



# Pain Relief Outcomes Using Peripheral Nerve Field Stimulation (PNFS) Combined with Spinal Cord Stimulation in Chronic Pain

Jose Emilio Llopis<sup>4</sup>, Philippe Rigoard<sup>1</sup>, Paolo Maino<sup>2</sup>, Eva Koetsier<sup>2</sup>, Simon Bayer<sup>1,3</sup>, Sylvie Raoul<sup>5</sup>, Edward Goldberg<sup>6</sup>

1. Hospital Universitario de la Ribera, Alzira (Valencia), Spain 2. Predictive Research in Spine/Neuromodulation Management and Thoracic Innovation/Cardiac Surgery Lab, Poitiers University Hospital, Poitiers, France 3. Pain Management Center, Neurocenter of Southern Switzerland, Ospedale Regionale di Lugano, Lugano, Switzerland 4. Charité-Universitätsmedizin Berlin, Berlin, Germany 5. Nantes University Hospital, Nantes, France 6. Boston Scientific, Neuromodulation, Valencia, CA USA

BACKGROUND	METHODS						
Peripheral Nerve Field Stimulation (PNFS) and Spinal Cord Stimulation (SCS) are treatment options for patients with neuropathic pain where PNFS tends to stimulate in more local areas than SCS. Recent reports have demonstrated positive outcomes using PNFS as an "add-on" therapy to Spinal Cord Stimulation (SCS) for Failed Back Surgery Syndrome (FBSS) as well as a "stand-alone" therapy for a variety of other pain conditions. <sup>1,2</sup> Here, we report outcomes associated with utilization of PNFS along-with SCS in patients implanted with a device allowing for precise customization and combination of neurostimulation settings for treating chronic neuropathic pain.	<table border="1"> <tr> <td><b>Study Design</b></td> <td>Multicenter, Consecutive, Observational, Case-Serie ((NCT01550575). Data collected by site personnel per standard of care.</td> </tr> <tr> <td><b>Study Device</b></td> <td>Multimodal SCS 4-port system (Precision Spectra, Montage, Spectra WaveWriter, Boston Scientific) with:                      • Multiple Independent Current Control (MICC)                      • Anatomically-Guided (3D) Neural Targeting (3DNT)                      • Multiple available waveforms                      • Simultaneous waveforms and field shapes</td> </tr> <tr> <td><b>Cohort</b></td> <td>34 patients with chronic pain who have been implanted with a single 4-port Boston Scientific device delivering neuromodulation therapies to both epidural SCS lead(s) and PNFS leads</td> </tr> </table>	<b>Study Design</b>	Multicenter, Consecutive, Observational, Case-Serie ((NCT01550575). Data collected by site personnel per standard of care.	<b>Study Device</b>	Multimodal SCS 4-port system (Precision Spectra, Montage, Spectra WaveWriter, Boston Scientific) with: • Multiple Independent Current Control (MICC) • Anatomically-Guided (3D) Neural Targeting (3DNT) • Multiple available waveforms • Simultaneous waveforms and field shapes	<b>Cohort</b>	34 patients with chronic pain who have been implanted with a single 4-port Boston Scientific device delivering neuromodulation therapies to both epidural SCS lead(s) and PNFS leads
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## RESULTS

