Instructions for use

Enterra Ascent®



Rx only
Humanitarian Device: Authorized by Federal law for use in the treatment of chronic intractable (drug-refractory) nausea and vomiting secondary to gastroparesis of diabetic or idiopathic etiology in patients aged 18 to 70 years. The effectiveness of this device for this use has not been demonstrated.

enterra® medical®

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Enterra Medical Neurostimulation System limited warranty[2] (U.S. Customers Only) 85

Information available for the system:
Product manuals, such as programming guides, and implant manuals provide device descriptions, package contents, device specifications, product-specific warnings and precautions, and instructions for use. The clinical summary provides information about the clinical study results for the neurostimulation system.

Indications

The Enterra Ascent® System for Gastric Electrical Stimulation (GES) is indicated for the treatment of chronic intractable (drug-refractory) nausea and vomiting secondary to gastroparesis of diabetic or idiopathic etiology in patients aged 18 to 70 years.

Humanitarian Device: Authorized by Federal law for use in the treatment of chronic intractable (drug-refractory) nausea and vomiting secondary to gastroparesis of diabetic or idiopathic etiology in patients aged 18 to 70 years. The effectiveness of this device for this use has not been demonstrated.

Contraindications

The Enterra Ascent System is contraindicated in patients if their doctor determines they are not a candidate for the surgical procedure and/or anesthesia because of physical or mental conditions.

After implantation of any Enterra System component, the following contraindications apply:

Diathermy - Do not use shortwave diathermy, microwave diathermy or therapeutic ultrasound diathermy (all now referred to as diathermy) on patients implanted with a neurostimulation system. Energy from diathermy can be transferred through the implanted system and can cause tissue damage at the location of the implanted electrodes, resulting in severe injury or death. Refer to **Appendix B: Electromagnetic interference** on page 44 for more information.



Patients with the Enterra Ascent System can safely have MRI examinations of some body parts under certain conditions. Consult your doctor if you have any questions.

Warnings

Use as indicated and instructed - Read all information available for the system. Contact Enterra Medical for issues with device or package labels. Only use products for the indicated therapy and indicated populations. The consequences of using products for uses other than indicated and instructed are unknown. No claims of safety or efficacy are made with regard to the use of products for non-indicated or non-instructed uses.

Bowel obstruction/perforation - The leads can become entangled with or erode into the bowel, which can result in bowel obstruction and perforation. Either may lead to life threatening intra-abdominal infections and may require laparotomy, bowel resection, and system revision. Avoid excess lead slack in the abdominal cavity. After the implant procedure, consider lead entanglement or erosion as a possible cause in patients with bowel obstruction symptoms.

Gastric erosion/perforation - The lead(s) can also erode through the stomach wall and result in gastric perforation. It is possible that leads can migrate through the intestinal wall into the lumen of the intestine. Patients may experience decreased therapeutic effect, increased nausea, vomiting, abdominal pain, life-threatening intra-abdominal infections, and gastrointestinal obstruction that may require laparotomy and/or system revision or removal. Patients may experience symptoms that may

be associated with high lead impedance. Post implant, consider gastric or small bowel perforation as a possible etiology for patients exhibiting these symptoms.

Electromagnetic Interference (EMI) - Electromagnetic interference is a field of energy generated by equipment found in home, work, medical or public environments that is strong enough to interfere with neurostimulator function. The Enterra Neurostimulator includes features that provide protection from electromagnetic interference. Most electrical devices and magnets encountered in a normal day are unlikely to affect the operation of a neurostimulator. However, sources of strong electromagnetic interference can result in the following:

- **Serious patient injury or death,** resulting from heating of the implanted components of the neurostimulation system and damage to surrounding tissue.
- **System damage,** resulting in a loss of or change in symptom control and requiring surgical replacement.
- **Operational changes to the neurostimulator,** causing it to turn on or off or to reset to Power-on-Reset (POR) settings, resulting in loss of stimulation, return of symptoms, and in the case of POR, potentially requiring reprogramming by a clinician.

- **Unexpected changes in stimulation,** causing a momentary increase in stimulation or intermittent stimulation, which some patients have described as a jolting or shocking sensation. Although the unexpected change in stimulation may feel uncomfortable, it does not damage the device. In rare cases, as a result of the unexpected change in stimulation, patients have fallen down and been injured.

Refer to **Table 1** (page 9) and **Appendix B: Electromagnetic interference** on page 44 for information on sources of EMI, the effect of EMI on the patient and the neurostimulation system, and instructions on how to reduce the risk from EMI.

For information on the effects of EMI on programming, refer to **Communication signal disruption from EMI** on page 17.

Table 1. Potential effects of EMI from devices or procedures

Device or procedure	Serious patient injury	Device damage	Momentary increase in stimulation	Intermittent stimulation	For guidelines
Bone growth stimulators		X	X	X	Page 51
CT scans			X		Page 46
Defibrillation/ cardioversion	X	X	X	X	Page 46
Dental drills and ultrasonic probes		X			Page 51
Diathermy, therapeutic	X	X		X	Page 44
Electrocautery	X	X			Page 47
Electrolysis		X		X	Page 51
Electromagnetic field devices: (such as arc welders and power stations)			X	X	Page 51
High-output ultrasonics		X			Page 48
Household items			X		Page 54
Laser procedures		X			Page 52
Lithotripsy		X			Page 48
Magnetic resonance imaging (MRI)	X	X	X	X	Page 5, 45, 71
Psychotherapeutic procedures		X	X	X	Page 52
Radiation therapy		X			Page 53
Radio-frequency (RF) / microwave ablation	X	X		X	Page 48
Theft detector			X	X	Page 48
Therapeutic ultrasound	X	X		X	Page 44
Transcutaneous electrical nerve stimulation (TENS)			X		Page 53

Warnings

Case damage - If the neurostimulator case is ruptured or pierced due to outside forces, severe burns could result from exposure to the battery chemicals.

Anticoagulation therapy - Patients on anticoagulation therapies may be at a greater risk for post-operative complications, such as hematomas.

Effects on other implanted devices

Neurostimulator interaction with implanted devices - When a patient's medical condition requires both a neurostimulator and an implanted device (such as another neurostimulator, pacemaker, or defibrillator), clinicians involved with both devices (such as a gastroenterologist, cardiologist, or cardiac surgeon) should discuss the possible interactions between the devices before surgery. Defibrillation therapy from an implanted defibrillator may damage the neurostimulator. The electrical pulses from the neurostimulation system may interact with the sensing operation from a cardiac device and could result in an inappropriate response of the cardiac device. To minimize or prevent device damage or device interactions, follow these recommendations:

- Implant the devices on opposite sides of the body.
- Program the neurostimulator therapy output to a bipolar configuration.

- Consider using bipolar sensing on the cardiac device.
- Check for interactions.

Careful programming and reviewing of each system's performance is necessary to ensure safe cardiac system operation with effective gastric stimulation.

Programmer interaction with other implanted devices - When a patient has a neurostimulator and another active implanted device (such as a pacemaker, defibrillator, or neurostimulator), the Radio-Frequency (RF) signal used to program these devices may reset or reprogram the other device.

To verify that inadvertent programming did not occur, clinicians familiar with each device should check the programmed parameters of each device before the patient is discharged from the hospital and after each programming session for either device (or as soon as possible after these times).

Also, inform patients to contact their physicians immediately if they experience symptoms that could be related to either device or to the medical condition treated by either device.

Precautions

Use in specific populations

Use in specific populations - The safety and effectiveness of this therapy have not been established for:

- Pregnancy, unborn fetus, or delivery.
- Pediatric use (patients under the age of 18 years).
- Patients over the age of 70.

Physician training

Implanting physicians - Implanting physicians should be experienced in laparoscopic procedures and should review the procedures described in the implant manual prior to performing surgery.

Prescribing physicians - Prescribing physicians should be experienced in the diagnosis and treatment of gastroparesis and should be familiar with using the neurostimulation system.

Packaging and sterilization

Component packaging - Visually inspect the sterile packaging for damage that may invalidate device sterility before opening and inspect the components before use. Do not implant a component if:

- The storage package has been pierced or altered. Component sterility cannot be guaranteed, and infection may occur.

- The component shows signs of damage. The component may not function properly.
- The use-by date has expired. Component sterility cannot be guaranteed and infection may occur; also, neurostimulator battery longevity may be reduced and may require early replacement.

Sterilization - Enterra Medical, Inc. has sterilized the package contents according to the process indicated on the package label before shipment. This device is for single use only and is not intended to be resterilized.

Single use - Do not reuse, reprocess, or resterilize single use products. Reusing, reprocessing, or resterilizing may compromise the functional integrity of the products and may create a risk of contamination, which could result in patient injury, illness, or death.

System implant

Compatibility, all components - Follow these guidelines when selecting system components:

- **Enterra Medical components:** For proper therapy, use only Enterra Medical Neurostimulation components that are compatible or are specified in an intended use statement (if present).

Components are compatible when the following conditions are met:

- Components have the same indication.
- For implanted components, the contact spacing and the number of electrode contacts at the connections for the lead and neurostimulator are the same.

For each product, refer to the indication insert(s) and the shipping label artwork for this information.

