



# Waveform Utilization and Outcomes of Spinal Cord Stimulation in CRPS patients: a Multicenter Real-World Observational Study

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## BACKGROUND

Spinal cord stimulation (SCS) is an established therapeutic option for patients with Complex Regional Pain Syndrome (CRPS) suffering from severe chronic pain. SCS programming customized to the individual needs of each patient is thought to be integral the most effective clinical outcomes when using SCS for management of chronic pain. Recent SCS devices are versatile and offer multiple waveform options with distinct mechanisms of action<sup>1,2</sup>.

One of them is a recently-developed fast-acting sub-perception therapy (FAST)<sup>3,4</sup> which acts on the surround inhibition mechanism and could be a valuable option for CRPS patients<sup>5,6</sup>. Here we report preliminary real-world outcomes from a subset of 78 CRPS patients who have been implanted with versatile SCS systems since 2016 and analyze their outcomes and waveform utilization.

## METHODS

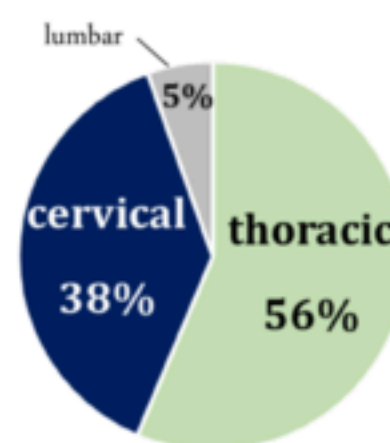
<b>Study Design</b>	Multicenter Consecutive Observational Case-Series (NCT01550575). Data collected by site personnel per standard of care.
<b>Study Device</b>	SCS Systems, Boston Scientific, capable of engaging multiple mechanisms of action: • Fast-Acting Sub-Perception Therapy (FAST) • Customized Field Shape Programming (Contour) • Combination therapy • Illumina3D Algorithm with Multiple Independent Current Control (MICC)
<b>Cohort</b>	Complex Regional Pain Syndrome (CRPS)
<b>Subjects</b>	78 subjects diagnosed with chronic pain secondary to complex regional pain syndrome and treated with a Boston Scientific SCS system

## RESULTS

### Baseline Characteristics (n = 78)

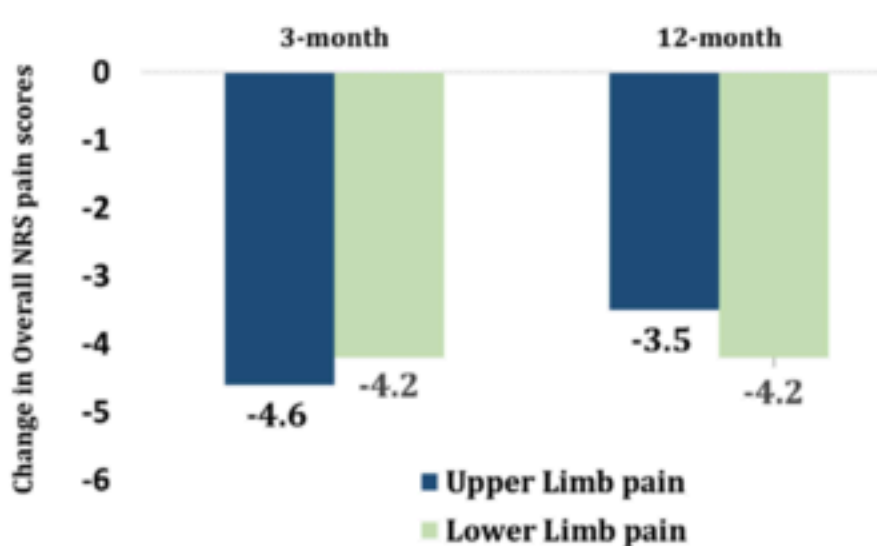
Age (yrs.) - Mean (SD) n	51.6 (10.1) 76
Gender (Female) - % (n/N)	64.1% (50/78)
Location of targeted pain (%)	
Lower limbs - % (n/N)	53.9% (42/78)
Upper limbs - % (n/N)	38.5% (30/78)
Lower limbs and Upper limbs - % (n/N)	7.7% (6/78)
Baseline Overall Pain (NRS)- Mean (SD) n	8.0 (1.4) 78
Follow-up Duration (days) - Mean (SD) n	639.2 (620.0) 77