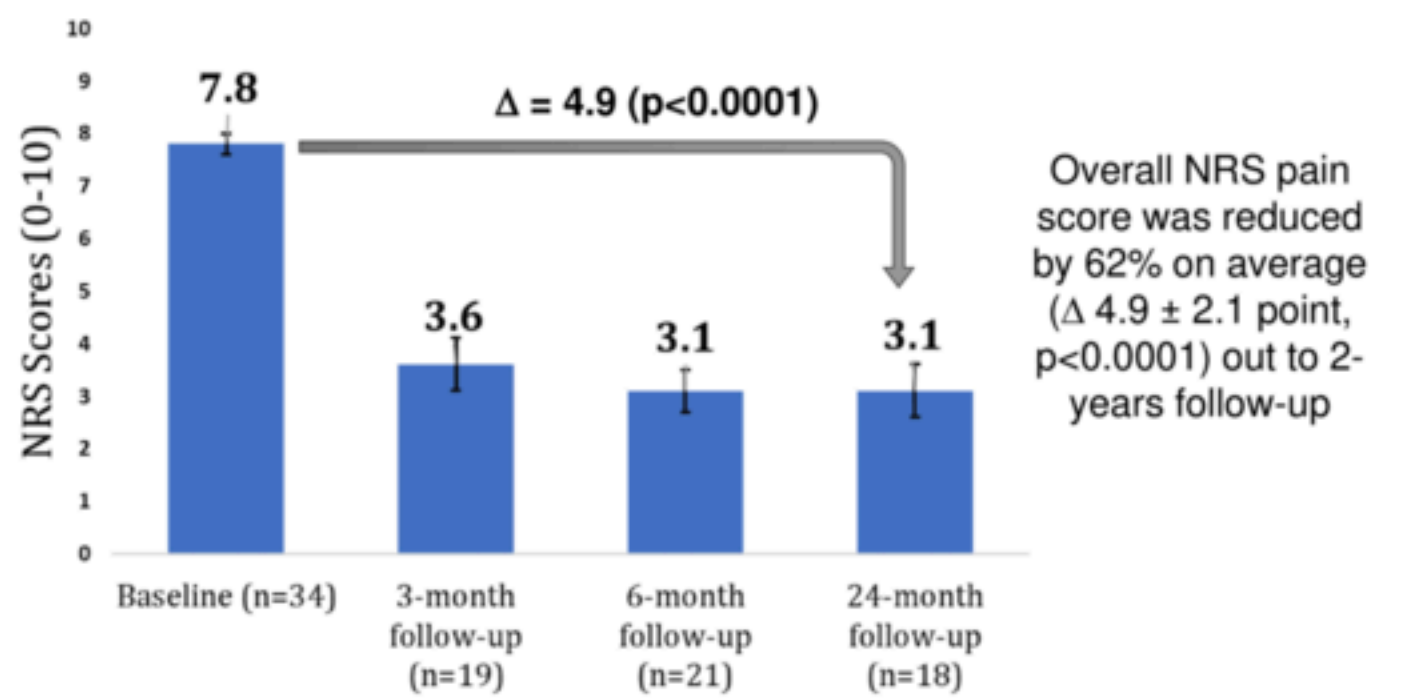
### Baseline Characteristics (n = 34)

Age (yrs.) - Mean (SD) n	58.1 (12.0) 34
Gender (Female) - % (n/N)	64.7% (22/34)
Pain location - % (patients may have multiple locations)	
Low back and leg	73%
Legs	37%
Head/Neck	21%
Baseline Overall Pain (NRS)- Mean (SD) n	7.8 (1.3) 34
Follow-up Duration (days) – Mean (SD) n	864.1 (544.6) 33
Number of leads per patient - Mean	2.7

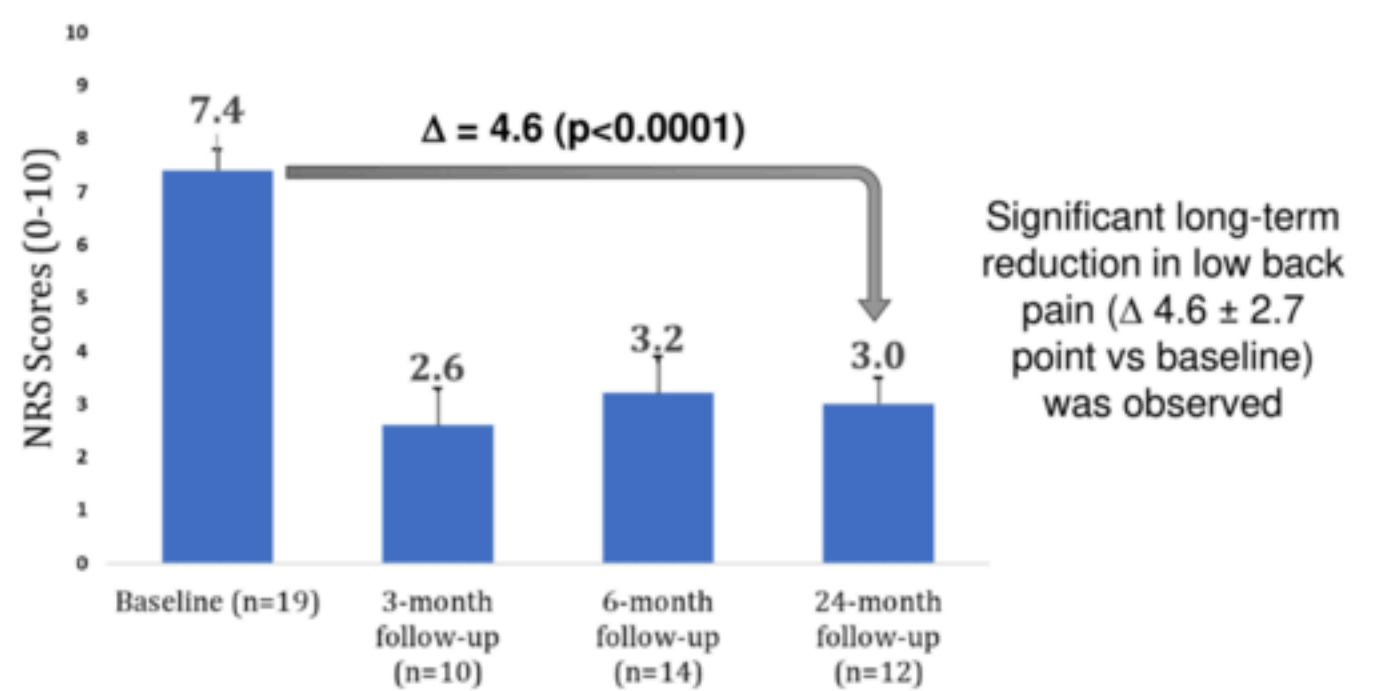
### Procedural and programming modalities

