

PERIPHERAL NERVE STIMULATION (TRIAL AND PERMANENT IMPLANTATION)

These safety practices have been developed to highlight the important elements in the safe performance of interventional pain procedures. Adherence to these practices will help decrease the risk of preventable complications.

GENERAL

- The physician must consider region-specific anatomical considerations that may influence the safety of the procedure.

PERSONNEL

- Only physicians trained in the performance of peripheral nerve stimulation (PNS) should perform these procedures.

CONTRAINDICATIONS

ABSOLUTE

- An active systemic and non-systemic (e.g. sinus, urinary tract) infection or a localized infection within the procedural field
- Uncooperative patient
- Allergy to medication(s) that cannot safely be mitigated by pre-treatment

RELATIVE

- Concurrent treatment with anticoagulants is a contraindication for permanent placement of PNS and in some cases, PNS trial depending on PNS anatomical location. The risks and benefits of discontinuing anticoagulants (as per Neurostimulation Appropriateness Consensus Committee recommendations) and antiplatelet drugs should be discussed with the patient in consultation with the patient's prescribing physician.
- In the presence of a pacemaker and/or automated implantable cardioverter defibrillator, PNS can be safely performed with prior approval from the cardiologist/electrophysiologist and through close collaboration with their team.
- Immunosuppression
- Chronic coagulopathy and chronic anticoagulation therapy are considered by many as relative contraindications to long-term PNS therapy. In both trial and permanent placements, the patient's coagulation has to be within normal range.
- Pregnancy, taking into consideration the location of hardware in relation to the fetus
- Need for repeat MRI depending on PNS technology and MRI compatibility
- Occupational issues: if patients need to be around powerful electromagnetic fields for work (e.g. welding)
- Severe psychiatric/psychological pathology – psychological screening is recommended for all implants



SEDATION

- In certain cases, moderate sedation or monitored anesthesia care (MAC) may be needed during trial lead placement for PNS. This needs to be assessed and discussed on a case-by-case basis.
- Depth of sedation needs to be discussed with the anesthesiologist, taking into consideration the ability to wake the patient to get reliable feedback during the procedure.
- MAC can be used for permanent PNS implantation in selected cases, which should only be performed in the ambulatory surgery center (ASC) or hospital setting.
- Resuscitation drugs, monitoring equipment, and oxygen must be available if sedation is utilized.

ANTIBIOTIC PROPHYLAXIS

- Preoperative antibiotic administration: 1 dose within 30 to 120 minutes prior to incision/start of procedure (cephalosporin such as cefazolin 1-3 g or cefuroxime 1.5 g intravenously. If allergic to beta-lactams, give clindamycin 600 mg. If the patient is colonized with MRSA, use vancomycin 1 g.)
- Second dose if the procedure goes beyond 4 hours

SAFE, ASEPTIC PRACTICES

- Strict aseptic technique should be followed at all times with respect to the facilities, materials, patient preparation, physician preparation, personnel, and injectate/syringe preparation. Examples include, but are not limited to:
 - Patients should be advised to shower with chlorhexidine gluconate soap the night before and morning of the permanent PNS placement procedure.
 - Surgical hand scrub for physician and scrub assistants
 - Skin overlying the target region should be prepared for an aseptic procedure, preferably using chlorhexidine in alcohol.
 - The patient's body should be draped entirely to create a sterile field, not only for the physician's hands but also for the leads and devices that will be brought into the field.
 - The ultrasound or C-arm equipment must be draped in a sterile fashion.
 - A cap, face mask, sterile gloves, and sterile gown must be worn during the procedure. Frequent glove changes and double-gloving are advised.
 - Sterile single-use syringes and needles are required for any injections, and single dose vials should be utilized when available. Centers for Disease Control and Prevention (CDC) guidelines for safe injection practices must be followed.
 - Acquisition, storage, and utilization of medications should be in accordance with relevant governmental guidelines such as those of the CDC in the United States.
 - Single-use or reusable probes are appropriate if proper sterilization techniques are employed between patients and procedures.
 - An adherent, iodinated dressing should be placed over the sterile field provided that the patient does not have an iodine allergy.



