

UPSIDE-DOWN: AN ALTERNATIVE APPROACH TO SACRAL NEUROMODULATION

Synopsis of Video

After nearly two decades of use, sacral neuromodulation has become well-established as a method of treating various lower urinary tract dysfunctions. Despite several advancements in the technique, however, relatively high rates of negative responses to trial stimulation, permanent implant failures, and surgical revisions still persist (1). At least some of these limiting factors are thought to be directly or indirectly caused by electrode displacement.

A new percutaneous peridural "retrograde" method of lead insertion for sacral root stimulation is outlined here, which could minimise migration and the consequent loss of contact between the leads and the sacral roots.

The new technique was originally introduced by two American chronic pain specialists (Claudio A. Feler and Kenneth M. Alo) for the treatment of intractable pain in the interstitial cystitis syndrome (2).

Technique

With the patient in a prone position and under fluoroscopic control, the L2-L3, L3-L4 and L4-L5 intervertebral spaces are identified. The most suitable space is chosen and local anesthesia is administered. A 14G Touhy needle is percutaneously inserted in a rostral-caudal direction, and the peridural space is entered. The electrode, stiffened by a stilet, is passed through the needle and, under fluoroscopic control, is advanced caudally in the peridural space, until the anterior aspect of the target sacral foramen (usually S3) is reached by slightly twisting the catheter. The latter is then connected through an extension cable to an external electrical stimulator, and a low intensity current is applied to the sacral root. The precise position of the lead is identified by observing the normal biological responses to stimulation. If necessary, the same procedure may be repeated by inserting a second lead to the contralateral foramen. The extension cable(s) protruding from the skin are kept connected to the external stimulator for duration of the stimulation trial period (usually 20-30 days). If there is a satisfactory response, the same lead is used for permanent implantation, and only a small incision is required to position the permanent pulse generator in a subcutaneous pouch.

Through this alternative approach, a lower rate of lead dislocation, a higher proportion of positive stimulation trials, and a lower incidence of surgical revisions can be expected, as the lead is maintained in place by a long intradural tract, and contact between the lead's 4 poles and the nerve is provided by a long common parallel pathway. Another valuable advantage of this approach (when compared with the established sacral direct method), is the simplicity of a true minimally-invasive technique, requiring no skin incision or muscle dissection to reach the periosteum of the sacrum and position the anchoring device for the second stage.

This approach does, however, bear inherent disadvantages, such as the need for fluoroscopic control (optional in the classic approach), a generally longer duration of the first stage of the procedure, and possible difficulties in the presence of peridural adhesions.

References

1. Bosch RJ, Groen J. Sacral nerve neuromodulation in the treatment of patients with refractory motor urge incontinence: long-term results of a prospective longitudinal study. *J Urol* 2000 Apr;163(4):1219-22.
2. Feler CA, Whitworth LA, Brookoff D, Powell R. Recent advances: sacral nerve root stimulation using a retrograde method of lead insertion for the treatment of pelvic pain due to interstitial cystitis. *Neuromodulation* 1999; 2(3):211-16