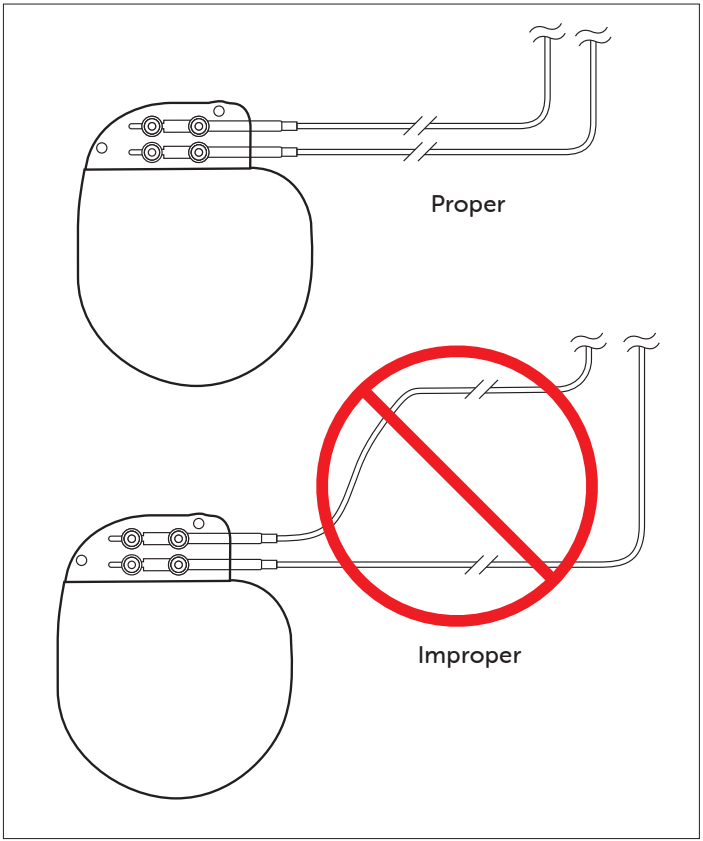
- **Non-Enterra Medical components:** No claims of safety or efficacy are made with regard to the compatibility of using non-Enterra Medical components with Enterra Medical components. Refer to the non-Enterra Medical documentation for information.

Component handling - Handle the implantable components of this system with extreme care. These components may be damaged by excessive traction or sharp instruments, which may result in intermittent stimulation or loss of stimulation, requiring surgical replacement of components.

Refer to the appropriate implant manual for additional instructions.

Routing for multiple leads - When multiple leads are implanted, route the leads such that the area between them is minimized (**Figure 1**). If the leads are routed in a loop and the patient is exposed to some sources of electromagnetic interference (such as theft detectors), the patient may feel a momentary increase in stimulation, which some patients have described as an uncomfortable jolting or shocking sensation.

Figure 1. Routing for multiple leads



Component Failures - The neurostimulation system may unexpectedly cease to function due to battery depletion or other causes. These events, which can include electrical shorts or open circuits, conductor (wire) fractures, and insulation breaches, cannot be predicted.

Patient detoxification (when applicable) - It is recommended that patients undergo detoxification from narcotics prior to undergoing a standard solid-phase gastric emptying test to confirm that they have gastroparesis; the narcotics themselves can cause nausea and delay gastric emptying. Patients who cannot reduce or stop narcotics use are less likely to respond to Enterra Therapy.

Clinician programming

Note: Ensure that the Enterra Entrust® Programmer is disconnected from the Enterra Ascent Neurostimulator prior to performing an emergency procedure.

Note: Store the tablet in a secure location when not in use.

Communication disruption from EMI - Do not attempt communication near equipment that may generate Electromagnetic Interference (EMI). If EMI disrupts programming, move the programmer away from the likely source of EMI. Examples of sources of EMI are Magnetic Resonance Imaging (MRI), lithotripsy, computer monitors, cellular telephones, X-ray equipment, and other monitoring equipment.

Patient activities

Activities requiring excessive twisting or stretching - Patients should avoid activities that may put undue stress on the implanted components of the neurostimulation system. Activities that include sudden, excessive, or repetitive bending, twisting, bouncing, or stretching can cause component fracture or dislodgement. Component fracture or dislodgement may result in loss of stimulation, intermittent stimulation, stimulation at the fracture site, and additional surgery to replace or reposition the component.

Component manipulation by patient (Twiddler's Syndrome) - Patients should avoid manipulating or rubbing the neurostimulation system through the skin. Manipulation may cause component damage, lead dislodgement, skin erosion, or stimulation at the implant site.

Scuba diving or hyperbaric chambers - Patients should not dive below 10 meters (33 feet) of water or enter hyperbaric chambers above 2.0 atmospheres absolute (ATA). Pressures below 10 meters (33 feet) of water (or above 2.0 ATA) could damage the neurostimulation system. Before diving or using a hyperbaric chamber, patients should discuss the effects of high pressure with their physician.

Skydiving, skiing, or hiking in the mountains - High altitudes should not affect the neurostimulator; however, the patient should consider the movements involved in any planned activity and take precautions to avoid putting undue stress on the implanted system.

Patients should be aware that during skydiving, the sudden jerking that occurs when the parachute opens may cause lead dislodgement or fractures, which may require surgery to repair or replace the lead.

Unexpected changes in stimulation - Electromagnetic interference, postural changes, and other activities may cause a perceived increase in stimulation, which some patients have described as uncomfortable stimulation (jolting or shocking sensation).

Hospital or medical environment

Effect on Electrocardiograms (ECGs) - Ensure that stimulation to the neurostimulator is programmed off prior to initiating an ECG. If the neurostimulator is on during an ECG, the ECG recording may be adversely affected, resulting in inaccurate ECG results. Inaccurate ECG results may lead to inappropriate treatment of the patient.

Refer to **Appendix B: Electromagnetic interference** on page 44 for information on other medical procedures that may interact with the neurostimulation system.

Component Disposal

When explanting a device (such as for a replacement, cessation of therapy, or postmortem), or when disposing of accessories, follow these guidelines:

- If possible, return the explanted device with completed paperwork to Enterra Medical, Inc. for analysis and disposal. See the back cover for the mailing address.
- To allow for device analysis, do not autoclave the device or expose the device to ultrasonic cleaners.
- Dispose of any unreturned components according to local environmental regulations; in some countries, explanting a battery-powered implantable device is mandatory.
  - Do not incinerate or cremate the neurostimulator. It may explode if subjected to these temperatures.

    Note: The implanted neurostimulator must be removed before cremation.
  - Do not reuse any implantable device or implantable accessory after exposure to body tissues or fluids because the functionality of the component cannot be guaranteed.

⚠ **Caution:** Follow appropriate biohazard controls for all explanted components or components coming into contact with bodily fluids. Only return such components to Enterra Medical, Inc. in the appropriate packaging supplied by Enterra Medical, Inc.

Individualization of treatment

Best results are achieved when the patient is fully informed of the therapy risks and benefits, surgical procedure, follow-up requirements, and self-care responsibilities.

Maximum benefits from the neurostimulation system require long-term postsurgical management and may require adjustment of stimulation parameters by the responsible physician or surgeon.

Patient selection

Select patients carefully to ensure that:

- Their symptoms are of physiological origin.
- They are appropriate candidates for surgery.

Adverse events summary

In addition to the risks associated with surgery, the following adverse events may occur from implantation or the use of a neurostimulation system for Enterra Ascent, which may necessitate reprogramming, medical treatment, or additional surgery:

- Lead impedance out of range
- Undesirable change in stimulation (described as a shocking, jolting, or tingling sensation), possibly related to cellular charges around the electrodes, shifts in electrode position, loose electrical connections, or lead fractures

- Loss of therapeutic effect
- Neurostimulation system ceases to function due to battery depletion, communication issues, or other causes
- Lead or neurostimulator erosion or migration
- Bowel obstruction, perforation, ileus, or necrosis
- Infections, including device/implant site infections, intra-abdominal infections, abscess, peritonitis, sepsis, urinary tract infections
- Stomach wall perforation
- Upper gastro-intestinal (GI) symptoms including nausea, vomiting, abdominal pain, discomfort, distention, or increased severity of gastroparesis symptoms
- Lower gastrointestinal (GI) symptoms including diarrhea and constipation
- Hemorrhage, hematoma, and possible GI complications resulting from the surgical procedure to implant the neurostimulator and leads
- Persistent pain at the neurostimulator site
- Extra-abdominal pain, bone-and joint-related pain
- Seroma at the neurostimulator site
- Allergenic or immune system response to implanted materials
- Stress incontinence
- Fever

- Feeding tube complications
- Dehydration
- Dysphagia
- Acute diabetic complications
- Cardiovascular renal related events
- Tissue damage

If a serious incident related to a patient's therapy occurs, immediately report the incident to Enterra Medical and the applicable competent authority.

Patient counseling information

Physicians should provide patients with information on:

- The components of the neurostimulation system: leads and neurostimulator.
- The indications, contraindications, warnings, and precautions for the Enterra Neurostimulation System.

Physicians should also instruct patients to:

- Always inform any health care personnel that they have an Enterra implanted neurostimulation system prior to any test or procedure.
- Contact their physician if they notice any unusual symptoms or signs.

Appendix A: Enterra Therapy clinical studies

Patients with drug-refractory gastroparesis of diabetic or idiopathic etiologies were evaluated in the following clinical studies: the World Wide Anti-Vomiting Electrical Stimulation study (WAVESS), the WAVESS Compassionate Use study (WCU), and the Compassionate Use Electrical Stimulation study (CUESS).

World Wide Anti-Vomiting Electrical Stimulation Study (WAVESS)

The WAVESS study was a double-blind, randomized cross-over study that enrolled a total of 33 subjects. The study was designed to collect both safety and effectiveness information.

WAVESS study objective

The primary endpoint of the study was a reduction in vomiting frequency, as measured by patient diaries. The treatment was considered successful if a reduction in vomiting frequency by at least 80% was observed during the cross-over period of the study with the ON-mode stimulation, when compared to the OFF-mode stimulation.