### Lead type and position

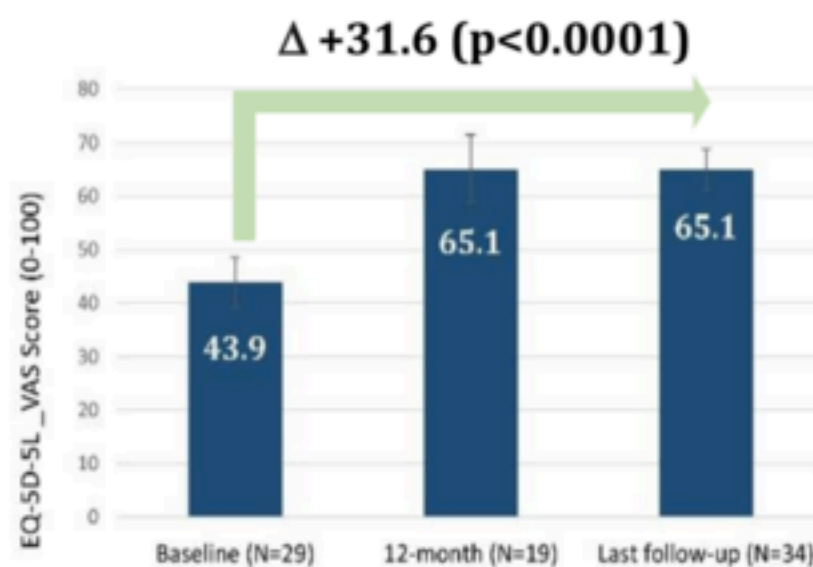


- 78% of patients had percutaneous leads implanted (N=50/64)
- 56% (N=31/55) and 38% (N=21/55) patients had their lead positioned in thoracic and cervical regions respectively.

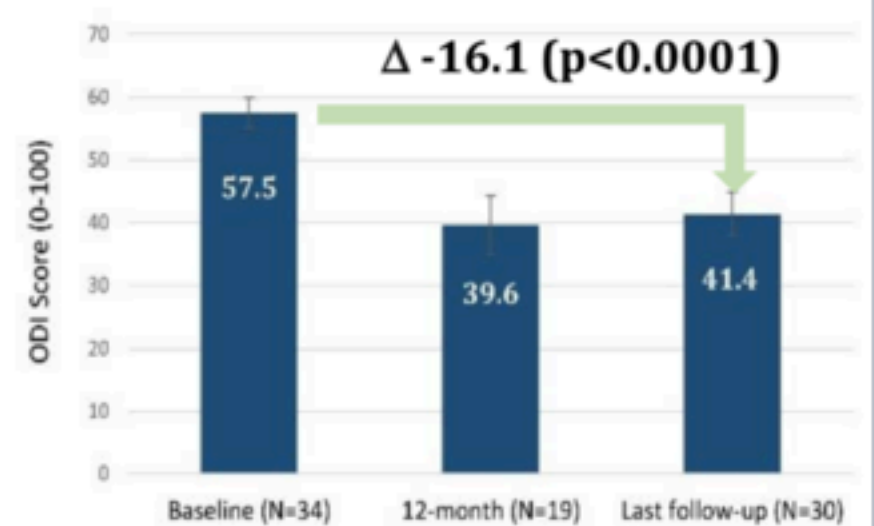
### Change in NRS Overall Pain Scores p<0.0001



