# Long-Term Clinical Outcomes with Fast-Acting Sub-perception Spinal Cord Stimulation for Chronic Pain

Magdalena Anitescu[1], Eric Loudermilk[2], James North[3], Sayed Wahezi[4], Ajay Antony[5], Tim Leier[6], Drew Trainor[7], John Noles[8], Gregory Moore[9], Jennifer Lee[10], Julio Paez[11], Derron Wilson[12], and Edward Goldberg[13]

1. University of Chicago Medical Center, Anesthesia and Critical Care Medicine, Chicago, IL USA 2. Piedmont Comprehensive Pain Management Group, PCPMG Clinical Research Unit LLC, Greenville, SC USA 3. Carolinas Pain Institute and Center for Clinical Research, Winston-Salem, North Carolina, USA 4. Multidisciplinary Pain Program, Montefiore Medical Center, Bronx, NY USA 5. The Orthopaedic Institute, Gainesville, Florida, USA 6. Vitamed Research, Palm Desert, California, USA 7. The Denver Spine and Pain Institute, Denver, CO USA 8. Spine and Pain Specialists, Shreveport, LA USA 9. Pacific Sports and Spine, Eugene, Oregon, USA 10. Department of Sports & Spine, Evergreen Health Medical Group, Kirkland, WA USA 11. South Lake Pain Institute, Clermont, Florida, USA 12. Goodman Campbell Brain & Spine; Ascension St. Vincent's Carmel, IN, USA 13. Boston Scientific Neuromodulation, Valencia, CA, USA

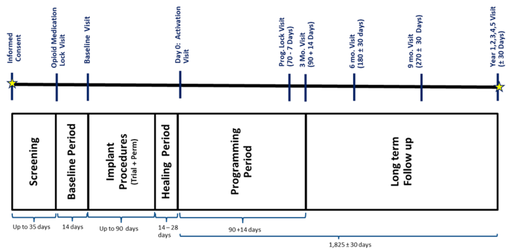
## BACKGROUND

Fast-Acting Sub-perception Therapy (FAST) has demonstrated robust and rapid (seconds to minutes) onset of analgesia in chronic pain patients implanted with Spinal Cord Stimulation (SCS) systems.[1]

Surround Inhibition is a well-established neural mechanism in the published literature. Recently published work suggests that FAST engages the surround inhibition mechanism of action (MOA) and computational modeling suggests that FAST activates dorsal column axons and inhibits dorsal horn projection neurons.[2] Data derived from the long-term, real-world with use of FAST-SCS has now shown sustained improvement up to 3-year follow-up.[3–5] We studied the effectiveness of FAST-SCS in a prospective, multicenter, single-arm clinical study and in this report, we present preliminary 2-year outcomes.

## METHODS

| | |
|---|---|
| **Study Design** | Prospective, multicenter, single-arm study (NCT04618471) |
| **Study Device** | Boston Scientific WaveWriter SCS Systems |
| **Primary Endpoint** | Proportion of subjects with ≥50% reduction from Baseline Visit in average targeted pain intensity at 3-months post-activation |
| **Secondary endpoints** | Secondary endpoints*: Pain intensity (VNRS), disability (ODI), mobility (6MWT, TUG), health-related quality of life (EQ5D-5L), emotional health (BDI, PCS), sleep quality (PSQI), and patient satisfaction (PGIC) |




*VNRS: Verbal Numerical Rating Scale; ODI: Oswestry Disability Index; 6MWT: 6-min Walk Test; TUG: Time Up-and-Go; BDI: Back Depression Inventory; PCS: Pain Catastrophizing Scale; PSQI: Pittsburgh Sleep Quality Index; PGIC: Patient Global Impression of Change

## RESULTS

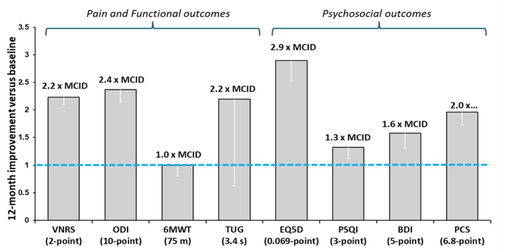
### Baseline characteristics and FAST-SCS activation

| | |
|---|---|
| Age (yrs.) - Mean (SD) n | 59.8 (12.5) 56 |
| Gender (Female) - % (n/N) | 64.3% (36/56) |
| Average Overall Pain (VNRS) - Mean (SD) n | 7.39 (0.13) 56 |
| Disability (ODI) - Mean (SD) n) | 51.68 (8.36) 56 |
| **Onset of Pain Relief post-FAST Activation (mean time – minutes)** | |
| 50% Pain Relief (48 of 56) | 2.6 minutes |
| 75% Pain Relief (43 of 56) | 4.3 minutes |
| 100% Pain Relief (30 of 56) | 4.2 minutes |