The secondary endpoints in the study were quality of life (measured with the Medical Outcomes study Short-Form 36 Health Survey), body mass index, hypoglycemic attacks

(diabetic group only), subjective symptoms documented by a clinical status interview, glycosylated hemoglobin, and gastric emptying documented with a gastric emptying test.

WAVESS entry criteria

The inclusion criteria for the study included:

- Symptomatic gastroparesis ≥1 year, as documented by an initial Gastric Emptying Test (GET)
- Refractory or intolerant to at least two antiemetic and two prokinetic drug classes
- On stable medical therapy, and, if applicable, stable nutritional support during the month prior to enrollment
- Frequency of vomiting >7 vomiting episodes per week, as documented with a baseline patient diary.
- Delayed gastric emptying, defined by greater than 60% retention at two hours and >10% retention at four hours, as measured by standardized gastric emptying testing.

The exclusion criteria included:

- Organ transplant
- Organic obstruction
- Pseudo-obstruction
- Prior gastric surgery
- Scleroderma
- Amyloidosis
- History of seizures
- Peritoneal or unstable dialysis
- Chemical dependency
- Pregnancy
- Primary eating or swallowing disorders
- Psychogenic vomiting
- Implanted electronic medical devices
- Age <18 or >70 years

WAVESS study enrollment

Enrollment and follow-up in the WAVESS study were as follows:

Table 2. Enrollment in WAVESS study

Number of subjects	At enrollment	Implanted >30 days	Implanted >60 days	Implanted >6 months	Implanted >12 months
(N)	33	33	33	27	24

WAVESS study demographics

A total of 33 subjects were enrolled in the WAVESS study. The demographic information on these subjects is presented in **Table 3**.

Table 3. WAVESS study patient demographics

	Diabetic (N=17)	Idiopathic (N=16)	Total (N=33)
Gender (M/F)	9/8 F	0/16 F	9/24 F
Age, mean	38.1	41.1	39.6
BMI, mean	24.7	22.9	23.7
Gastric retention (mean/median)%			
@2 hours	79.7/80.0	73.1/76.5	76.5/78.0
@4 hours	53.2/51.0	34.3/28.0	44.0/34.0

WAVESS study design

Subjects satisfying entry criteria received gastric stimulation systems that included an implanted neurostimulator connected to two unipolar leads that were implanted in the muscle wall of the stomach on the greater curvature at the limit of the corpus-antrum. All subjects received a model 7425 implantable neurostimulator and a pair of model 4300[1] leads.

The stimulation parameters used in the study were: Intensity: 5 mA, Pulse Width: 330 µsec, Frequency: 14 Hz. The neurostimulator was set to deliver a pair of pulses at these parameters every five seconds continuously 24 hours per day.

The study was conducted in two phases:

1. Phase I was a double-blind crossover study with evaluations prior to implant and at 30 days and 60 days post-implant. Subjects were randomly assigned to stimulation on and off for the first month after implant and were crossed to off and on for the second month. Subjects were blinded as to which stimulation sequence they received.
2. Phase II was an unblinded open label study with follow-up at six and twelve months. After the crossover period was complete, the subjects were asked which month of the crossover stimulation they preferred. After the selection was made, the study blind was broken. The subjects then received stimulation (on or off) consistent with their preference.

The primary and the secondary endpoints, except gastric emptying, were measured at baseline, 30 days, 60 days, six months, and twelve months postrandomization. Gastric emptying was measured at baseline, and six and twelve months postrandomization.

Primary endpoint evaluations included weekly vomiting frequency and patient preference within Phase I of the study. Secondary endpoint evaluations included gastric retention, hypoglycemic attacks, upper GI symptoms, and quality of life using the Medical Outcomes Study Short-Form 36 Health Survey.

[1] The model 7425G neurostimulator is identical to the model 7425 neurostimulator used in the clinical study. The model 4351 lead is similar to the model 4300 lead used in the clinical study. The model 4351 lead has a fixed electrode length of 10 mm, whereas the model 4300 lead had an adjustable electrode length.

WAVESS Compassionate Use study (WCU)

In contrast to the WAVESS study design, the WCU study was an unblinded, open label study. Upon implantation of the device within each patient, the stimulation therapy was immediately initiated without a randomized on/off cross-over period.

The WAVESS Compassionate Use study (WCU) was an open label, non-randomized study that included a total of 18 subjects. The WCU study was designed to provide safety (adverse events) information on gastric stimulation.

WCU study objective

The purpose of the WCU study was to provide treatment for patients and to evaluate adverse events of patients with drug-refractory gastroparesis who did not meet the entry criteria of the WAVESS study.

WCU entry criteria

Candidates eligible for the WCU study consisted of those subjects who did not meet the complete entry criteria for the WAVESS study, but who had documentation of drug refractory gastroparesis.

The study entry criteria:

- Did not meet the entry criteria of the WAVESS study
- Were likely to die within the next few weeks if they did not receive this therapy

- Signed an informed consent form relevant to this study

This WAVESS Compassionate Use study required:

- Documentation of life-threatening situation by an independent physician
- IRB (or IRB chairperson) approval on a case-by-case basis
- An additional informed consent form relevant to the applicable patient's condition was approved by the clinical investigator and the IRB or IRB chairperson (this varied depending on the reason(s) that the patient did not qualify for the WAVESS study)

WCU study demographics

A total of 24 subjects were enrolled in the WCU study. The demographic information on these subjects is presented in Table 4 on page 32.

Table 4. WCU study patient demographics

	Diabetic	Idiopathic	Post-surgical
(N)	6	17	1
Gender (M/F)	1M / 5F	17 F	1 F
Age, mean	36.4	35.7	69.0
BMI, mean	20.5	23.1	18.4
Baseline:			
Vomiting severity (mean)	3.5	3.6	4.0
Nausea severity (mean)	3.3	3.6	4.0
GET 2 Hr (median)	74.0	67.0	18.0
GET 4 Hr (median)	34.0	22.0	2.0

WCU study design

Subjects satisfying entry criteria received gastric stimulation systems which included an implanted neurostimulator connected to two unipolar leads which were implanted in the muscle wall of the stomach on the greater curvature at the limit of the corpus-antrum. All subjects received a model 7425 implantable neurostimulator and a pair of model 4300 leads. The stimulation parameters used in the study were: Intensity: 5 mA, Pulse Width: 330 µsec, Frequency: 14 Hz. The neurostimulator was set to deliver a pair of pulses at these parameters every five seconds continuously 24 hours per day. The stimulation parameters could be adjusted at any time by the physician to optimize treatment therapy.

Compassionate Use Electrical Stimulation Study (CUESS)

The Compassionate Use Electrical Stimulation Study was an open label, non-randomized study that included a total of 51 subjects. This study was designed to provide gastric stimulation safety information.

CUESS study objective

The purpose of the Compassionate Use Electrical Stimulation Study was to treat patients with drug-refractory gastroparesis who had no other medical treatment alternative.

CUESS entry criteria

The inclusion criteria for the study were:

- Symptomatic gastroparesis ≥1 year, as documented by an initial gastric emptying test (GET)
- Refractory or intolerant to at least two antiemetic and prokinetic drug classes
- On stable medical therapy during the month prior to enrollment

- Frequency of vomiting >7 vomiting or nausea episodes per week, as documented with a baseline patient diary
- Delayed gastric emptying, defined by greater than 50% retention at two hours and >6% retention at four hours, as measured by standardized gastric emptying testing

The exclusion criteria were:

- Organ transplant
- Organic obstruction
- Pseudo-obstruction
- Scleroderma
- Amyloidosis
- Peritoneal or unstable dialysis
- Chemical dependency
- Pregnancy
- Primary eating or swallowing disorders
- Psychogenic vomiting
- Implanted electronic medical devices
- Age <18 or >70 years

CUESS study demographics

A total of 50 subjects were enrolled, screened, and qualified in the Compassionate Use Electrical Stimulation Study. The demographic information on these subjects is presented in **Table 5**.

Table 5. CUESS study patient demographics

	Diabetic	Idiopathic	Post-surgical[a]
(N)	22	19	9
Gender (M/F)	10 / 12 F	1 / 18 F	1 / 8 F
Age, mean	39.8	44.5	48.8
BMI, mean	23.5	22.4	23.5
Gastric retention (median)%			
@ 2 hours	79.5	51.0	73.5
@ 4 hours	39.5	21.0	33.5

[a] Enterra Therapy System is not indicated for postsurgical gastroparesis

CUESS study design

Subjects satisfying entry criteria received gastric stimulation systems which included an implanted neurostimulator connected to two unipolar leads which were implanted in the muscle wall of the stomach on the greater curvature at the limit of the corpus-antrum. All subjects received a model 7425 implantable neurostimulator and a pair of model 4300 leads.

The stimulation parameters used in the study were: Intensity: 5 mA, Pulse Width: 330 µsec, Frequency: 14 Hz. The neurostimulator was set to deliver a pair of pulses at these parameters every five seconds continuously 24 hours per day.

The stimulation parameters could be adjusted at any time by the physician to optimize treatment therapy. In contrast to the WAVESS study design, Compassionate Use Electrical Stimulation Study was an unblinded open label study. Upon implantation of the device within each patient, the stimulation therapy was immediately initiated without a randomized on/off crossover period.

WAVESS results

The effectiveness results described below were obtained from the WAVESS study.