PROCEDURE

- Extensive irrigation of incisions and careful hemostasis before closure of the incisions and pockets is recommended.
- Avoid monopolar electrocautery near electrical equipment where bipolar electrocautery can be utilized instead.

POST-PROCEDURE MONITORING/FOLLOW-UP

- Patients should be monitored for an appropriate time following the procedure depending upon the nature of the intervention and the agents utilized.
- Provide detailed oral and written discharge instructions to patients that outline:
 - activity restrictions for the immediate post-procedure period (e.g. do not operate a motor vehicle or machinery for the remainder of the day),
 - the location of the leads should dictate the duration of time for which activity should be restricted,
 - potential expected side effects that may occur immediately post-procedure and in the first few days following the procedure (e.g. pain at procedure site),
 - symptoms that merit immediate medical attention,
 - requirement to take analgesics only for moderate or severe pain during trial, and
 - when to resume usual medications and anticoagulants if discontinued for the procedure.
- Ensure patients have a follow-up plan to monitor progress and for lead removal, as needed.

SOURCES

Deer TR, Narouze S, Provenzano DA, et al. The Neurostimulation Appropriateness Consensus Committee (NACC): recommendations on bleeding and coagulation management in neurostimulation devices. *Neuromodulation*. 2017;20:51–62.

Solomkin JS, Mazuski JE, Baron EJ, et al. Guidelines for the selection of anti-infective agents for complicated intra-abdominal infections. *Clin Infect Dis* 2003;37(15):997–1005.

DISCLAIMER

While these Safety Practices are intended to identify elements critical to the safe performance of interventional spine procedures, they are not intended to be inclusive of all proper methods relevant to the safe performance of spine procedures, or exclusive of other methods of care reasonably utilized to obtain the same results. Nothing contained in these documents is intended to be used as a substitute for the care and knowledge of the individual clinician. They are guidelines based on evidence-informed expert consensus. SIS makes no representation and assumes no responsibility for the accuracy of the information contained or available through this website, and such information is subject to change without notice. The clinician's independent medical judgment, given the individual patient's clinical circumstances and preferences, should always determine patient care and treatment. Practitioners are advised to consider management options in the context of their own training and background and institutional capabilities when selecting recommended treatment options. SIS is not responsible nor does it assume any legal liability or responsibility for the accuracy, completeness, clinical efficacy, or value of any such information or any apparatus, product, or process described or referenced through this website or the information contained therein.



SPINE INTERVENTION SOCIETY

SAFETY PRACTICES FOR INTERVENTIONAL PAIN PROCEDURES

MODULE 1 EPIDURAL STEROID INJECTIONS
MODULE 2.1 FACET INTERVENTIONS: MEDIAL BRANCH BLOCKS
MODULE 2.2 FACET INTERVENTIONS: INTRA-ARTICULAR (ZYGAPOPHYSIAL) JOINT INJECTIONS
MODULE 2.3 FACET INTERVENTIONS: MEDIAL BRANCH RADIOFREQUENCY NEUROTOMY
MODULE 2.4 FACET INTERVENTIONS: LATERAL ATLANTO-AXIAL JOINT INJECTIONS
MODULE 3.1 SACROILIAC INTERVENTIONS: SACRAL LATERAL BRANCH BLOCKS
MODULE 3.2 SACROILIAC INTERVENTIONS: SACROILIAC JOINT INJECTIONS
MODULE 3.3 SACROILIAC INTERVENTIONS: SACRAL LATERAL BRANCH RADIOFREQUENCY NEUROTOMY
MODULE 4.1 NEUROSTIMULATION: SPINAL CORD AND DORSAL ROOT GANGLION STIMULATION
MODULE 4.2 NEUROSTIMULATION: PERIPHERAL NERVE STIMULATION
MODULE 5 PROVOCATION DISCOGRAPHY
MODULE 6 VERTEBRAL AUGMENTATION

THE INTERVENTIONAL SPECIALISTS' FREE RESOURCE TO HELP DECREASE THE RISK OF PREVENTABLE COMPLICATIONS

For additional information about the indications and technical aspects that yield improved treatment outcomes, refer to the *SIS Practice Guidelines for Spinal Diagnostic and Treatment Procedures*.

