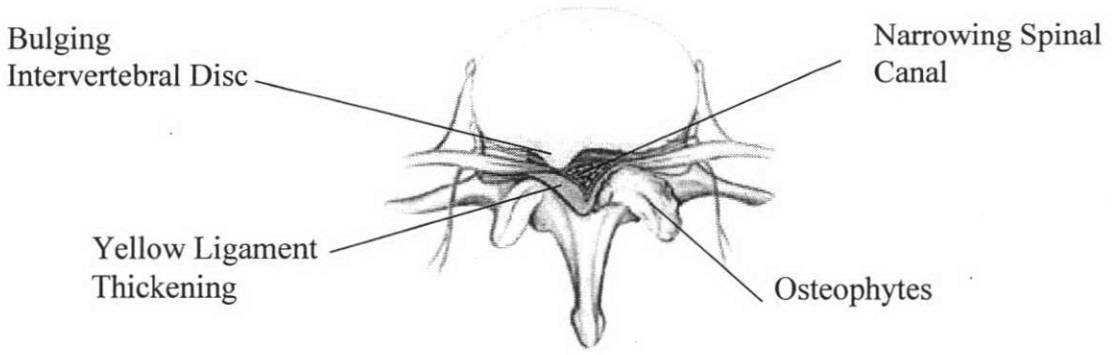



**Figure 8: Spinal Column with Stenosis**

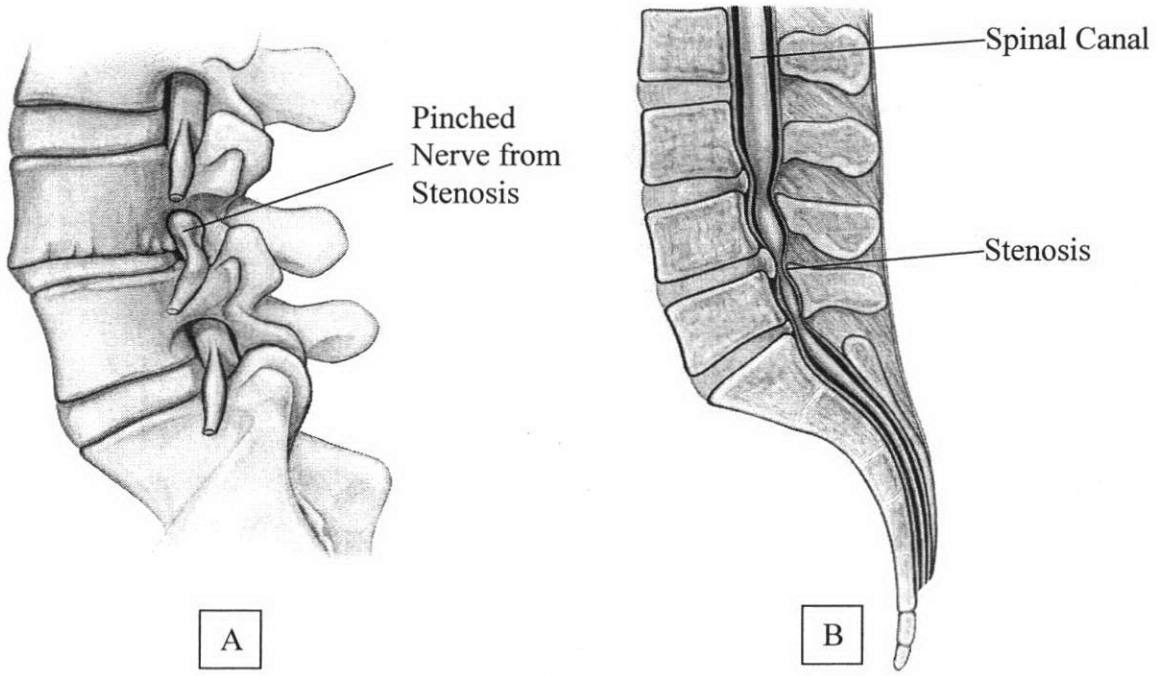



**Figure 9: Stenotic Spine**
**A: Lateral Spinal Stenosis**
**B: Central Spinal Stenosis**

Spinal stenosis is the gradual result of aging and "wear and tear" on the spine from everyday activities. This wear and tear on the spine can lead to pressure on the nerves that may cause pain and/or damage.

## HOW DO I KNOW IF I HAVE SPINAL STENOSIS?

If you suffer from lumbar spinal stenosis you may feel various symptoms. These symptoms include:

- You may feel a dull or aching back pain spreading to your legs.
- You may feel a numbness and "pins and needles" in your legs, calves or buttocks.
- You may feel a weakness, or a loss of balance.
- You may feel a decreased endurance for physical activities.

Before saying you have stenosis, it is important for your doctor to rule out other conditions that may produce similar symptoms. Your doctor will ask you to describe any symptoms you have and how these symptoms have changed over time. Your doctor will ask you the treatments you

have had for these symptoms. This includes medications. Additional radiology tests will be needed to confirm that you have spinal stenosis.

## SUMMARY

This brochure has been designed to help you understand the coflex® Interlaminar Technology as an option to treat your spinal stenosis surgery. It also should give you the information you need to be an active participant in your own care.

We hope that you take the time to discuss all possible treatments with your doctor. You should also learn as much as you can about your own pain and what is causing it.

We also want to make sure that you understand all of the risks of surgery and the potential complications after surgery.

It is important that you understand exactly the procedure for the coflex® surgery before you decide to move forward. This includes the risks, benefits and other treatments. Always remember that the final decision to have surgery is up to you.