Primary endpoint evaluations

Weekly vomiting frequency was determined for each patient diary. These data were further analyzed by Wilcoxon signed-rank test. For the combined patient group, median weekly vomiting frequency declined 49.6% in the on period vs. the off period ($p<0.05$), see **Table 6**. Before breaking the blind at the end of Phase I, 21 patients (10 diabetic, 11 idiopathic) preferred stimulation on, while 7 (4 diabetic and 3 idiopathic) preferred stimulation off, and 5 (3 diabetic and 2 idiopathic) had no preference.

These results were analyzed by the Mainland-Gart test and were statistically significant for the idiopathic and the combined group ($p <0.05$). At the end of Phase I, subjects were unblinded and given the option of having the device programmed on or off. At the six-month follow-up, all subjects had the device programmed on. Each patient had the option of having stimulation turned off or on at any time during the Phase II period.

Although 33 patients completed the two-month crossover period of the study (through Phase I), data at six months is provided for only 27 patients. Of these 27 patients, some patients had the device turned to the on mode immediately at the end of the Phase I period, while others had the device turned on later. By the end of the fourth month postrandomization, all 27 patients had the device turned on. As a result, the vomiting frequency at six months was obtained from patients who received continuous stimulation for at least two months, see **Table 9**.

Vomiting frequency results at 6- and 12-months post-implantation are shown in **Table 7**, **Table 8**, and **Table 9**. **Table 7** includes data for all subjects, while **Table 8** and **Table 9** include data for the idiopathic and diabetic gastroparesis groups, respectively. The vomiting frequency at 6 and 12 months was significant compared to baseline.

Appendix A: Enterra Therapy clinical studies

Table 6. Vomiting frequency, WAVESS phase I, all subjects (N=33)

Vomiting episodes per week	Baseline	On	Off	Difference (off-on)	% difference
Mean (N ± SD)	37.3 ± 45.1	15.9 ± 25.0	23.6 ± 35.6	7.7	32.6
Median (N)	17.3	6.8	13.5	6.7	49.6

Table 7. Vomiting frequency, WAVESS phase II, all subjects

All patients combined	Baseline	6 months	% difference	Baseline	12 months	% difference
(N)	33	27	—	33	24	—
Mean number of episodes ± SD	37.3±45.1	13.7±30.2	-63	37.3±45.1	8.5±16.3	-77
Median number of episodes	17.3	2.6	-85	17.3	4.8	-72
Patients with >50% vomiting reduction vs baseline, N(%)	—	16/27 (59)	—	—	18/24 (75)	—
Patients with >80% vomiting reduction vs baseline, N(%)	—	13/27 (48)	—	—	13/24 (54)	—

Table 8. Vomiting frequency, WAVESS phase II, idiopathic gastroparesis subjects

All patients combined	Baseline	6 months	% difference	Baseline	12 months	% difference
(N)	16	14	—	16	13	—
Mean number of episodes ± SD	44.3±55.5	12.1±25.1	-73	43.3±55.5	11.8±21.2	-73
Median number of episodes	26.8	3.0	-88	26.8	4.5	-83
Patients with >50% vomiting reduction vs baseline, N(%)	—	9/14 (64)	—	—	10/13 (77)	—
Patients with >80% vomiting reduction vs baseline, N(%)	—	8/14 (57)	—	—	7/13 (54)	—

Appendix A: Enterra Therapy clinical studies

Table 9. Vomiting frequency, WAVESS phase II, diabetic gastroparesis subjects

All patients combined	Baseline	6 months	% difference	Baseline	12 months	% difference
(N)	16	13	—	16	11	—
Mean number of episodes ± SD	30.3±31.9	15.7±36.4	-48	30.3±31.9	4.2±3.9	-87
Median number of episodes	13.4	2.6	-80	13.4	4.9	-63
Patients with >50% vomiting reduction vs baseline, N(%)	—	7/12 (58)	—	—	8/11 (73)	—
Patients with >80% vomiting reduction vs baseline, N(%)	—	5/12 (42)	—	—	6/11 (55)	—

WAVESS secondary endpoint evaluations

The results of secondary endpoint evaluations indicate that many patients experienced improvements in quality of life (73%) and ability to tolerate solid meals (73%).

Additionally, there was a trend in improvement for gastric retention, subjective symptoms, and hypoglycemic attacks.

Adverse events

The adverse events information (**Table 10**) was obtained from the WAVESS study (N=27), the WAVESS Compassionate Use study (N=24), and the CUESS study (N=49). Adverse events were reported at each follow-up visit or at interim periods as appropriate in both studies. **Table 10** summarizes those system related adverse events reported through May 22, 2003.

Table 10. Summary study of system related adverse events[a]

Event description	WAVESS N=27			WAVESS compassionate use N=24			CUESS N=49		
	Events	Patients	% of patients	Events	Patients	% of patients	Events	Patients	% of patients
Device infections	10	7	26	4	4	17	5	5	10
Device erosion	1	1	4	0	0	0	0	0	0
Extrusion of neurostimulator through incision	1	1	4	0	0	0	0	0	0
Hematoma at pocket	1	1	4	0	0	0	1	1	2
Infection in wound incision/abdominal wall	1	1	4	0	0	0	0	0	0
Neurostimulator migration	1	1	4	2	1	4	1	1	2
Lead penetration	4	4	15	1	1	4	0	0	0
Lead revision	1	1	4	0	0	0	0	0	0
Lead impedance out of range	3	3	11	5	5	21	3	2	4
Irritation/inflammation over neurostimulator site	5	4	15	5	5	21	3	2	4
Pain at neurostimulator site	5	4	15	0	0	0	2	2	4
Concomitant stimulation of abdominal rectus muscle	1	1	4	0	0	0	2	2	4
Seroma at pocket	2	2	7	1	1	4	0	0	0
Surgical removal of system due to discomfort	0	0	0	2	2	8	0	0	0
Inability to program device/ programming difficulty	0	0	0	1	1	4	1	1	2
Tingling sensation	0	0	0	1	1	4	0	0	0
Failure of wound healing	0	0	0	0	0	0	1	1	2
Extra-abdominal pain	0	0	0	0	0	0	4	4	8
Epigastric pain	0	0	0	0	0	0	1	1	2
Surgical removal of IV access	0	0	0	0	0	0	1	1	2
Electrical shocks with discomfort	0	0	0	0	0	0	1	1	2
Patient "can't eat as well as before therapy"	0	0	0	0	0	0	1	1	2
Left side nerve rib pain	0	0	0	0	0	0	1	1	2
Uncomfortable neurostimulator location	0	0	0	0	0	0	2	2	4
Fluid collection at neurostimulator site with erythema over RLQ	0	0	0	0	0	0	1	1	2

[a] Refer to the notes following this table for more information.

Adverse event table notes

The decline in the rate of device-related adverse events from the WAVESS to the CUESS protocols may be related to several factors:

- During patient enrollment in the WAVESS study, the protocol was modified to require intraoperative endoscopy to ensure that neither stimulating lead perforated the stomach.
- During the WAVESS study, the physicians were encouraged to administer perioperative antibiotics to minimize the potential for infections at the implant site.
- At one center, the majority of the 39 total cases implanted in the three protocols were done by one surgeon, and 4 infections (10.3%) were reported.
- At another center, 11 systems were implanted in the three protocols and 5 infections (45.5%) were reported. All implant procedures in the WAVESS study and WAVESS Compassionate Use study were done by laparotomy, whereas 5 (10.2%) of the 49 in CUESS were done by laparoscopy.

CUESS (N=49): Two diabetic patients who were implanted but did not qualify for the CUESS protocol were excluded from this summary table.

Appendix B: Electromagnetic interference

Please review **Electromagnetic Interference (EMI) Warnings** on page 7 and **Table 1. Potential effects of EMI from devices or procedures** on page 9.

Prior to any medical procedure, patients should always inform any health care personnel that they have an implanted neurostimulation system. The potential for the following effects results from an interaction among the neurostimulation system and other components or equipment—even when both are working properly.

Contraindications

The Enterra Ascent System is contraindicated in patients if their doctor determines they are not candidates for the Enterra surgical procedures and/or anesthesia because of physical or mental conditions.

After implantation of any system component, the following contraindications apply:

Diathermy - Do not use shortwave diathermy, microwave diathermy or therapeutic ultrasound diathermy (all now referred to as diathermy) on patients implanted with a neurostimulation system. Energy from diathermy can be transferred through the implanted system and can cause tissue damage at the location of the implanted electrodes, resulting in severe injury or death.

Diathermy can also damage the neurostimulation system components, resulting in loss of therapy and requiring additional surgery for system removal and replacement. Advise your patient to inform all their health care professionals that they should not be exposed to diathermy treatment.

Injury to the patient or damage to the device can occur during diathermy treatment when:

- The neurostimulation system is turned on or off.
- Diathermy is used anywhere on the body—not just at the location of the neurostimulation system.
- Diathermy delivers heat or no heat.
- Any component of the neurostimulation system (lead or neurostimulator) remains in the body.



Patients with the Enterra Ascent System can safely have MRI examinations of some body parts under certain conditions. Consult your doctor if you have any questions.

Warnings

EMI from the following medical procedures or equipment may damage the device, interfere with device operation, or cause harm to the patient. If the following procedures are required, follow the guidelines below:

CT scans - Prior to the patient undergoing a CT scan, turn the neurostimulator off. If these guidelines are not followed, the patient may experience a momentary increase in stimulation, which some patients have described as an uncomfortable jolting or shocking sensation.