## 1-YEAR OUTCOMES

### Multidimensional* outcomes at 12-months

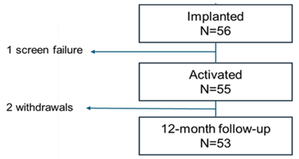
**Responses to FAST-SCS were at or above the minimal clinically important differences across all dimensions**




**Clinical endpoints (MCID values).** *Error bars represent standard errors*

### Patient Survey at 12-month follow-up

| Statement | "Agree", % (n/N) |
|---|---|
| Achieving pain relief before leaving my physician's clinic gave me confidence that my SCS therapy was working | 85% (29/34) |
| I find it easy to control my SCS therapy | 97% (33/34) |
| I am satisfied with the frequency of charging my SCS implant | 82% (28/34) |

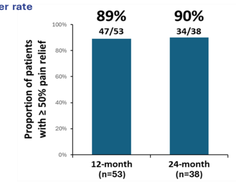



*Ongoing follow-up*

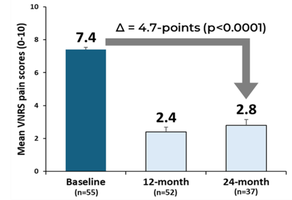
*To date, 39 patients have completed their 2-year visit*

## 2-YEAR OUTCOMES

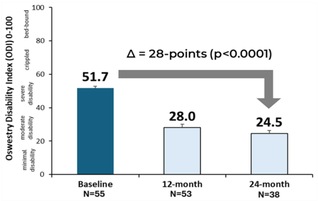
**Responder rate**




**Low back pain**




**Disability**




**Sustained outcomes out to 2-years after FAST-SCS activation**

## CONCLUSIONS

In this ongoing prospective study, FAST-SCS therapy engaging with the Surround Inhibition MOA provided for significant outcomes out to 2 years.

1-year results showed clinically significant outcomes across multiple dimensions, including objective functional assessments and psychosocial endpoints.[6]

Preliminary 2-year results showed:

- 4.7-point reduction of low back pain (p<0.0001)
- 28.0-point improvement in ODI (p<0.0001)
- ≥90% responder rate & patient satisfaction

Results are consistent with prior reports.[3–5]

### REFERENCES

1. Metzger CS. et al. A novel fast-acting sub-perception spinal cord stimulation therapy enables rapid onset of analgesia in patients with chronic pain. Expert Rev Med Devices. 2021 Mar;18(3):299-306.
2. Gilbert JE, Titus N, Zhang T, Esteller R, Grill WM. Surround Inhibition Mediates Pain Relief by Low Amplitude Spinal Cord Stimulation: Modeling and Measurement. eNeuro. 2022 Sep 22:ENEURO.0058-22.2022.
3. Bayert S, et al. Two-Year Outcomes Using Fast-Acting, Sub-Perception Therapy for Spinal Cord Stimulation: A European, Real-World, Multicenter Experience. J Clin Med. 2024 Nov 20;13(22):6999.
4. Metzger C, Hammond B, Ferro R, North J, Pyles S, Kranenburg A, et al. Two-year outcomes using fast-acting sub-perception therapy for spinal cord stimulation: results of a real-world multicenter study in the United States. Expert Rev Med Devices. 2025
5. Ferro R, North J, Kranenburg A, Pyles S, Dorenkamp C, Poston J, Schneider J, Auten K, Goldberg E. Automated Neural Dosing for Fast-Acting Subperception Therapy: Sustained Spinal Cord Stimulation Outcomes from a Multicenter Study. Pain Ther. 2025 Aug;14(4):1417-1429. doi: 10.1007/s40122-025-00758-y. Epub 2025 Jul 3. PMID: 40603812; PMCID: PMC12279662.
6. Levy RM, Mekhail N, Abd-Elsayed A, Abejón D, Anitescu M, Deer TR, Eldabe S, Goudman L, Kallewaard JW, Moens M, Petersen EA, Pilitsis JG, Pope JE, Poree L, Raslan AM, Russo M, Sayed D, Staats PS, Taylor RS, Thomson S, Verrills P, Duarte RV. Holistic Treatment Response: An International Expert Panel Definition and Criteria for a New Paradigm in the Assessment of Clinical Outcomes of Spinal Cord Stimulation. Neuromodulation. 2023 Jul;26(5):1015-1022. doi: 10.1016/j.neurom.2022.11.011. Epub 2023 Jan 4. PMID: 36604242.

### DISCLOSURES

Study Sponsored by Boston Scientific.
Drs. North, Trainor, and Engle have a consulting agreement with Boston Scientific
Edward Goldberg is an employee of Boston Scientific

**November 5-7, 2026**

**JW Marriott Tampa Water Street | Tampa, Florida**

#ASRAFALL26

