# Subcutaneous peripheral nerve field stimulation

Peripheral nerve field stimulation (PNFS) is a neurosurgical procedure consisting of implantation of subcutaneous leads in specific painful areas in different types of painful, drug-resistant syndromes.

It is a minimally invasive neuromodulatory technique which has been shown to be effective for chronic localised pain conditions.

<html><iframe width="420" height="315" src="https://www.youtube.com/embed/aHd-04NnQJc" frameborder="0" allowfullscreen></iframe></html>

Findings support the belief that PNFS provides effective, long-term pain control for trigeminal pain. Statistical heterogeneity was considerable across all studies. Future work should be aimed at conducting double-blind randomized controlled trials to determine the utility of PNFS for treating various forms of trigeminal pain for which limited therapeutic options exist [1)]

## Case series

### 2016

Reports on sPNFS for the treatment of trigeminal pain (sTNFS) are still sparse and primarily focused on pain intensity as outcome measure. Detailed data on the impact of sTNFS on attack frequency are currently not available.

Patients were classified according to the International Headache Society classification (ICHD-3-beta). Three patients had classical TN without (n = 3) and another three TN with concomitant persistent facial pain (n = 3). Two patients suffered from post-herpetic trigeminal neuropathy (n = 2). All eight patients underwent a trial stimulation of at least 7 days with subcutaneous leads in the affected trigeminal area connected to an external neurostimulator. Of those, six patients received permanent implantation of a neurostimulator. During the follow-up (6-29 months, mean 15.2), VAS-scores, attack frequencies, oral drug intake, complications and side effects were documented.

Seven out of eight patients responded to sTNFS (i.e. ≥50 % pain reduction) during the test trial. The pain intensity (according to VAS) was reduced by 83 ± 16 % (mean ± SD) and the number of attacks decreased by 73 ± 26 % (mean ± SD). Five out of six patients were able to reduce or stop pain medication. One patient developed device infection. Two patients developed stimulation-related side effects which could be resolved by reprogramming.

Treatment by sTNFS is a beneficial option for patients with refractory trigeminal pain. Prospective randomised trials are required to systematically evaluate efficacy rates and safety of this low-invasive neurosurgical technique [2)].

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Twenty-two patients affected by different types of chronic neuropathic pain were submitted to PNFS at the Department of Neurosurgery of the Istituto Neurologico “C. Besta” in Milan between July 2009 and July 2013. The visual analog scale (VAS) and variations in the use of analgesic drugs, along with complications, were considered to assess results.

In 59 % of the patients, an average pain reduction of 5.50 points on the visual analog scale was observed (average pre-implant score 8.86 and average post-implant score 3.36). These patients reduced their analgesic drug use after PNFS. They observed no early or long-term complications after the last follow-up evaluation.

PNFS can be considered an effective and safe option to treat carefully selected, drug-resistant and chronic neuropathic pain patients; the reversibility of the procedure and its lack, at least in the autor hands, of long-term complications may contribute to wider use of this procedure [3].

**2014**

Four patients with intractable thoracic post herpetic neuropathic pain were operated after maximum medical treatment and a neuropsychological evaluation. Multiple percutaneous electrodes were placed in the subcutaneous plane in the region of pain for a 7-day trial. Following a successful trial (more than 50% reduction of pain), the electrodes were then internalized and attached to a pulse generator. Visual analog scores (VAS) were studied during the preoperative, immediate postoperative and last follow-up visits. Long-term treatment results were determined by retrospective review of medical records. Average follow-up period was 28.2 months.

All 4 patients showed persistent improvement in their VAS pain scores with an average improvement of more than 75%. There were no treatment failures and no complication requiring re-operation was reported.

Peripheral field stimulation for the treatment of post herpetic neuropathic pain is a safe and effective method for pain relief for an extremely complex problem with very few solutions. Patient selection and proper lead placement is most important for the success of treatment [4].

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