Defibrillation or cardioversion - If a patient develops ventricular or atrial dysrhythmias, the first consideration is to correct the cardiac dysrhythmia. External defibrillation or cardioversion can damage the Enterra Neurostimulation System and cause induced currents in the lead portion of the neurostimulation system that can injure the patient. To minimize the current flowing through the neurostimulation system, follow these guidelines:

- Position defibrillation paddles as far from the neurostimulator as possible.
- Position defibrillation paddles perpendicular to the neurostimulation system.
- Use the lowest clinically appropriate energy output (watt seconds).

After defibrillation, confirm that the neurostimulation system is functioning as intended.

Electrocautery - If electrocautery is used near an implanted device, or contacts a device or insertion needle, the following effects may occur:

- The tissue surrounding the insertion-needle (during placement of a percutaneous lead) may be damaged.
- The insulation on the lead may be damaged, resulting in component failure, or induced currents into the patient that may damage tissue, or stimulate or shock the patient.
- The neurostimulator may be damaged, output may be temporarily suppressed or increased, or stimulation may stop because parameters were changed to power-on reset settings (output off or amplitude 0.0 ma).

When electrocautery is necessary, follow these precautions:

- Before using electrocautery, turn off the neurostimulator.
- Disconnect any cable connecting the lead to a screener or external neurostimulator.
- Use only bipolar cautery.

- If unipolar cautery is necessary:
  - Use only a low-voltage mode.
  - Use the lowest possible power setting.
  - Keep the current path (ground plate) as far from the neurostimulator and lead as possible.
  - Do not use full-length operating room table grounding pads.
- After using electrocautery, confirm that the neurostimulator is functioning as intended.

High-output ultrasonics - Use of high-output ultrasonic devices is not recommended for patients who have an implanted neurostimulation system. If high-output ultrasonics must be used, do not focus the beam within 15 cm (6 in) of the neurostimulator.

Lithotripsy - Safety has not been established. Lithotripsy is not recommended for patients with an implanted neurostimulation system. If lithotripsy must be used, do not focus the beam on the neurostimulator. Doing so may damage the device.

Radio-frequency or microwave ablation - Safety has not been established for Radio Frequency (RF) or microwave ablation in patients who have an implanted neurostimulation system. Induced electrical currents may cause device heating that could result in tissue damage.

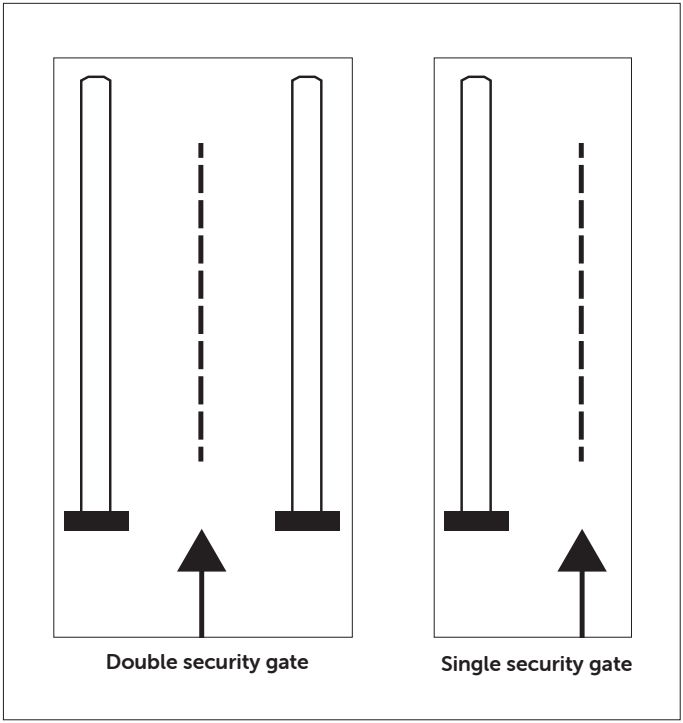
Theft detectors and security screening devices - Advise patients to use care when approaching theft detector and security screening devices (such as those found in airports, libraries, and some department stores). When approaching

these devices, patients should do the following:

1. If possible, patients should request to bypass these devices. Patients should show the security personnel their Enterra patient identification card for the neurostimulator and request a manual search. Security personnel may use a handheld security wand but patients should ask the security personnel not to hold the security wand near the neurostimulator any longer than is absolutely necessary. Patients may wish to ask for another form of personal search.
2. If patients must pass through the theft detector or security screening device, they should approach the center of the device and walk through normally (**Figure 2**).
    a. If two security gates are present, they should walk through the middle, keeping as far from each gate as possible.
    b. If one gate is present, they should walk as far from it as possible.

    Note: Some theft detectors may not be visible.
3. Patients should proceed through the security screening device. They should not linger near or lean on the security screening device.

Figure 2. Approaching security gates



Precautions

EMI from the following equipment is unlikely to affect the neurostimulation system if the guidelines below are followed:

Bone growth stimulators - Keep external magnetic field bone growth stimulator coils away from the neurostimulation system. When using either an implanted or external bone growth stimulator, ensure that both the bone stimulator and neurostimulator are working as intended.

Dental drills and ultrasonic probes - Keep the drill or probe 15 cm (6 in) away from the neurostimulator.

Electrolysis - Turn off the neurostimulator. Keep the electrolysis wand away from the neurostimulator.

Electromagnetic field devices - Patients should exercise care or avoid the following equipment or environments:

- Antenna of citizens band (CB) radio or ham radio
- Electric arc welding equipment
- Electric induction heaters used in industry to bend plastic
- Electric steel furnaces
- High-power amateur transmitters
- High-voltage areas (safe if outside the fenced area)
- Linear power amplifiers
- Magnetic degaussing equipment

- Magnets or other equipment that generates strong magnetic fields
- Microwave communication transmitters (safe if outside the fenced area)
- Perfusion systems
- Resistance welders
- Television and radio transmitting towers (safe if outside the fenced area)

If patients suspect that equipment is interfering with neurostimulator function, they should do the following:

1. Move away from the equipment or object.
2. If possible, turn off the equipment or object.
3. Inform the equipment owner or operator of the occurrence.

If the above actions do not resolve the effects of the interference, or if the patients suspect that their therapy is not effective after exposure to EMI, they should contact their physician.

Laser procedures - Turn off the neurostimulator. Keep the laser directed away from the neurostimulation system.

Psychotherapeutic procedures - Safety has not been established for psychotherapeutic procedures using equipment that generates electromagnetic interference

(therapies such as electroconvulsive therapy and transcranial magnetic stimulation) in patients who have an implanted neurostimulation system. Induced electrical currents may cause heating, especially at the lead electrode site, resulting in tissue damage.

Radiation therapy - High-radiation sources should not be directed at the neurostimulator. High-radiation exposure may temporarily interfere with neurostimulator operation and may damage the neurostimulator. Damage may not be immediately apparent. To limit device exposure, use appropriate shielding or other measures, such as making beam angle adjustments to avoid the device.

Transcutaneous Electrical Nerve Stimulation (TENS) - Do not place transcutaneous electrical nerve stimulation electrodes so that the TENS current passes over any part of the neurostimulation system. If patients feel that the TENS may be interfering with the implanted neurostimulator, patients should discontinue using the TENS until they talk with their doctor.

Notes

Household items - Most household appliances and equipment that are working properly and grounded properly will not interfere with the neurostimulation system. The following equipment is generally safe if patients follow these guidelines:

- **Induction range:** Keep the neurostimulator away from the burners while the burners are turned on.
- **Power tools:** Keep the motor away from the neurostimulator and lead.

Other medical procedures - EMI from the following medical procedures is unlikely to affect the neurostimulation system:

- Diagnostic ultrasound (such as carotid scans and doppler studies).
  Note: To minimize potential image distortion, turn off the neurostimulator and keep the transducer 15 cm (6 in) away from the neurostimulation system.
- Diagnostic X-rays or fluoroscopy

Notes:

- To minimize potential image distortion, turn off the neurostimulator.
- Strong pressure on the neurostimulator or tissue around it, such as those applied during mammography, may damage the neurostimulator or disconnect the neurostimulation system components, which may require surgery to reconnect or replace components. During X-ray procedures that require external compression around implanted components, the X-ray equipment should be adjusted to limit the amount of pressure exerted on the neurostimulator.

- Magnetoencephalography (MEG).
- Positron Emission Tomography (PET) scans.

Appendix C: Electromagnetic compatibility declaration

The Model 10102 IPG contains RF transmission and receiving capabilities; consequently, it is possible that other portable and mobile RF communications equipment may interfere with the IPG communication. The IPG is compliant with applicable clauses of the following standards:

2014/30/EU - Harmonisation of the laws of the Member States relating to electromagnetic compatibility

2014/53/EU - Radio equipment directive (RED)

AIM 7351731 - Medical electrical equipment and system electromagnetic immunity test for exposure to radio frequency identification readers

ANSI C63.27 - American national standard for evaluation of wireless coexistence

RTCA-DO-160G - environmental conditions and test procedures for airborne equipment - Category M, Section 21

ETSI EN 300 328 - Wideband transmission systems; data transmission equipment operating in the 2.4 GHz band; harmonised standard for access to radio spectrum

ETSI EN 301 489-1 - Electromagnetic compatibility standard for radio equipment and services; Part 1: Common technical requirements; harmonized standard for electromagnetic compatibility

ETSI EN 301 489-17 - Electromagnetic compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for broadband data transmission systems; harmonised standard for electromagnetic compatibility

FCC 47CFR15.247 - Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

IEC 60601-1-2 - Medical electrical equipment - Part 1-2: General requirements for basic safety and essential performance - collateral standard: electromagnetic compatibility - requirements and tests

IEC TS 60601-4-2 - Medical electrical equipment - Part 4-2: Guidance and interpretation - electromagnetic immunity: performance of medical electrical equipment and medical electrical systems

ISO 14708-3 - Wireless coexistence and wireless quality of service, clauses 5.101 and 27

Wireless Specifications and Safety

The Model 10102 IPG incorporates Bluetooth® LE wireless technology to enable secure communication with the Enterra Entrust® Clinician Programmer. The wireless interface supports device programming, monitoring, and bidirectional data exchange required for normal device operation. The Bluetooth LE communicates at 2.4 GHz Industrial, Scientific, and Medical (ISM) band. The effective radiated power is below the limits as specified in FCC 47 CFR Part 15. The system is designed for short-range

operations typical of implantable medical devices. Wireless performance may vary depending on patient anatomy, implant depth, external device positioning, and surrounding electromagnetic conditions.