- Average number of leads per patient was 2.7.
- For 58% of the patients with reported data (n=18/31), PNFS leads were placed in the lumbar area. Other patients had their subcutaneous lead(s) placed in thoracic, cervical or occipital regions.
- For 67% of the patients with reported data (n=12/18), SCS leads were placed at T8-T10 level. Other patients had their SCS lead(s) placed in T5-T7 or cervical levels.
- 61% (17/28) patients used standard rate SCS, 25% (7/28) used sub-perception therapies (Burst, Contour, FAST), 14% (4/28) used combination therapy.

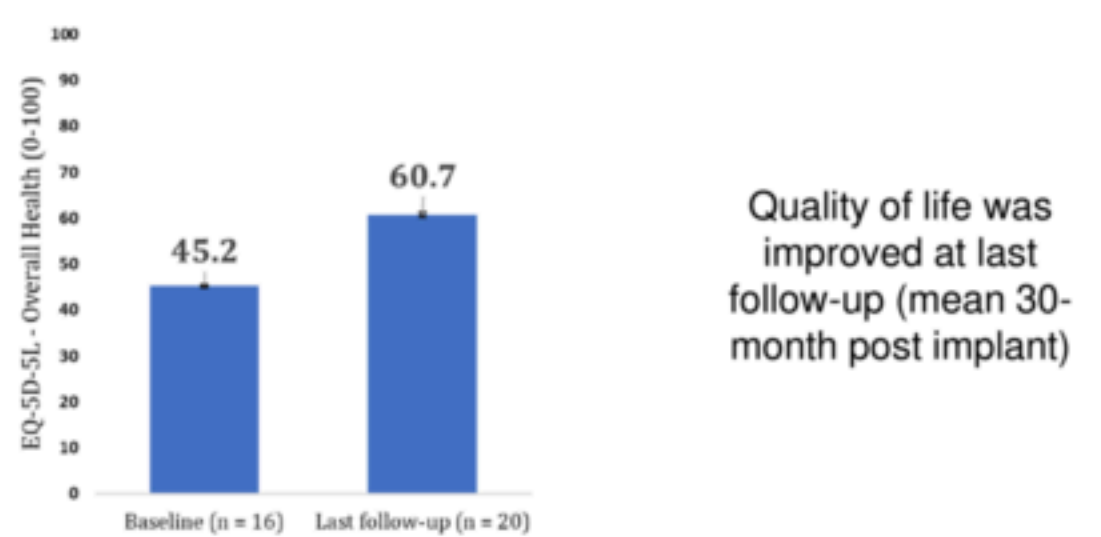
### Overall Pain Scores at 2-years Follow Up



### Low back Pain Scores at 2-years Follow Up



### Quality of Life (EQ-5D-5L Overall Health)



Epidural SCS leads	
Cervical	2 patients
T5-T7	4 patients
<b>T8-T10</b>	<b>12 patients</b>
Not reported	16 patients

Subcutaneous PNFS leads	
Occipital	3 patients
Cervical	6 patients
Thoracic	4 patients
<b>Lumbar</b>	<b>18 patients</b>
Other	3 patients

## CONCLUSIONS

This European, multi-center, observational case-series demonstrates that use of PNFS along-with SCS for chronic pain is effective for patients with chronic pain:

- A mean 4.9-point improvement (7.8 → 3.1,  $p<0.0001$ ) in overall pain (NRS) was noted at 24-month follow-up.
- A mean 4.6-point improvement (7.4 → 3.0,  $p<0.0001$ ) in low back pain (NRS) was noted at 24-month follow-up.

Neuromodulation devices enabling use of up to 4 leads connected to a single IPG, and capable of various neurostimulative waveforms can be utilized to combine SCS and PNFS therapies and provide significant and personalized pain relief.

## REFERENCES

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2. Verrills P, Vivian D, Mitchell B, Barnard A. Peripheral nerve field stimulation for chronic pain: 100 cases and review of the literature. *Pain Med*. 2011 Sep;12(9):1395-405. doi: 10.1111/j.1526-4637.2011.01201.x. Epub 2011 Aug 3. PMID: 21812906