Sacral nerve stimulation

Sacral nerve stimulation, also termed sacral neuromodulation, is a type of medical electrical stimulation therapy.

It typically involves the implantation of a programmable stimulator subcutaneously, which delivers low amplitude electrical stimulation via a lead to the sacral nerve, usually accessed via the S3 foramen.

The U.S. Food and Drug Administration has approved InterStim Therapy, by Medtronic, as a sacral nerve stimulator for treatment of urinary incontinence, high urinary frequency and urinary retention. Sacral nerve stimulation is also under investigation as treatment for other conditions, including constipation brought on by nerve damage due to surgical procedures. An experimental procedure for constipation in children is being conducted in Nationwide Children's Hospital.

In the event that the nerves and the brain are no longer communicating effectively, resulting in a bowel/bladder disorder, this type of treatment is designed to imitate a signal sent via the central nervous system.

One of the major nerve routes is from the brain, along the spinal cord and through the back. This is commonly referred to as the sacral area. This area controls the everyday function of the pelvic floor, urethral sphincter, bladder and bowel. By stimulating the sacral nerve (located in the lower back), a signal is sent that manipulates a contraction within the pelvic floor. Over time these contractions rebuild the strength of the organs and muscles within it. This effectively alleviates all symptoms of urinary/faecal disorders, and in many cases eliminates them completely.

The success of sacral nerve stimulation, a common treatment for pelvic floor disorders, depends on correct placement of the electrodes through the sacral foramina. When the bony anatomy and topography of the sacrum and sacral spinal nerves are intact, this is easily achieved; where sacral anomalies exist, it can be challenging. A better understanding of common sacral malformations can improve the success of sacral nerve stimulation (SNS) electrode placement.

Povo et al. reviewed 998 consecutive MRI scans performed to investigate low back pain in patients who had undergone CT and/or X-ray.

Congenital sacral malformations were found in 24.1 %, the most common being sacral meningeal cysts (16 %) and spina bifida occulta (9.9 %). Others were lumbosacral transitional vertebrae (2.5 %), anterior occult meningocele (0.5 %), partial sacral agenesis (0.2 %) and vertebral dysplasia of S1 (0.2 %).

This radiologic review uncovered a high incidence of sacral malformations, and most were asymptomatic. All surgeons who perform SNS should have a basic understanding of sacral malformations, their incidence and effect on foraminal anatomy. Imaging will aid procedural planning [1)]

1)

Povo A, Arantes M, Matzel KE, Barbosa J, Ferreira MA. Sacral malformations: use of imaging to optimise sacral nerve stimulation. Int J Colorectal Dis. 2015 Nov 7. [Epub ahead of print] PubMed PMID: 26547863.