Refer to the Samsung tablet resources available at https://www.samsung.com/hk_en/support/model/SM-X110NZAATGY/#downloads for compliance with the limits for a Class B digital device.

RF Wireless Characteristics

- Wireless technology: Bluetooth Low Energy
- Operating frequency band: 2.4 GHz ISM band
- Modulation: Gaussian Frequency - Shift Keying (GFSK)
- Maximum RF radiated power output: –3.1 dBm
- Typical operating range: approximately 0.1 m to 1.5 m
- Maximum implant depth: up to 4 cm from the body surface

Performance outside these conditions may be reduced.

Wireless Pairing and Access Control

Wireless communication with the implant is restricted to authorized Enterra Entrust Programmers that have been securely paired with the device. Pairing uses device-specific authentication and encrypted communication to prevent unauthorized access.

Unpaired or unauthorized wireless devices cannot establish a connection with the implant. Security measures are designed to protect patient data integrity and confidentiality and to reduce the risk of unintended device interactions.

There is no guarantee that interference will not occur in a particular situation. If interference occurs, the user is encouraged to try to correct the interference by reorienting or relocating the clinician programmer or increasing the separation between the clinician programmer and other electronic equipment

Interference and Coexistence - The Model 10102 IPG is compliant with FCC's coexistence requirements and has been verified to meet applicable requirements of ANSI C63.27-2021.The FCC requires coexistence testing to ensure wireless devices and systems operating in the same or adjacent frequency bands can function without causing harmful interference to one another.

Because Bluetooth LE operates in the 2.4 GHz ISM band, wireless communication may be affected by nearby radiofrequency (RF) sources, including Wi-Fi® routers, other Bluetooth devices, cellular phones, microwave ovens, or other consumer and medical electronics operating in the same frequency range.

To reduce the likelihood of wireless communication issues:

- Position the Enterra Entrust Programmer as close as practical to the implant site.

- Minimize the presence of nearby active 2.4 GHz wireless devices during communication sessions.
- Avoid placing the programmer near strong RF emitters or sources of electromagnetic interference.

Wireless Performance Limitations - Wireless communication is disabled when the Enterra Entrust Programmer is outside the effective operating range. Temporary loss or degradation of wireless communication does not affect the implant's primary therapeutic function.

If wireless communication cannot be established or is interrupted, reposition the external programmer and reduce nearby wireless interference sources before attempting reconnection.

Bluetooth Wireless Technology - Bluetooth wireless technology is a wideband transmission system operating in the 2.4 to 2.4835 GHz ISM band and using wide band modulation techniques. It is used between the clinician programmer and the IPG. The system uses forward error correction (FEC) on data packets, frequency hopping spread spectrum (FHSS), which aids in spectral co-existence, and a reliable data stream profile. Interrupted or partial messages are invalid and must be resent. If communication errors are detected, the system will automatically retransmit the interrupted message to guarantee delivery of the message. If the wireless connection does not automatically re-establish itself, the user should reposition the clinician programmer to re-establish communication.

Appendix D: Enterra Ascent Neurostimulator model 10102 communications regulations

The following communications regulations apply to the model 10102.

United States Compliance

FCC ID: 2BH4M-10102

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT: Changes or modifications to this product not authorized by Enterra Medical, Inc., could void the FCC Certification and negate your authority to operate this product.

FCC Interference Statement (Part 15.105 (b))

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

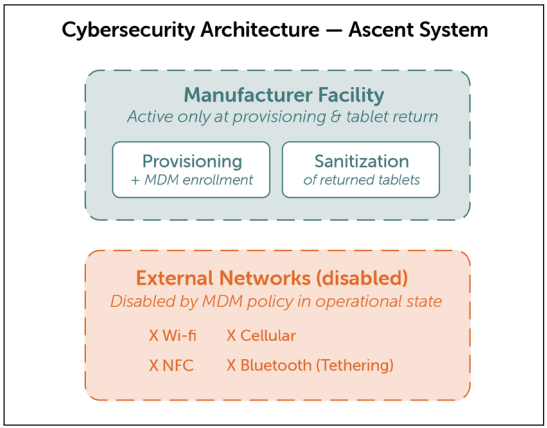
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Appendix E: Cybersecurity

This chapter describes the cybersecurity posture of the Ascent system, which consists of the Ascent Implantable Pulse Generator and the Entrust Programming Software. A separate Detailed Security Documentation is available to operating organizations upon request to info@enterramedical.com or by calling 1-855-768-3772. The Detailed Security Documentation contains deeper technical specifics including architectural views, security controls, and device management policy details.

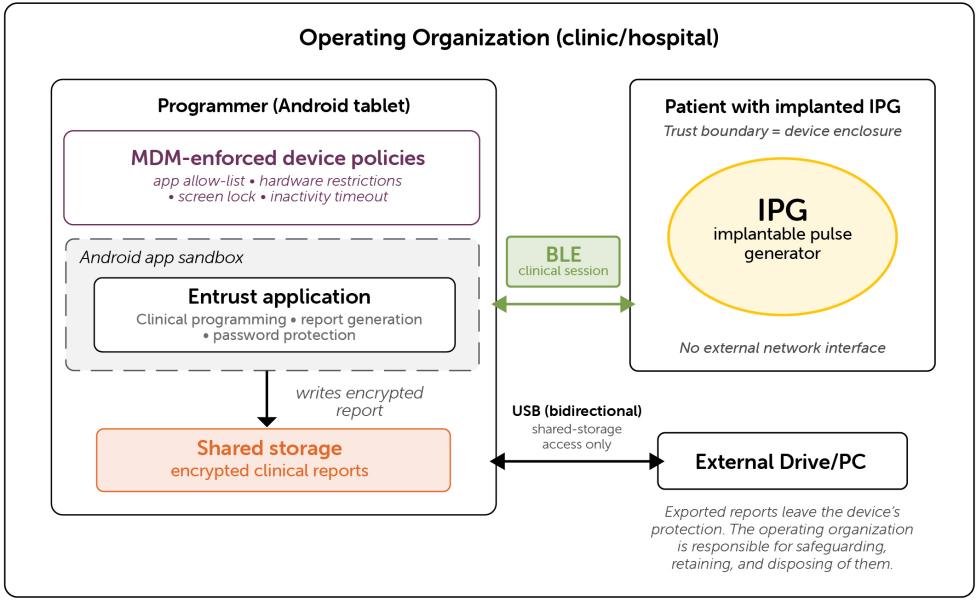
Intended use environment and recommended cybersecurity controls

Connectivity model



Appendix E: Cybersecurity

Operational State



Legend: active operational link — — — — active only outside operational state X disabled by MDM policy

The system ships as a **closed clinical system**. The programmer is fully provisioned by the manufacturer at the factory before shipment. Once in the user's hands, no inbound or outbound network connectivity is required or permitted for clinical operation. The Mobile Device Management (MDM) profile applied during provisioning explicitly disables Wi-Fi, cellular, Bluetooth tethering, and NFC paths to all external endpoints, including the MDM itself.

USB is enabled for export of password-protected clinical reports to portable media (typically a thumb drive). It is the only data-bearing interface in operational state outside the IPG programmer wireless clinical session. The report is generated and password-protected by the Entrust application within the Android app sandbox, written to the programmer's shared storage, and then exported via USB to portable media or a workstation.

Recommended Organizational Controls

The user's organization does not need to provide network infrastructure, firewall rules, or anti-malware software on the programmer host. The programmer is not a general-purpose, connected Android device.

Operating-state security depends primarily on **physical control** of the programmer and on the **MDM-enforced lockdown** baked into the device at provisioning time.

Control	Required / Recommended	Notes
Physical security of the programmer when not in clinical use	Required	Locked storage; controlled access. The programmer is the only path to reconfigure or interrogate the IPG.
Line-of-sight control during programming sessions	Required	The wireless link between programmer and IPG is short-range and proximity-gated; controlling the physical environment prevents unauthorized in-range attempts.
Password-protected handling of exported clinical reports (see Exported clinical reports below)	Required	Reports are exported as password-protected files; the password is configured in the Entrust application on the programmer. Treat the report password as protected a clinical record.

Programmer Passcode

The programmer is **shipped without a login passcode set**. This is a deliberate design choice to preserve emergency device accessibility: in an emergency interrogation or reprogramming scenario, no clinician should be locked out of the programmer by a forgotten or unavailable credential. This default-no-passcode posture is offset by:

- MDM controls prevent the programmer from being used as a general-purpose device even when unlocked.
- Cryptographic protection on exported reports (see Exported clinical reports below), so that even an unlocked programmer does not expose previously generated clinical reports in plaintext.

