

**AN INTRODUCTION TO**

# NVM5<sup>®</sup>

## NERVE MONITORING SYSTEM

*This booklet is designed to inform you about the use of NVM5<sup>®</sup> nerve monitoring in the course of your surgery. It is not meant to replace any personal conversations that you might have with your physician or other members of your healthcare team. The booklet is intended to answer some of your questions and serve as a stimulus for you to ask appropriate questions about the surgery.*

*Not all the information here will apply to your individual treatment or its outcome. The information is intended to answer some of your questions and serve as a stimulus for you to ask appropriate questions about the procedure.*



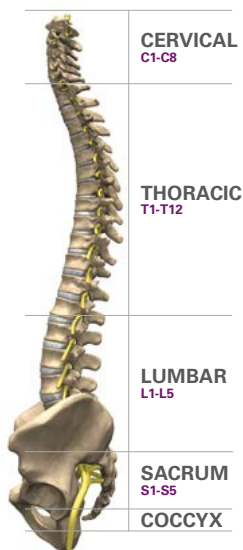
## Neural Anatomy

### SPINAL CORD

The spinal cord is the part of the central nervous system which extends from the brain to the lower back through the bony protection of the spinal canal. It acts as a conduit for sensory and motor information to travel to and from the brain. The spinal cord usually ends at the second lumbar level (L2) and then extends as a bundle of individual nerves, known as the cauda equina, which exit the spinal canal at each spinal level.

### SPINAL NERVES

From the spinal cord, nerves exit the spinal canal between each vertebra on both sides. After exiting the spinal canal, spinal nerves then further entwine and extend to send signals between your brain and your organs, muscles, and other tissues. Cervical spinal nerves innervate (provide muscle activity and sensation functions to) your upper back, arms, and hands. Lumbar spinal nerves innervate your lower back, abdomen, and legs. If any of these nerves are pinched by a bulging disc or the position of your vertebrae, for example, you might experience back, groin, and/or leg pain or numbness.

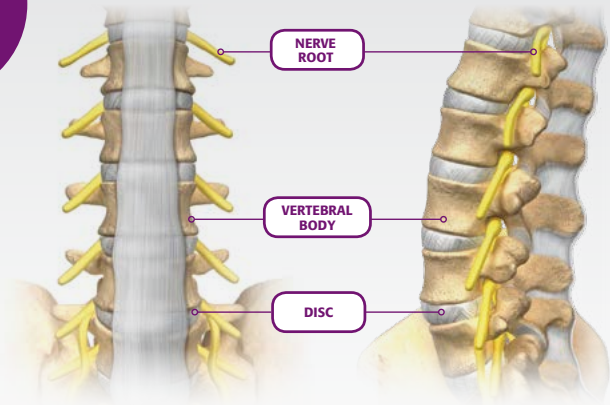


## MYOTOMES

Myotomes are muscle groups that are innervated by particular spinal nerve levels. By knowing which spinal nerves innervate specific muscles, we can monitor those muscles for changes in the health of the nerve. For example, we can monitor the following muscle groups for information about the corresponding spinal nerves:

- Quadriceps (front thigh muscles) L2, L3, L4
- Anterior Tibialis (shin muscle) L4, L5
- Hamstrings (back thigh muscles) L5, S1
- Gastrocnemius (calf muscle) S1, S2

### Anterior & Lateral View



*Front and side views of the lumbar spine*

## What is Electromyography (EMG)?

Electromyography, also known as EMG, is the study of the electrical activity of muscles. It is a test used to help assess the health and function of nerves and/or muscles.

## Why is EMG used in surgery?

EMG can be used to help your physician assess proper pedicle screw placement in fusion surgeries to help reduce the chance of nerve impingement, or to aid in assessing nerve proximity and location during surgical approaches, such as the eXtreme lateral interbody fusion (XLIF®) surgical approach. Intraoperative EMG monitoring is the standard of care for nerve root monitoring, but if your surgery puts the spinal cord at risk, other monitoring techniques are better suited. In this case, your surgeon may opt for somatosensory evoked potential (SSEP) or motor evoked potential (MEP) monitoring. The lower lumbar spine, however, is comprised of nerve roots only, as the spinal cord ends above this region, and therefore EMG monitoring is applicable in all lumbar surgeries.





## What can I expect before and during surgery?

Preparation for surgery includes being sure that all of your questions are answered. You should inform your physician of any health problems which you may have or medications that you are taking before surgery. If you have an allergy to adhesives, alert your surgeon, as adhesive surface electrodes may be used with NVM5® monitoring. Needle electrodes can alternatively be used instead in this situation. Your physician may request that you do not apply body lotion prior to surgery and that you also shave your legs.

Once you have been admitted to the hospital, you will be taken to a pre-op room and prepared for surgery. This may include instruction about the surgery, anesthesia, and the postoperative period. At this time you may be prepared for intraoperative EMG monitoring, which will entail the placement of adhesive electrodes on the skin overlying your leg or arm myotomes (for lumbar or cervical surgery, respectively). Putting the electrodes on will require cleaning and light abrasion of the skin. If needle electrodes are used, these will be placed in the operating room after anesthesia is given, to minimize any discomfort.

## Is EMG monitoring right for me?

Your physician might determine that intraoperative NVM5® EMG monitoring is a good option for you if you require spine surgery where your cervical or lumbar nerve roots are affected.

Example surgeries include:

- Lumbar decompression
- Lumbar interbody fusion from any approach: anterior (ALIF), posterior (PLIF, TLIF), lateral (XLIF®)
- Lumbar pedicle screw instrumentation
- Lumbar total disc replacement
- Cauda equina surgery
- Anterior cervical decompression and fusion (ACDF)
- Cervical total disc replacement



*Intraoperative EMG monitoring can only be performed when muscle relaxants are not in effect. Muscle relaxants are often used for placing the operative breathing tube and for the surgical incision, but can be reversed or allowed to dissipate before EMG monitoring is necessary. If your surgeon determines that the muscle relaxant proves to be necessary throughout the surgery, monitoring cannot effectively be performed. Electrically stimulated EMG is not recommended in patients who have an electrically-sensitive device implanted, such as a pacemaker or defibrillator.*

*It is important that you discuss the potential risks, complications, and benefits of spine surgery with your doctor prior to receiving treatment, and that you rely on your physician's judgment. Only your doctor can determine whether you are a suitable candidate for spine surgery.*

# Notes

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## RESOURCES

For more information about NVM5® please visit:

**[www.nuvasive.com](http://www.nuvasive.com)**

If you would like to learn more about patient support and education for chronic back and leg pain sufferers and their loved ones, please visit:

**[www.thebetterwayback.org](http://www.thebetterwayback.org)**

*If you have any questions about NVM5 or spine surgery in general, please call or see your physician, who is the only one qualified to diagnose and treat your spinal condition. This patient information brochure is not a replacement for professional medical advice.*

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