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

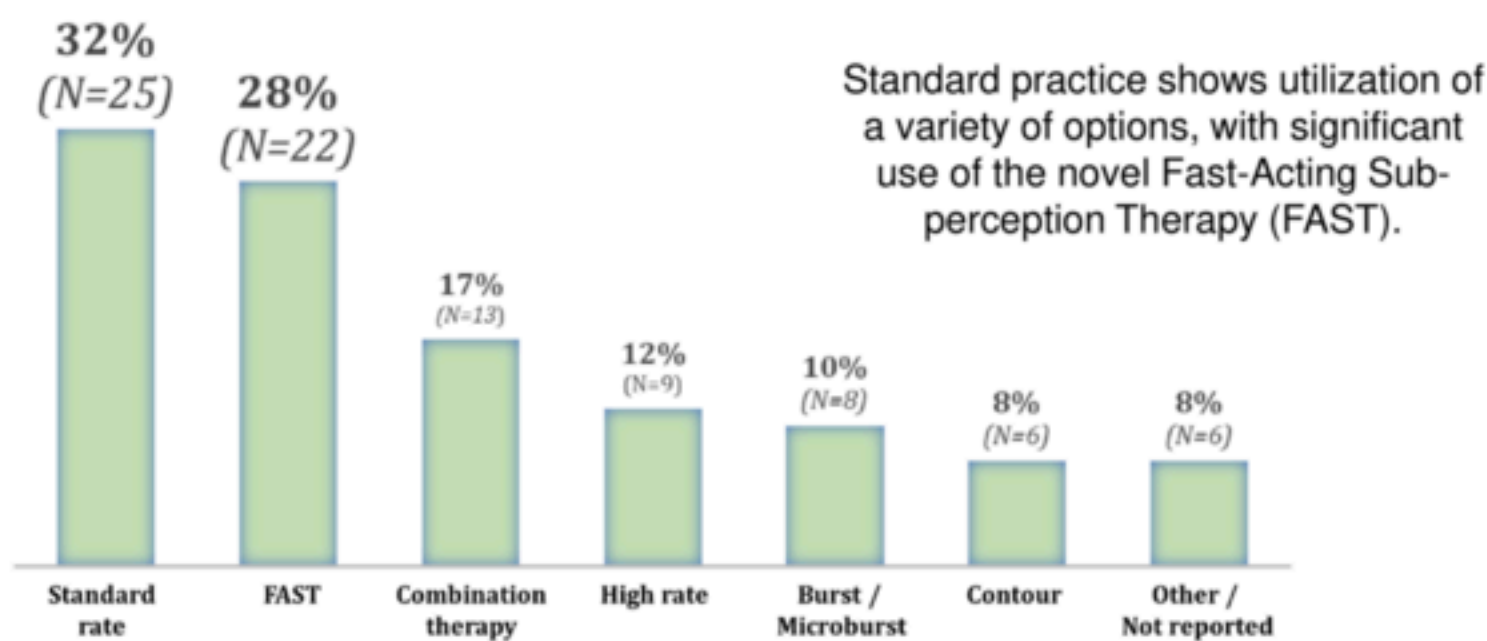


### Mean improvement in Disability (Oswestry Disability Index, ODI)



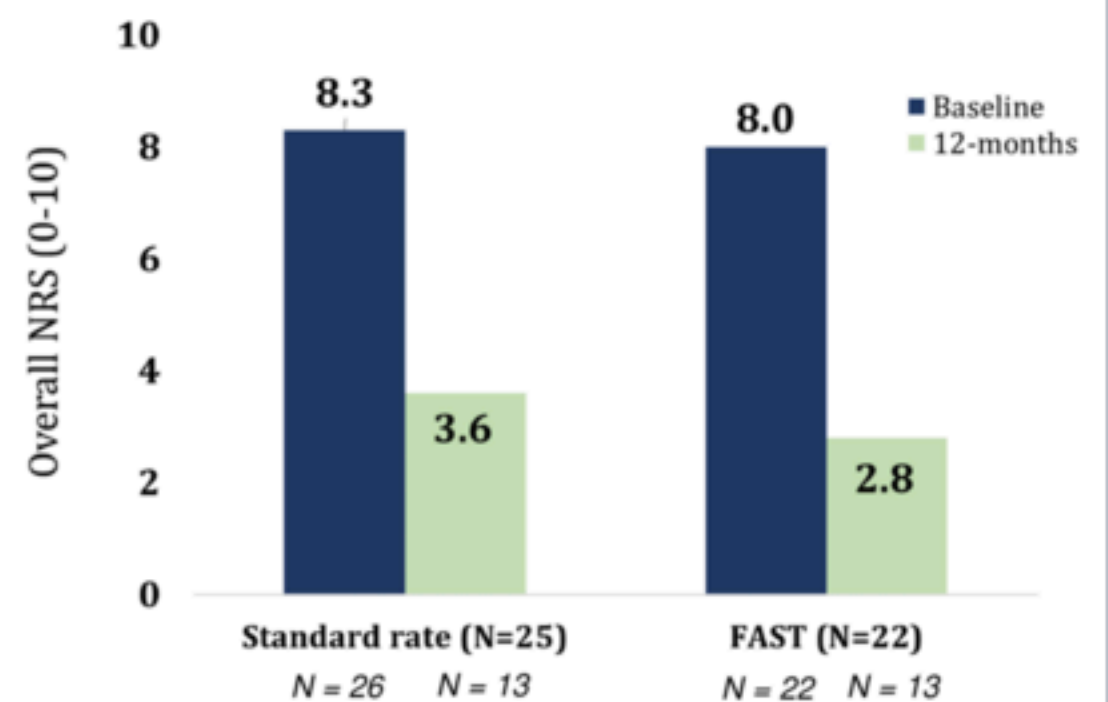
- Significant reduction of overall NRS pain scores at 12-month follow-up, for both patients with Upper and Lower limb CRPS
- Significant improvement in quality of life and disability at last follow-up (2.5 years on average)

### Waveform utilization at last follow-up\* (each patient may have multiple preferences)



\* This chart does not reflect preferences (not all patients received all waveforms). It reflects standard practice at study sites.

### Overall Pain Scores with most commonly used waveforms



## CONCLUSIONS

Preliminary results show that personalization of SCS therapy led to significant improvements in pain relief, disability, and quality of life in patients with CRPS. At 12-month follow-up, NRS pain scores were decreased by 3.5-point and 4.2-point for patients with upper and lower limb pain respectively. ODI and EQ-5D-5L scores were improved significantly by 16.1-point (p<0.0001) and 31.6-point (p<0.0001) respectively. Standard practice shows significant utilization (28%) of the novel fast-acting sub-perception therapy. FAST therapy led to significant pain relief at 12-month follow-up (8.0/10 → 2.8/10). SCS is diverse and offers the possibility to use waveforms with different mechanisms of action.

## REFERENCES

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