Ports and interfaces

Interface	Component	Function	Protocol/ Spec	Notes
Bluetooth® LE Bidirectional	IPG, Programmer	Clinical session: interrogation, programming, telemetry	BLE 5.1 with application-layer protocol	Paired Programmer only
USB Bidirectional	Programmer	Charging; Sharing password-protected clinical reports.	USB 2.0 Type-C Power + Data Mode	Clinic Managed, Charger, External Media, or Workstation

Additional Security Controls

Entrust Programmer Security Controls are manufacturer-managed via the MDM profile applied at provisioning and are not user-configurable. The user's organization does not need to install anti-malware or maintain firewall rules on the programmer; doing so is not supported and could interfere with MDM-enforced policy if allowed. The specific settings enforced by the MDM bundle are documented in the Detailed Security Documentation.

Coordinated Vulnerability Disclosure

When a vulnerability patch or fix is ready for release, the company will disclose it by releasing an advisory to affected stakeholders. The disclosure information shall be published on the company website and provided directly to known users. In the event of a critical update, users are directly notified via email or phone.

In the event of a Coordinated Vulnerability Disclosure, the following is communicated:

- Overview of the identified vulnerability, its nature, potential impact, affected devices and SW versions.
- Actions recommended to mitigate the vulnerability, including details on software updates, patches, or other remediation measures.
- Risk assessment of vulnerability, outlining the potential risks to patient safety, data integrity, and overall device functionality if any.

Configuration, Backup and Update Processes

Software integration is not available as the device cannot be connected to a local network. As stated above, all device configuration is performed during provisioning prior to deliver to user. Backup, update, and restore processes shall only be performed by company technicians unless specific instructions are provided as part of a Coordinated Vulnerability Disclosure.

Software Bill of Materials (SBOM), Architecture and Ports

The Software Bill of Materials (SBOM) is available in machine-readable format. Architectural diagrams and port configurations are also available. Any of these may be requested by contacting **info@enterramedical.com** or by calling 1-855-768-3772.

End of Life

At the end of support, the company may no longer be able to reasonably provide security patches or software updates. If the device needs to remain in service following the end of support, the company will communicate through the coordinated vulnerability disclosure the potential cybersecurity risks that can be expected to increase over time in addition to the sanitization process

Retired programmers are returned to the manufacturer for sanitization. The user's organization should not sanitize them locally, though could do so by doing a full device reset. **WARNING: A FULL DEVICE RESET WILL ERASE ALL DATA AND APPLICATIONS AND CANNOT BE RESTORED BY USER**. Explanted IPGs are returned under the device-return process. Any user held reports and external media are the responsibility of the user's organization. If user media is returned to Enterra Medical they will be sanitized in accordance with the Enterra's information-security and records-retention policies.

Event Detection and Response

The IPG and the programmer each record device usage and anomalies to their own encrypted logs. User-actionable events, such as an authentication lockout, are shown on-screen on the programmer at the time of detection.

There are known software anomalies that you may encounter during use. These are expected and do not affect the function of the Enterra Entrust programmer or the programming outcomes or workflow of the Enterra Ascent neurostimulator.

If an issue is suspected, contact your local Enterra Medical representative. The programmer can consolidate its own logs and the IPG's logs into a diagnostics package to share with the manufacturer for analysis. An Enterra technical expert is required to collect the diagnostics package.

Protection of critical functionality

The device's critical function is therapy delivery. The IPG continues delivering therapy at the last authenticated parameters regardless of programmer availability, so a lost or destroyed programmer cannot cause an acute change in therapy. Therapy parameters can be changed only through an authenticated programmer provided by Enterra Medical, and any programmer provisioned by Enterra Medical can access any IPG in order to support therapy.

Appendix F: MRI Guidelines for Physicians

Glossary



MR Conditional - An item with demonstrated safety in the MR environment within defined conditions, including conditions of the static magnetic field, the switched gradient magnetic field and the radio frequency fields. Additional conditions, including specific configurations of the item, may be required.



MR Unsafe - An item which poses unacceptable risks to the patient, medical staff, or other persons within the MR environment.

ACR Zone - Zones of an MR site that denote areas with various MR safety levels, as defined by the American College of Radiology.

MRI - Magnetic Resonance Imaging.

1. MRI safety information MR

The Enterra Ascent System is **MR Conditional**. This means that patients with Enterra Ascent can safely have MRI examinations of some body parts under certain conditions. The conditions for MRI scans will vary with the type of MRI coil.

Always obtain the latest MRI guidelines. Refer to the contact information on the last page of this manual or go to **www.enterramedical.com/intl-hcp/manuals**.

1.1. MR Conditional Devices MR

Non-clinical testing has demonstrated that the Enterra Ascent Model 10102 Neurostimulator with two Enterra ReliaStim® Model 30101 or Model 4351-35 Unipolar leads are **MR Conditional**.

Patients with these devices can be safely scanned in an MR system meeting the conditions described in the following section.

1.2. For MRI examinations using a detachable head, upper extremity, or lower extremity RF transmit/receive volume coil

A patient implanted with the Enterra Ascent System may be safely scanned at the head or upper/lower extremity at 1.5T or 3.0T MRI under the following conditions. Failure to follow these conditions may result in injury to the patient.

Table 1

MRI Safety Information A person with the Enterra Ascent System may be safely scanned under the following conditions. Failure to follow these conditions may result in injury.	
Device Name	Enterra Ascent
Device Configuration	Stimulation OFF*
Static Magnetic Field Strength (Bo)	1.5 T or 3.0T
MR Scanner Type	Cylindrical
Bo Field Orientation	Horizontal
Maximum Spatial Field Gradient	20 T/m (2,000 gauss/cm)
Maximum Gradient Slew Rate	200 T/m/s per axis
RF Excitation	Circularly Polarized (CP)
RF Transmit Coil Type	Head or Extremity Coils Only
RF Receive Coil Type	Head or Extremity Coils Only
Operating Mode	Normal Operating Mode
Maximum Whole-Body SAR	2 W/kg
Maximum Head SAR	3.2 W/kg
Scan Duration	Scan for up to 60 minutes of continuous RF (a sequence or back to back series/scan without breaks).
Scan Regions	Only head or extremity scanning allowed.
MR Image Artifact	The presence of this implant may produce an image artifact.

*The device stimulation must be turned Off using an Enterra Entrust Clinician Programmer.

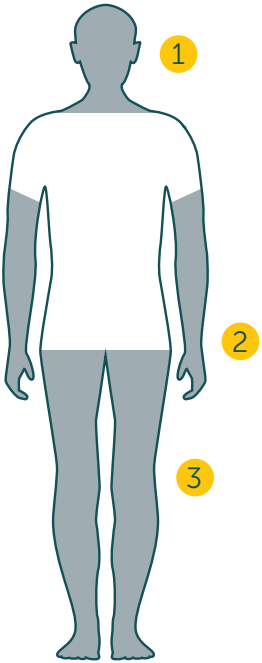


Figure 1: MRI scan* using detachable 1 head, 2 upper extremity, or 3 lower extremity RF transmit coil.

*Illustrated are typical use scenarios of detachable RF transmit/receive volume coils. Other scanning scenarios are also permissible according to MR scanner/coil manuals. For example, an MRI scan of the ankle with a detachable lower extremity RF transmit/receive volume coil or an MRI scan of the upper arm with a detachable lower extremity RF transmit/receive volume coil in the superman posture is permissible provided that the aforementioned scan conditions are met.

1.3. MR unsafe devices MR

The external components of the Enterra System, including the Enterra Entrust® Model 40100 Clinician Programmer, are **MR Unsafe.** These devices must **NOT** be taken into the MR scanner room (ACR Zone IV).

2. Patient MRI eligibility checklist

This checklist is provided as an optional resource to support MRI centers in conducting an MRI of a patient implanted with the Enterra System.

Prior to performing a scan, verify all information with the patient's pain management physician, the referring medical facility, the implanting physician or a Enterra Medical representative.

Patient Name: _____

☐ **Step 1: Verify that the patient has an Enterra Ascent model 10102 neurostimulator.**

☐ **Step 2: Check if the patient has any other medical device implants.**
The most restrictive MRI exposure requirements must be used if the patient has multiple medical device implants. For patients with other implanted devices in addition to the Enterra Ascent System, consult the appropriate device manufacturers for MRI eligibility of those devices.

☐ **Step 3: Arrange to get an Enterra Entrust 40100 Clinician Programmer through Enterra Medical, Inc. at 1-855-768-3772.** The Enterra Entrust Clinician Programmer is to be used by MRI Technologists, Enterra Providers or Enterra Medical representatives only. Enterra patients do not have a personal patient control device for programming of their IPG.

- ☐ **Step 4: Perform an impedance check using the Enterra Entrust Model 40100 Clinician Programmer.** Refer to Appendix G, On/Off instructions for the Enterra Entrust Clincian Programmer, for detailed programming instructions. **Do NOT** perform an MRI scan if any value is out of range.

- ☐ **Step 5: Turn stimulation off using the Entrust Clinician Programmer.** DO NOT perform an MRI scan if stimulation is On. Note, additional neurostimulator therapy settings should only be changed by an Enterra healthcare provider.

- ☐ **Step 6: Verify the MR scanner requirements presented in Table 1 on page 73 and perform scans per Table 1.** Monitor the patient both visually and audibly. Discontinue the MRI scan immediately if the patient reports any problems. Note, the Enterra Entrust Clinician programmer is not MRI safe

- ☐ **Step 7: After scan is completed, turn stimulation back on using the Enterra Entrust Model 40100 Clinician Programmer.** Verify that the patient has not experienced any adverse effects as a result of the MRI. Contact Enterra Medical, Inc. if the patient has experienced any adverse effects.

3. Possible risks of MRI with the Enterra Ascent System

Non-clinical testing has shown that patients with the Enterra Ascent System can safely have MRI when the conditions for safe MRI described in this document are met. However, there may be some risks of performing MRI when the patient has an implanted Enterra Ascent System. Possible risks include:

- Heating of the implant
- Unintended stimulation
- Image distortion and artifacts
- Magnetic field interactions
- Device malfunction or damage

3.1. Heating of the implant

MRI may cause the implant to become hot. However, if the conditions for safe MRI are followed, this heating is minimal. If the specific MRI conditions are not followed, heating of the implant could damage surrounding tissue. If the site of the patient's implant feels hot during MRI, the patient must inform the MRI technologist immediately and then contact their doctor.

3.2. Unintended stimulation

MRI may cause unintended stimulation from the implant. This unintended stimulation may be uncomfortable (the patient may feel a tingling, shocking, or jolting sensation). However, if the conditions for safe MRI are met, such stimulations may not occur. If the patient experiences any uncomfortable stimulations during MRI, the patient must inform the MRI technologist immediately and then contact their doctor.

3.3. Image distortion and artifacts

No image distortion or artifacts should be visible from MRI head and extremity scans.

3.4. Magnetic field interactions

The magnets used in MRI may cause the neurostimulator to shift or move slightly within the implant pocket. This may cause stress to tissues and/or the lead. As a result, the patient may feel a slight tugging sensation at the site of the implant. If the patient feels uncomfortable while in the MRI, the patient must inform the MRI technologist immediately.

3.5. Device malfunction or damage

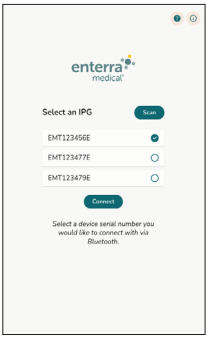
Non-clinical tests in various MRI systems were conducted. These tests did not cause any damage to, or malfunction of, the implant. If the implant malfunctions or becomes damaged, the result may be nerve damage and other associated problems. If the patient feels any stimulation or discomfort during MRI, the patient must inform the MRI technologist immediately and then contact their doctor.

Appendix G: On/Off Instructions for Enterra Entrust Clinician Programmer

The following steps should be used as a guide to using the Enterra Entrust Clinician Programmer during Enterra Ascent device On/Off

Clinician Programmer Set Up & Device Connect

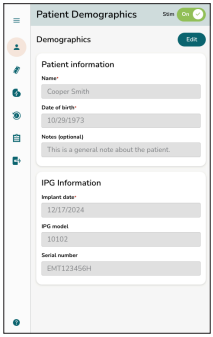
1. Turn the tablet on by pressing the Power button. Swipe to access the tablet's Home screen.
2. Ensure that Bluetooth® is enabled on the tablet.
3. Tap the Enterra Entrust app icon to launch the application.
4. Press the Scan button. Scan The programmer will automatically search for nearby IPGs (Implantable Pulse Generators) via Bluetooth.
5. A list of all detected Enterra Ascent devices will appear in the device selection area.
6. Locate the patient's device serial number and click the select button. Refer to the patient's Enterra Medical ID Card or Patient Records to verify the serial number.



Step 6

7. Press the Connect button Connect to connect to the selected IPG.

8. Confirm patient information by selecting OK in the Confirm Patient Information window or by navigating to the Patient Demographics screen.
   Verify patient and IPG information.



Step 8

Turning IPG stimulation ON and/or OFF

9. The current IPG stimulation setting is displayed in the upper right corner of the title bar on all programmer screens. This toggle button will indicate stimulation status:

   ON (toggle green) Stim On | **OFF** (toggle gray) Stim Off

10. To turn the stimulator On or Off, tap the On/Off toggle in the title bar. A confirmation pop-up dialog box will display. Tap Turn On Stimulation or Turn Off Stimulation as appropriate.



Step 10

Clinician Programmer End Session & Return to Enterra Medical

11. Once the stimulation status reflects the desired setting, end the programming session by tapping the "End Session icon" on the navigation panel, then confirm by tapping "End Session" on the pop-up dialog.
12. The programmer is now able to be powered off by pressing the Power button.
13. Please package and return the programmer to Enterra Medical.

Troubleshooting

Connection failure - Connection failure occurs when the Enterra Entrust Clinician Programmer cannot establish a Bluetooth connection with the patient's IPG.

If the patient's IPG battery is completely depleted, or the programmer is not within range, the clinician programmer will not connect.

Wireless transmitters near the patient or the Clinician Programmer (Wi-Fi access points, cellular phones, tablets, laptops, other 2.4 GHz devices) can interrupt the Bluetooth connection used to program the IPG. If a programming session is interrupted, the IPG may reset. During a reset, stimulation stops for up to 8 seconds and then resumes automatically at the parameters that were active before the reset.

If programming resets persist or repeat in succession from continued signal interruption, the programmer will display "IPG Programming Update Failed", "Reconnecting to Device" and "Connection Error" in succession during stimulation parameter programming. In this case, ensure all Wi-Fi routers, equipment towers, and wireless communication nodes, including phones, are located at a minimum of 1 meter from the IPG. If needed, move to a different programming location.

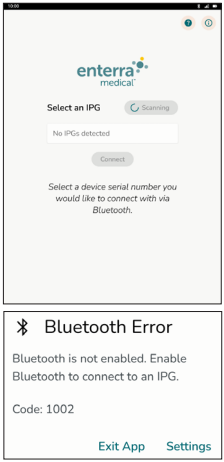
After connection is re-established, the user can confirm updated stimulation parameters in the stimulation settings screen. A confirmation message stating "Programming Successful" will be displayed after programming the new parameters, thereby verifying successful connection to the IPG.

This Bluetooth session reset can only occur during an open programming session. Therapy delivery does not depend on the Bluetooth connection.

The most common steps to overcome connection failures: Ensure you are within a 1.5-meter range of the patient's IPG. Move closer to the front of the patient in a direct line of sight.

- Ensure nothing stands between you and the patient. Avoid any potential interfering equipment during a programming session.

- Keep wireless transmitters at least 1 meter from the patient. Place personal phones and tablets in airplane mode.
- Close the Enterra Entrust app and re-launch it to restart the IPG search.
- If a Bluetooth error occurs, follow the on-screen instructions to enable Bluetooth on the device settings, then re-open the app.
- If errors persist, please contact Enterra Medical for assistance at 1-855-768-3772.



Connection issues

Enterra Medical Neurostimulation System limited warranty[2] (U.S. Customers Only)

A. This limited warranty provides the following assurance to the patient who receives an Enterra Medical Neurostimulation System. The Neurostimulation System includes neurostimulators, permanent leads, single-use accessories, and disposable tools, hereafter referred to as "components", unless specifically noted.

(1) Should the components fail to function within normal tolerances due to a defect in materials or workmanship within a period of one (1) year, commencing with the date of implantation or use of the components, Enterra Medical will at its option: (a) issue a credit to the purchaser of the replacement component equal to the Purchase Price, as defined in Subsection A(3), against the purchase of any same component requested as its replacement, or, (b) provide a functionally comparable replacement component at no charge.

(2) Neurostimulator battery cell depletion will occur with time and is not considered to be a defect in materials or workmanship. The batteries have a specified capacity that may deplete at different rates depending on settings and individual requirements for neurostimulation functions.

Therefore, no representation is made that the neurostimulator will last the entire term of this limited warranty.

(3) As used herein, "purchase price" shall mean the lesser of the net invoiced price of the original or current functionally comparable, or replacement component.

B. To qualify for this limited warranty, these conditions must be met:

(1) The components must be implanted prior to its "Use By" date.

(2) The components must be used in conjunction with components compatible with the Enterra Medical Neurostimulation System.

(3) All device registration materials must be completed and returned to Enterra Medical within thirty (30) days of implantation of the neurostimulator.

(4) Replaced neurostimulators must be returned to Enterra Medical within thirty (30) days of explantation and shall be the property of Enterra Medical. For all other components, the component, or portion thereof, must be returned to Enterra Medical within thirty (30) days after discovery of the defect and shall be the property of Enterra Medical, and if not explanted, the serial number or lot number must be provided to Enterra Medical instead.

(5) The components must be used in accordance with the labeling and instructions for use provided with the components.

C. This limited warranty is limited to its express terms. In particular:

(1) Except as expressly provided by this limited warranty, ENTERRA MEDICAL IS NOT RESPONSIBLE FOR ANY DIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES BASED ON ANY DEFECT, FAILURE OR MALFUNCTION OF THE NEUROSTIMULATOR TO FUNCTION WITHIN NORMAL TOLERANCES WHETHER THE CLAIM IS BASED ON WARRANTY, CONTRACT, NEGLIGENCE, STRICT LIABILITY, OR OTHER TORT OR OTHERWISE.

(2) This limited warranty is made only to the patient in whom the components were implanted. AS TO ALL OTHERS, ENTERRA MEDICAL MAKES NO WARRANTY, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WHETHER ARISING FROM STATUTE, COMMON LAW, CUSTOM OR OTHERWISE. NO SUCH EXPRESS OR IMPLIED WARRANTY TO THE PATIENT SHALL EXTEND BEYOND THE PERIOD SPECIFIED IN A(1) ABOVE. THIS LIMITED WARRANTY SHALL BE THE EXCLUSIVE REMEDY AVAILABLE TO ANY PERSON.

Manufacturer

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